



THE REGULATION OF MOBILE MONEY

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ABSTRACT

This thesis examines the regulation of ‘mobile money’. This is an electronic payment and storage service provided by phone companies (‘mobile money firms’ or ‘MM firms’). The first mobile money service, M-Pesa, was launched in Kenya in 2007. Since then, mobile money has spread rapidly throughout the developing world, particularly across Africa. A novel feature of mobile money is its ability to serve large numbers of people who do not have bank accounts, commonly labelled ‘the unbanked’.

The thesis offers a framework, based on a functional approach, to analyse the key regulatory and policy issues that arise when customers’ funds are stored and transferred within mobile money platforms. The objectives of this framework are drawn from traditional financial regulation, such as financial stability and consumer protection, and ‘financial inclusion’, which involves connecting the unbanked to formal, electronic payment and storage functions.

The thesis makes three main claims. First, mobile money operates as a *shadow retail deposit* system. Mobile money is ‘shadow’ because a customer contracts with a non-banking firm. It is ‘retail’ because the system meets the payment needs of individuals for ordinary transactions. And the service is a ‘deposit’ system because a mobile money account provides payment and storage functions which are functionally equivalent to a bank deposit.

Second, mobile money provides these payment and storage functions, functionally equivalent to a bank deposit, through a *different legal structure* to that

used by a bank to provide deposit account services. This structure, which is established through private ordering, comprises a set of mechanisms by which the MM firm (the ‘agent’ in the service) and its associates credibly commit to safeguard the funds of the mobile money customers (the ‘principals’) for the purposes of providing payment and storage functions.

Collectively, these commitments require the MM firm to maintain a 1:1 relationship between cash received from customers, which is stored within the system as highly liquid assets, and ‘e-money’ which customers use in the mobile money service. As a result, mobile money customers face primarily operational risks, usually without the credit and liquidity risks associated with banking.

Third, public ordering can increase the efficiency of MM firms’ commitments in addressing risks in mobile money platforms through adopting an *‘active’ approach* to regulation. In this approach, the policymaker monitors a greater range of risks and more closely than what might be expected in other comparable principal-agent relationships, such as retail investors and financial intermediaries, and depositors and banks. This approach is appropriate because unbanked customers are likely to face significant information asymmetries with MM firms and coordination problems amongst themselves. This means they are unlikely to effectively monitor a range of risks to the service caused by the MM firm and its associates.

DPHIL IN LAW: THE REGULATION OF MOBILE MONEY

JONATHAN GREENACRE

OVERVIEW

Table of Contents

ABSTRACT	2
ABBREVIATIONS	9
STATUTES AND OTHER PRIMARY LEGAL SOURCES	10
DIAGRAMS AND TABLES	12
MAIN BODY	13
CHAPTER 1: INTRODUCTION	14
Introduction	14
1.1 Introduction to Mobile Money	14
1.2 Motivation for Thesis	16
1.2.1 Economic Benefits to the ‘Unbanked’	17
1.2.1.1 The Ability to Reach the Unbanked	17
1.2.1.2 The Economic Benefits of ‘Financial Inclusion’	18
1.2.1.3 The Benefits of Mobile Money	20
1.2.2 Sustainability.....	31
1.2.2.1 Banking’s Business Model	34
1.2.2.2 Mobile Money’s Business Model	36
1.2.3 The Regulatory Lag.....	45
1.2.3.1 High Donor and Policy Enthusiasm for Mobile Money	45
1.2.3.2 Limited Scholarship About the Regulation of Mobile Money	48
1.2.3.3 Why the Regulatory Lag Matters.....	57
1.3 Structure	64
CHAPTER 2: AIMS, METHODOLOGY, AND CLAIMS	67
2.1 Aims	67
2.2 Methodology	67
2.2.1 Functional Approach.....	68
2.2.2 Economic Approach to Regulation	68
2.2.2.1 Starting Point for Regulation – The Efficiencies of Markets	69
2.2.2.2 Responding to Market Failures.....	73
2.2.3 Applying the Framework to Mobile Money	76
2.2.3.1 Aim	76
2.2.3.2 Component Steps	77
2.2.4 Subject Matter and Assumptions	81

2.2.4.1 Materials for Analysis.....	81
2.2.4.2 Assumptions and Areas of Focus.....	82
2.3 Claims.....	84
2.3.1 Mobile Money: A Shadow Retail Deposit System	85
2.3.1.1 Shadow.....	85
2.3.1.2 Deposit.....	85
2.3.1.3 Retail.....	94
2.3.2 Legal Structure.....	96
2.3.2.1 Functions.....	97
2.3.2.2 Market Failures and Risks	97
2.3.2.3 Private Ordering.....	103
2.3.2.4 Public Ordering.....	112
2.3.3 The Active Approach	114
2.3.3.1 Limited Ability to Use Governance Strategies – an ‘Active’ Approach	115
2.3.3.2 Resource Constraints	119
2.3.3.3 Policy Trade-Offs	126
CHAPTER 3: CONFLICT OF INTEREST BETWEEN SHAREHOLDERS AND CUSTOMERS	129
Introduction.....	129
3.1. Function	133
3.1.1 Introduction.....	133
3.1.2 Limited Policy Attention to Storage	133
3.1.3 Limited Research on Storage	136
3.2 Market Failures and Risks.....	137
3.3 Private Ordering	139
3.3.1 Commitments.....	139
3.3.1.1 Holding Company.....	140
3.3.1.2 Trust Arrangement.....	141
3.3.1.3 Narrow Banking.....	143
3.3.1.4 Conclusion	144
3.3.2 Analysis.....	145
3.3.2.1 The Holding Company Structure	145
3.3.2.2 Limitations of Trust Instruments	146
3.3.2.3 Governance Strategies	148
3.3.3 Conclusion.....	156
3.4 Public Ordering.....	157
3.4.1 Ex Ante.....	157
3.4.1.1 Dissuade People from Viewing Mobile Money As Storage.....	157
3.4.1.2 Capital Requirements.....	160
3.4.1.3 Active Approach	163
3.4.1.4 Conclusion from Public Ordering.....	171
3.4.2 Ex Post	172
3.4.2.1 Deposit Insurance	172
3.4.2.2 Special Resolution Scheme.....	176
Conclusion	178
CHAPTER 4: THE BALANCE SHEET OF THE MMHC.....	180
Introduction.....	180
4.1. Function	183

4.1.1 Introduction.....	183
4.1.2 Literature.....	185
4.2 Market Failures and Risks.....	186
4.3 Policy Objectives.....	186
4.3.1 Safety.....	187
4.3.2 Compliance Costs.....	189
4.3.3 Interest Payments.....	190
4.4 Trust Assets.....	191
4.4.1 Central Bank.....	191
4.4.2 Government Bonds.....	193
4.4.3 Corporate Bonds.....	197
4.4.4 Commercial Bank.....	198
4.4.4.1 The Introduction of Credit, Liquidity, and Maturity Transformation.....	199
4.4.4.2 Public Ordering.....	201
4.4.4 Conclusion.....	204
4.5 Additional Proposals.....	205
4.5.1 MMMF.....	205
4.5.1.1 Benefits.....	205
4.5.1.2 Costs.....	206
4.5.2 Central Bank Plus Interest.....	207
4.5.2.1 Benefits.....	207
4.5.2.2 Challenges.....	208
Conclusion.....	211
CHAPTER 5: FUNDS CONVERSION.....	213
Introduction.....	213
5.1 Function.....	217
5.1.1 Operation of the Service.....	217
5.1.2 Function.....	219
5.1.3 Policy Emphasis on Growth.....	220
5.1.4 Literature.....	221
5.2 Market Failures and Risks.....	223
5.2.1 The Agency Problem.....	223
5.2.1.1 Performing the Funds Conversion Transaction As Required.....	224
5.2.1.2 Illiquidity.....	226
5.2.2 Consequence of the Agency Problem.....	227
5.2.2.1 Uncorrelated Illiquidity.....	227
5.2.2.2 Correlated Illiquidity.....	229
5.3 Private Ordering.....	235
5.3.1 Commitments.....	237
5.3.1.1 Commitments.....	237
5.3.1.2 Residual Risks.....	239
5.3.2 Governance Arrangements.....	242
5.3.2.1 Governance Strategies for Customers.....	242
5.3.2.2 Institutional Arrangements.....	244
5.4 Public Ordering.....	251
5.4.1 Ex Ante.....	252
5.4.1.1 MM Firm Liability and an Active Approach.....	252
5.4.1.2 Screening, Training, and Monitoring, Procedures.....	255

5.4.1.3 Capital Requirements.....	256
5.4.1.4 Conclusion	257
5.4.2 Ex Post	258
5.4.2.1 Back-Up Systems.....	258
5.4.2.2 Public Notification Systems.....	259
Conclusion	260
CHAPTER 6: PAYMENT	263
Introduction.....	263
6.1 Function	266
6.1.1 Introduction	266
6.1.2.1 Non-interoperable	267
6.1.2.2 Interoperable	268
6.1.2 Limited Literature on Risks	270
6.2 Market Failure and Risks	272
6.3 Non-Interoperable.....	273
6.3.1 The Payment Function	273
6.3.2 Market Failures and Risks.....	274
6.3.3 Private Ordering.....	275
6.3.3.1 Commitments.....	276
6.3.3.2 Governance Strategies	277
6.3.4 Public Ordering	279
6.3.4.1 Reduce Monetary Cost in Existing Private Ordering	280
6.3.4.2 Regulatory Strategies.....	281
6.3.4.3 Direct Public Monitoring.....	283
6.3.5 Conclusion.....	285
6.4 Interoperable	286
6.4.1 Function.....	286
6.4.2 Market Failures and Risks.....	287
6.4.3 Private Ordering	289
6.4.3.1 Commitments.....	290
6.4.3.2 Governance Tools	295
6.4.3.3 Conclusion	297
6.4.4 Public Ordering	297
6.4.4.1 Design and Monitor Operating Systems.....	298
6.4.4.2 Accelerated Resolution Regimes	300
Conclusion	301
CHAPTER 7: CONCLUSION	305
Introduction.....	305
7.1 The Key Findings from the Thesis	305
7.2 Institutional Design of Banking and Payment Systems.....	307
7.2.1 Mobile Money	308
7.2.2 Banking and Payment Systems	310
7.2.2.1 Design of Financial Systems.....	310
7.2.2.2 Rise of Financial Inclusion	311
7.2.2.3 The Design of Payment Systems	313
7.2.3 An Insulated Retail Payments and Storage System	315
7.3 Next Steps in Research	318

7.3.1 Potential Behavioural Problems of Unbanked	319
7.3.2 Financial Crime	321
7.3.3 Competition.....	323
7.3.4 Political Economy and Institutional Design.....	325
7.3.5 Reputation	326
7.3.6 Trusts.....	327
7.3.7 Systemic Risk.....	327
Conclusion	331
BIBLIOGRAPHY	334

ABBREVIATIONS

AFI	Alliance for Financial Inclusion
AML	Anti-Money Laundering
ATM	Automated Teller Machine
BoT	Bank of Tanzania
CBA	Commercial Bank of Africa
GSMA	Global System for Mobile Association
Ksh	Kenyan shilling
KYC	Know Your Customer
MM firm	Mobile Money Firm
MMMF	Money Market Mutual Fund
MMHC	Mobile Money Holding Company
MPHC	M-Pesa Holding Company
NPS Regulations	National Payment System Regulations 2014
WAEMU	West African Economic and Monetary Union

STATUTES AND OTHE PRIMARY LEGAL SOURCES

Country	Legal Instrument	Page Reference
Bolivia	Circular ASFI/102/2011	188
	Recompilation of Regulations for Banks and Financial Institutions 2008	188
Chad	Regulation on E-Money Issuance 2011	146, 188
Congo	Instruction on E-Money Issuance 2011	146, 188
Colombia	Decreto 1491 de 13 July 2015	188
El Salvador	Ley para Facilitar la Inclusion Financiera	146, 188
European Union	Regulation No. 575/2013	16
Ghana	E-Money Guidelines 2015	141, 188
	Mobile Money Guidelines 2015	198
Kenya	Banking Act 1995	208
	Prevention of Terrorism Act 2012	254
	Proceeds of Crime and Anti-Money Laundering Act 2009	254
	National Payment System Act 2011	83
	National Payment System Regulations 2014	78, 80, 95, 118, 208, 209, 141, 160, 164, 167, 175, 188, 190, 198, 252, 254, 255, 257, 270, 280, 283
Lesotho	Guidelines on Mobile Money 2013	141, 188, 198
Malawi	Guidelines for Mobile Payment Systems 2011	141, 188, 198
Malaysia	Central Bank of Malaysia Act 2009	46

Country	Legal Instrument	Page Reference
Namibia	Determination on Issuing of Electronic Money in Namibia 2012	188, 198
	Guidelines for Issuers of Electronic Money and Other Payment Instruments in Namibia 2012	188, 198
Paraguay	Ley No. 921 de Negocios Fiduciarios	146
The Philippines	Circular 649 2009	188, 193
Sri Lanka	Mobile Payments Guidelines No. 2 of 2011 for Custodian Account Based Mobile Payment Services	167, 188, 198
United Kingdom	Financial Services (Banking Reform) Act 2013	174
United States	Bank Holding Company Act 1956	16
West African Economic and Monetary Union	BCEAO Instruction Regarding E-Money Issuance 2006	146, 188, 193

DIAGRAMS AND TABLES

Table 1: ‘Storage’ Assets Purchased by MM Firms

Diagram 1: The Entry of Funds to M-Pesa

Diagram 2: Mobile Money as an Extension of the Banking System

Diagram 3: Conflict of Interest Between Shareholders of the MM Firm and Customers

Diagram 4: The Balance Sheet of the MMHC

Diagram 5: The Funds Conversion Service of Mobile Money

Diagram 6: The Operation of Wholesale Cash Merchants

Diagram 7: The Operation of Master Cash Merchants

Diagram 8: The Payment Function of Mobile Money

Diagram 9: The Operation of An Interoperable Mobile Money Transfer (Tanzania)

MAIN BODY

CHAPTER 1: INTRODUCTION

Introduction

This Chapter introduces the thesis. It has three parts. The first introduces mobile money and outlines the rapid growth of the service. The second explains the motivation for the thesis. The third outlines the structure of the thesis.

1.1 Introduction to Mobile Money

In March 2007, Safaricom, a Vodafone subsidiary, launched an electronic payments and storage service called M-Pesa in Kenya.¹ Unbeknownst to Safaricom and the customers involved, M-Pesa would have significant ramifications for contemporary thinking on international development and the regulation of banking and payment systems.²

M-Pesa was the world's first 'mobile money' service.³ A customer converts cash for an electronic currency called 'e-money' that is issued by Safaricom (labelled a 'mobile money firm' or 'MM firm' in this thesis).⁴ She performs this cash-in

¹ For a detailed discussion of the work behind launching M-Pesa, see Winifred N. Karugu and Triza Mwendwa,

² For the purpose of this thesis, 'regulation' describes measures imposed by governments on the financial sector, primarily mandatory rules: see John Armour, Daniel Awrey, Paul Davies, Jeffrey Gordon, Colin Mayer and Jennifer Payne, *Principles of Financial Regulation* (Oxford University Press 2016) ch 1, 12.

³ Timothy Lyman, Mark Pickens and David Porteous, 'Regulating Transformational Branchless Banking' (2008) Consultative Group to Assist the Poor, Focus Note No 43 <<http://www.cgap.org/publications/regulating-transformational-branchless-banking>> accessed 29 September 2015, 1.

⁴ See the full definition of 'e-money' in Alliance for Financial Inclusion, 'Mobile Financial Services: Basic Terminology' (2013) Mobile Financial Services Working Group, Guidance Note No 1 <<http://www.afif-global.org/library/publications/mobile-financial-services-basic-terminology-2013>> accessed 29 September 2015: (i) issued upon receipt of funds in an amount no lesser in value than the value of the e-money issued; (ii) stored on an electronic device (e.g. a chip, prepaid card, mobile phone, or computer system); (iii) accepted as a means of payment by parties other than the issuer; and (iv) convertible into cash. Note that in contracts between MM firms and customers, e-money is often defined as electronic monetary value depicted in the customer's mobile money account. For example, see the definition of 'e-money' in Safaricom, 'M-Pesa Terms and Conditions', cl 1.

function at a ‘cash merchant’, which is usually a corner store, post office, or another type of retail outlet. The cash merchant operates on behalf of Safaricom.⁵

The customer can store her funds in the M-Pesa service. She can transfer e-money to other M-Pesa users through text messages on her mobile phone. She can later convert any remaining e-money in her account into cash at a cash merchant.

M-Pesa grew very rapidly. By April 2007, after one month of operations, over 19,000 people had subscribed to the service. By June 2010, this number stood at 10 million. By July 2015, over 20 million Kenyans were using M-Pesa.⁶

Replicator models also grew around the world. By June 2015, mobile money operated in 93 countries, overwhelmingly located in developing regions, particularly in sub-Saharan Africa.⁷ In addition to Kenya, sophisticated mobile money sectors exist in the Philippines, Tanzania, Zambia, and Zimbabwe. In December 2015, mobile money processed over a billion transactions, which is more than double those performed by PayPal.⁸

⁵ Safaricom, ‘M-Pesa Agents’ <<https://www.safaricom.co.ke/personal/m-pesa/get-started-with-m-pesa/m-pesa-agents>> accessed 8 November 2014.

⁶ See Claudia McKay and Rafe Mazar, ‘10 Myths about M-Pesa: 2014 Update’ (2014) Consultative Group to Assist the Poor (CGAP) Update, 1 October 2014 <<http://www.cgap.org/blog/10-myths-about-m-pesa-2014-update>> accessed 29 May 2016; Safaricom, ‘Timeline’ (Safaricom) <http://www.safaricom.co.ke/mpesa_timeline/timeline.html> accessed 29 September 2015. Omar Mohammed, ‘Kenya’s Safaricom Might Have to Spin off M-Pesa, the World’s Largest Mobile Money Business’ (Quartz Africa, 6 July 2015) <<http://qz.com/445114/dominating-mobile-money-could-lead-to-the-break-up-of-kenyas-biggest-mobile-network/>> accessed 20 April 2016.

⁷ GSMA, ‘State of Industry Report: 2015’ (2015) GSMA <http://www.gsma.com/mobilefordevelopment/wp-content/uploads/2016/03/SOTIR_2015.pdf> accessed 28 March 2016, 9 and 13.

⁸ *ibid* 9.

There are now 411 million registered accounts. Of those accounts, 134 million are ‘active’, meaning they were used at least once over a 90-day period.⁹

In many countries, mobile money rivals the retail payments and storage component of the banking sector.¹⁰ For example, Safaricom now has over 37,000 cash merchants, which means this service has a much greater institutional reach than the Kenyan banking system.¹¹ Kenyan banks saw the threat early; in 2008 they lobbied unsuccessfully to have M-Pesa shut down.¹²

Banks in other countries may also have reason for feeling threatened. There are now 10 times more mobile money cash merchants than bank branches in 37 developing countries.¹³ There are more mobile money accounts than bank deposits in 19 countries.¹⁴

1.2 Motivation for Thesis

The thesis is motivated by three related issues. The first is the apparent economic benefits that ‘unbanked’ communities gain when accessing payment and storage functions through mobile money platforms. The second is the potential for mobile

⁹ *ibid* 9.

¹⁰ For the purposes of this thesis, a ‘bank’ means a firm which takes deposits and makes medium- and long-term loans. In doing so, the thesis adopts a definition that is consistent with used in the European Union and United States (see, respectively, Regulation (EU) No. 575/2013, art 4.1(1)) and Bank Holding Company Act 1956, §2(c)) in Armour and others (n 2) ch 14, 295. For ease of analysis, the thesis assumes that retail depositors are the only short term funders of the bank, but notes that in conventional banks, there is usually wider range of entities performing this role.

¹¹ Note Safaricom (n 5).

¹² Ignacio Mas and Dan Radcliffe, ‘Mobile Payments Go Viral: M-PESA in Kenya’ (2010) Bill and Melinda Gates Foundation, March 2010 <http://siteresources.worldbank.org/AFRICAEXT/Resources/258643-1271798012256/M-PESA_Kenya.pdf> accessed 14 December 2016; Ignacio Mas and Dan Radcliffe, ‘Mobile Payments Go Viral: M-PESA in Kenya’ (2010) Bill and Melinda Gates Foundation, March 2010 <http://siteresources.worldbank.org/AFRICAEXT/Resources/258643-1271798012256/M-PESA_Kenya.pdf> accessed 14 December 2016, 2.

¹³ GSMA (n 7) 9.

¹⁴ GSMA (n 7) 7.

money to operate profitably and, as a result, sustainably when serving unbanked people. The third is that scholarship about the regulation of mobile money is lagging far behind its growth. As a result, important components of mobile money may not be effectively regulated. The three subsections below examine each motivation.

1.2.1 Economic Benefits to the ‘Unbanked’

A key motivation for the thesis is the apparent economic benefits that those without a bank account, labelled the ‘unbanked’, appear to derive when using mobile money.¹⁵ This section explores the ability of mobile money to reach the unbanked and the economic functions provided by the service. This section also explains the economic benefits unbanked communities appear to gain by accessing these functions.

1.2.1.1 The Ability to Reach the Unbanked

Studies suggest mobile money reaches low-income groups, including the unbanked. For example, a 2010 study conducted by Jack and Suri of Georgetown University and the Massachusetts Institute of Technology, respectively, found that the unbanked comprise 50% of M-Pesa’s customer base.¹⁶ Furthermore, 59% of M-Pesa’s customer base reside in rural areas where the unbanked tend to live and work.¹⁷

These findings are broadly comparable with other studies which find that mobile money serves low-income communities. For example a 2011 study by Coffey International Development, a consulting firm, found that 41% of mobile money

¹⁵ Asli Demirguc-Kunt, Leora Klapper, Dorothy Singer and Peter Van Oudheusden, ‘The Global Findex Database 2014: Measuring Financial Inclusion Around the World’ (2015) World Bank Policy Research Working Paper 57255, 15 April 2015 <<http://documents.worldbank.org/curated/en/187761468179367706/pdf/WPS7255.pdf>> accessed 20 April 2016, 2.

¹⁶ William Jack and Tavneet Suri, ‘The Economics of M-Pesa: An Update’, (2010) Massachusetts Institute of Technology, Working Paper, October 2010 <http://www.mit.edu/~tavneet/M-PESA_Update.pdf> accessed 28 June 2016.

¹⁷ *ibid* 3.

customers in Pakistan live on less than £1.80 per day.¹⁸ A 2011 study by Intermedia, also a consulting firm, found that one third of mobile money customers live on less than £1.40 per day.¹⁹

1.2.1.2 The Economic Benefits of ‘Financial Inclusion’

This subsection explores the economic consequences that arise when unbanked communities access mobile money. Perhaps the most obvious consequence is that unbanked communities move from informal methods of trading, such as cash and barter, to electronic, formal financial services for the first time.²⁰ The objective of assisting unbanked people to move from informal to electronic, formal financial services has become commonly known as ‘financial inclusion’.²¹ Usually financial inclusion focuses on providing a range of financial services to unbanked communities, such as payment, storage, insurance, and credit.²² This objective motivates an increasing range of policy and regulatory activities, discussed below in Section 1.2.3.1.

¹⁸ Chris Bold, ‘Does Branchless Banking Reach Poor People? The Evidence from Pakistan’, (2011) Consultative Group to Assist the Poor (CGAP) Blog, 7 June 2011 <<http://www.cgap.org/blog/does-branchless-banking-reach-poor-people-evidence-pakistan>> accessed 30 March 2016.

¹⁹ A degree of caution is required with such studies given mobile money, as an industry, is still in a relatively early stage of development. Furthermore, many of the surveys are conducted or financed by the mobile money industry which may encourage a selection bias amongst survey results: see scepticism from Mark Pickens, David Porteous and Sarah Rotman, ‘Scenarios for Branchless Banking in 2020’ (2009) Consultative Group to Assist the Poor (CGAP) Focus Note 57 <<http://www.cgap.org/sites/default/files/CGAP-Focus-Note-Scenarios-for-Branchless-Banking-in-2020-Oct-2009.pdf>> accessed 20 April 2016, 3.

²⁰ Financial instruments are loosely termed ‘informal’ because they are not subject to formal legal and regulatory arrangements: see a discussion of informal employment in Françoise Carré and James Heintz, ‘Issues in Developing a Common Framework on Informal Employment’ (2009) Women in Informal Employment: Globalizing and Organizing, Research Paper, January 2009 <http://wiego.org/sites/wiego.org/files/publications/files/Carre_and_Heintz_Common_Framework.pdf> accessed 28 December 2016, 3-4.

²¹ United Nations Secretary-General’s Special Advocate for Inclusive Finance for Development, ‘Financial Inclusion’ (UNSGSA, 2015) <<http://www.unsgsa.org/about/financial-inclusion>> accessed 29 September 2015; see similar definitions from Centre for Financial Inclusion, ‘Financial Inclusion Glossary’ (Centre for Financial Inclusion, 2015) <<http://www.centerforfinancialinclusion.org/publications-a-resources/financial-inclusion-glossary>> accessed 29 September 2015.

²² *ibid.* And See Basel Committee on Banking Supervision, ‘Range of Practice in the Regulation and Supervision of Institutions Relevant to Financial Inclusion’ (2015) Bank for International Settlements, January 2015, 3 <<http://www.bis.org/bcbs/publ/d310.pdf>> accessed 20 April 2016.

Mobile money contributes to financial inclusion objectives by enabling unbanked customers to access the following two functions which are available through the service. The first is a *payment* function. Like other payment instruments, mobile money enables transfers of value between agents.²³ This is because a customer can transfer units of ‘e-money’ to fellow customers, merchants, and other actors that accept payments of this kind. The second function of mobile money is *electronic storage of funds*. This is because a mobile money customer can store money in electronic form, add additional funds, transfer value to other customers in the form of a payment, and redeem some or all of her remaining balance of e-money for cash which she can use for her own consumption.²⁴

Chapter 2, Section 2.3.1 explains the function of mobile money in greater depth. For the purposes of discussing the motivation of the thesis, it is sufficient to explain that mobile money enables unbanked customers to access electronic payment and storage functions. In turn, this means for the purposes of the thesis, ‘financial inclusion’ does not take the conventional definition of enabling the unbanked to access a full suite of financial services. Instead this term focuses on enabling unbanked people to shift from informal tools to electronic, formal payment and storage functions, which they can access through mobile money platforms.²⁵

²³ A payment is a transfer of value between agents: see Benjamin Lester, Stephen Millard and Matthew Willison, ‘Optimal Settlement Rules for Payment Systems’ in Andrew Haldane, Stephen Millard and Victoria Saporta (eds), *The Future of Payment Systems* (Routledge 2007), 1891. A payment system is ‘the set of rules, institutions, and technical mechanisms for the transfer of money’: Summers (ed) (n 50) 112. See a similar definition in Benjamin Geva ‘The Concept of Payment Mechanism’ (1986) 24 Osegoode Hall LJ 1.

²⁴ Text to below n 222.

²⁵ Note that the CBK conceived of financial inclusion in terms of a payment function: text to n 119.

1.2.1.3 The Benefits of Mobile Money

The next component of the motivation of the thesis is the economic *benefits* unbanked people appear to gain when shifting from informal financial tools, particularly cash, to mobile money platforms.²⁶ This shift is correlated with an improved ability to build and protect assets, which in turn is linked to improvements in risk-sharing, higher savings, and greater consumption.²⁷ More specifically, studies have found the income of M-Pesa users increased by up to 30% after they started using the service.²⁸ Other studies have shown economic shocks had no impact on the household income of M-Pesa users. In contrast, the income of statistically-comparable non-users fell on average 7%.²⁹

Additional empirical material focuses on the apparent economic benefits unbanked and low-income communities gain when accessing specific functions of mobile money. Much of this material focuses on the apparent advantages of mobile money over cash, rather than the other informal tools unbanked people often use to meet their economic and liquidity needs, such as deposit collectors, money lenders,

²⁶ However, the results have been a surprise to the international development community, which has traditionally focused on providing credit to the unbanked. The most famous effort was ‘micro-credit’, which involves providing small loans to groups of unbanked people, usually village women. This scheme became particularly famous in 2006 when the Bangladesh Grameen Bank and its founder, Muhammad Yunus, won the Nobel Prize: see discussion of the early history of micro-credit in Muhammed Yunus, *Banker to the Poor: Microlending and the Battle Against World Poverty* (Public Affairs 2003).

²⁷ William Jack and Tavneet Suri, ‘Risk Sharing and Transactions Costs: Evidence from Kenya’s Mobile Money Revolution’ (2014) 104(1) *American Economic Review*, January 2014 <http://www.mit.edu/~tavneet/Jack_Suri.pdf> accessed 14 December 2016. William Jack, Thomas M. Stokera and Tavneet Suri, ‘Documenting the Birth of a financial economy’ (2012) 109(26) *Proceedings of the National Academy of Sciences of the United States of America*, June 2012 <<http://www.pnas.org.ezp.lib.unimelb.edu.au/content/109/26/10257.full.pdf>> accessed 14 December 2016.

²⁸ Olga Morawczynski and Mark Pickens, ‘Poor People Using Mobile Financial Services: Observations on Customer Usage and Impact from M-PESA’ (2009) Consultative Group to Assist the Poor (CGAP) Brief, August 2009 <<https://www.cgap.org/sites/default/files/CGAP-Brief-Poor-People-Using-Mobile-Financial-Services-Observations-on-Customer-Usage-and-Impact-from-M-PESA-Aug-2009.pdf>> accessed 14 December 2016, 3.

²⁹ Simone di Castri and Jeremiah Grossman, ‘Impact of Mobile Money on Financial Inclusion and Other Public Policy Objectives’ (2015) Groupe Speciale Mobile Association (GSMA), *Financial Inclusion 2020 Week*, 4 November 2015, 17.

rotating savings and credit associates (ROSCA), and storing value in the form of livestock.³⁰

The thesis takes the same approach and uses cash as the baseline informal financial instrument against which the benefits and costs of mobile money can be assessed. This approach is useful because cash is the most commonly used financial instrument in the informal sector.³¹ Cash is also particularly relevant to payment and storage functions. Unbanked and low-income people use cash extensively for payments in which the payor and payee can physically meet. These people also use cash for remote payments, usually by entrusting its transfer to bus drivers and other informal counterparties.³² Cash is also used for storage. Low-income and unbanked people usually store cash in a range of ways. These include in one or more locations

³⁰ A ROSCA is a group of individuals who agree to meet for a defined period in order to save and borrow together. These clubs are owned and managed by their members. The participants make regular contributions to a fund, the total of which is given, in whole or in part, to each contributor in rotation. So each member of the ROSCA contributes the same amount at each meeting, and one member takes the whole sum once. This model provides a form of storage, because the customer can provide funds during each meeting knowing she can obtain cash in a large sum during the life of the ROSCA, which she can use for whatever purposes she deems necessary. See further information in Stuart Rutherford, 'The Poor and Their Money' (1999) Institute for Development Policy and Management, University of Manchester, January 1999 <<http://www.jointokyo.org/mfdl/readings/PoorMoney.pdf>> accessed 14 December 2016. See also Daryl Collins, Jonathan Morduch, Stuart Rutherford and Orlanda Ruthven, *Portfolios of the Poor: How the World's Poor Live on \$2 a Day* (Princeton University Press, 2009).

³¹ Research tends to find cash counts for 85% of consumer transactions across developed and developing countries: Kevin Mellyn, 'Broken Markets: A User's Guide to the Post-Finance Economy' (2012) 11, cited in Hal Scott, 'The Importance of the Retail Payment System' (2014) Harvard Law School, 16 December 2014 <<https://dash.harvard.edu/bitstream/handle/1/16883011/hal-scott---mastercard-retail-payment-systems.pdf?sequence=1>> accessed 20 April 2016, 3. Surveys tend to find that cash is used particularly extensively for low value transactions in developing countries, particularly in Africa: John Bagnall, David Bounie, Kim P. Huynh, Anneke Kosse, Tobias Schmidt, Scott Schuh and Helmut Stix, 'Consumer Cash Usage: A Cross-Country Comparison with Payment Diary Survey Data' (2016) 12(4) International Journal of Central Banking, December 2016, 1 <<http://www.ijcb.org/journal/ijcb16q4a1.pdf>> accessed 23 December 2016, 53; Johanna Godoy, Bob Tortora, Jan Sonnenschein and Jake Kendall 'Payments and Money Transfer Behavior of Sub-Saharan Africans' (2012) The Gallup Organisation, 1 June 2012 <<https://www.microfinancegateway.org/sites/default/files/mfg-en-paper-payments-and-money-transfer-behavior-of-sub-saharan-africans-jun-2012.pdf>> accessed 23 December 2016, 39; See also the discussion of the extensive use of cash amongst low-income communities in Collins and others (n 30).

³² Susan Johnson, 'Competing Visions of Financial Inclusion in Kenya' (2014) Bath Papers in International Development and Wellbeing, Centre for Development Studies, Working Paper 30, March 2014 <<http://www.bath.ac.uk/cds/publications/bpd30.pdf>> accessed 14 December 2016. Isaac Mbiti and David N. Weil, 'Mobile Banking: The Impact of M-Pesa in Kenya' (2011) National Bureau of Economic Research, Working Paper 17129, June 2011 <<http://www.nber.org/papers/w17129.pdf>> accessed 14 December 2016; Jonathan Greenacre, Louise Malady and Ross Buckley, 'The Regulation of Mobile Money in Malawi: Progress Report' (2014), Centre for International Finance and Regulation (CIFR), March 2014. <http://www.unCDF.org/sites/default/files/Documents/the_regulation_of_mobile_money_in_malawi_project_report_final_version.pdf> accessed 14 December 2016.

within the family home, and with friends, joint savings clubs, and saving and loan clubs.³³

The benefits of moving from cash to formal, electronic payment and storage functions through mobile money can be understood in two ways: first, empirical material suggesting that unbanked and low-income people prefer to use mobile money payment and storage functions rather than cash and the economic benefits they gain from doing so; and second, a functional comparison between cash and mobile money, as follows.

1.2.1.3(a) Empirical Material

There are several limitations to existing empirical studies on mobile money. These studies tend to focus on M-Pesa, presumably because this is the oldest and one of the largest mobile money platforms in the world. A degree of caution is required when seeking to extrapolate from M-Pesa to the mobile money sector as a whole. This is because M-Pesa was able to develop in specific market conditions that are not replicated in most other countries. For example, Safaricom served 70% of Kenya's mobile phone subscribers at the time of M-Pesa's launch.³⁴ This dominance gave Safaricom considerable first-mover advantages. It could cross-sell mobile money to these subscribers at low cost, creating an instant, large customer base of M-Pesa

³³ Astrid Manroth and Tova Maria Solo, 'Access to Financial Services in Columbia: The 'Unbanked' in Bogata' (2006) World Bank Policy Research Working Paper 3834, February 2006, 45 <<http://documents.worldbank.org/curated/en/882081468243250739/pdf/wps3834.pdf>> accessed 14 December 2016, 50l; Mark Pickens, 'Window on the Unbanked: Mobile Money in the Philippines' (2009) Consultative Group to Assist the Poor (CGAP) Brief, December 2009 <<https://www.cgap.org/sites/default/files/CGAP-Brief-Window-on-the-Unbanked-Mobile-Money-in-the-Philippines-Dec-2009.pdf>> accessed 14 December 2016; Rutherford (n 30); and Collins and others (n 30).

³⁴ David (surname not provided), 'Replicating MPESA: Lessons from Vodafone (Safaricom) on why Mobile Money fails to gain traction in other markets' (2016) Technology and Operations Management, Assignment Submissions, 18 November 2016 <<https://rctom.hbs.org/submission/replicating-mpesa-lessons-from-vodafone-safaricom-on-why-mobile-money-fails-to-gain-traction-in-other-markets/#ednref10>> accessed 23 December 2016; Jenny C. Aker and Isaac M. Mbiti, 'Mobile Phones and Economic Development in Africa' (2010) 24(3) Journal of Economic Perspectives, Summer 2010, 207.

users.³⁵ Furthermore, Safaricom's dominance of the mobile phone sector meant it had a very large collection of 'airtime sellers'. These are retail outlets selling Safaricom's phone credit to customers. Airtime sellers could add mobile money to their product selection at low cost and become cash merchants, giving Safaricom an instant, significant reach of mobile money infrastructure across Kenya.³⁶

Studies of M-Pesa and other mobile money platforms face various methodological limitations. Each involve small sample sizes and are yet to be replicated in studies of other mobile money schemes. Furthermore, these studies do not distinguish between banked and unbanked customers.³⁷ This means it is difficult to determine the empirical benefit of mobile money for unbanked customers as opposed to low-income people in general. Finally, there is a lack of attention to causation, namely the extent that mobile money adoption contributes to the economic outcomes.

However, on the limited empirical material available, it appears mobile money is more useful than cash to unbanked and low-income people and provides a range of economic benefits to these communities. This is evidenced, in part, through the rapid growth of mobile money in developing countries which suggests there exists a latent demand for payment and storage services that are cheaper than cash. It is also evidenced through several studies on the impact of the spread of mobile money.

³⁵ Jack and Suri (n 27) 65; and Ignacio Mas, 'The Economics of Branchless Banking' (2009) 4(2) *Innovations*, Spring 2009, 57 <<http://www.mitpressjournals.org/doi/pdf/10.1162/itgg.2009.4.2.57>> accessed 23 December 2016, 65; Mas and Radcliffe (n 12).

³⁶ Jay Rosengard, 'A Quantum Leap over High Hurdles to Financial Inclusion: The Mobile Banking Revolution in Kenya' (2016) Harvard Kennedy School, Faculty Research Working Paper Series, June 2016 <<https://research.hks.harvard.edu/publications/getFile.aspx?Id=1416>> accessed 14 December 2016.

³⁷ Jonathon Donner and Camilo Andres Tellez, 'Mobile banking and economic development: Linking adoption, impact, and use' (2008) 18(4) *Asian Journal of Communication* 318 <<http://www.tandfonline.com/doi/full/10.1080/01292980802344190?scroll=top&needAccess=true>> accessed 14 December 2016, 320.

For example, surveys in Kenya suggest that for unbanked and low-income communities, M-Pesa is cheaper, easier to access and safer than informal payments options, particularly cash.³⁸ Perhaps for this reason, in Kenya, M-Pesa has virtually eliminated informal payment mechanisms that rely on cash, such as transferring funds with bus drivers.³⁹ It has also increased the circulation of money in the Kenyan communities in which it operates.⁴⁰ The service has enabled customers to transfer money much more quickly and to a wider economic network of people than when using traditional informal mechanisms, such as cash.⁴¹

The spread of M-Pesa in Kenya appears to increase the effective size of, and number of active participants in, risk-sharing networks. In turn, this may enable unbanked and low-income communities to better manage economic shocks.⁴²

Empirical materials also suggest that while M-Pesa was launched and marketed as a payments product, customers are making considerable use of its storage function.⁴³ For example, by September 2013, around £4.8 billion (726,000,000,000 in

³⁸ Morawczynski and Pickens (n 28) 3.

³⁹ *ibid.*

⁴⁰ Mbiti and Weil (n 32) 2 and 17.

⁴¹ Claire Alexandre, Ignacio Mas and Daniel Radcliffe, 'Regulating New Banking Models That Can Bring Financial Services to All' (2010) 54(3) *Challenge* 116
<<https://www.microfinancegateway.org/sites/default/files/mfg-en-paper-regulating-new-banking-models-that-can-bring-financial-services-to-all-aug-2010.pdf>> accessed 14 December 2016, 118. Claire Alexandre, 'What Can Branchless Banking Do to Advance the Field, and What Can It Not Do? From Mobile Banking to Point of Service' (2011) Global Microcredit Summit Commissioned Workshop Paper, 14-17 November 2011
<http://partnershipsagainstpoverty.org/wp-content/uploads/2013/03/C_-Alexandre-What-Can-Branchless-Banking-Do-to-Advance-the-Field-and-What-Can-It-Not-Do_-From-Mobile-Banking-to-Point-of-Service.pdf> accessed 14 December 2016, 4. This result is unsurprising; payments literature posits that businesses and households have a natural demand for a safe and verifiable asset, which can be used for payments and storage. This demand is driven by the so-called 'double coincidence of wants' problem: see Nobuhiro Kiyotaki and Randall Wright, 'On Money as a Medium of Exchange' (1989) 97 *Journal of Political Economy* 927
<<https://pantherfile.uwm.edu/vesely/www/831/Kiyotaki%201989%20JPE.pdf>> accessed 14 December 2016. Charles Kahn and William Roberds, 'Payment System Settlement and Bank Incentives', Wharton Financial Institutions Centre Working Paper 97-32 (2006). Cited in Armour and others (n 2) ch 18, 393.

⁴² Jack and Suri (n 27), 14, 20, 33 and 39.

⁴³ This study has been replicated in the Philippines: Pickens (n 33) 4.

Kenyan shilling (Ksh)) worth of funds had been received from and were being stored in the Commercial Bank of Africa (CBA) for M-Pesa customers.⁴⁴ Other mobile money services have seen the same development, as discussed further in Chapter 3.⁴⁵

Customers appear to be storing, rather than simply transferring funds in mobile money platforms, for a number of reasons. Mobile money is seen as safer than storing money in cash at home, where it can be stolen by household members and other people.⁴⁶ A limited set of empirical material also suggests mobile money is considered even safer than the banking system because the firm providing the service is a phone company, not a bank.⁴⁷ This may be because in many developing countries, particularly in Africa, banking sectors have extensive histories of fraud, corruption and instability.⁴⁸ In contrast, unbanked people who are customers of a phone company may have already developed a degree of trust with this firm through their pre-existing contractual relationship. This may mean they are more likely to begin using mobile money services, including storing funds in the service.⁴⁹ These funds are protected from a range of the security risks that arise in cash, as explored below in Section 1.2.1.3(b). For this reason, mobile money may increase savings rates, although this point has not been quantified.⁵⁰

⁴⁴ See Safaricom 'M-Pesa Statistics' (Safaricom, undated) <<http://www.safaricom.co.ke/personal/tools/m-pesa-tools/m-pesa-statistics>> accessed 9 April 2016).

⁴⁵ For some services this has occurred because MM firms have added interest payments to mobile money offerings: see text to n 468.

⁴⁶ Pickens (n 33) 4.

⁴⁷ Morawczynski and Pickens (n 28).

⁴⁸ Empirical studies find unbanked and low income people do not trust the banking system: Pascaline Dupas, Dean Karlan, Jonathan Robinson and Diego Ubfal, 'Banking the Unbanked? Evidence from Three Countries' (2016) National Bureau of Economic Research (NBER), Working Paper 22463, July 2016 <<https://web.stanford.edu/~pdupas/BankingTheUnbanked.pdf>> accessed 14 December 2016, 3, 18 and 20; Dean Karlan, Aishwarya Lakshmi Ratan and Jonathan Zinman, 'Savings by and for the Poor: A Research Review and Agenda' (2014) 60(1) *The Review of Income and Wealth*, 4 February 2014, 36 <<http://onlinelibrary.wiley.com/doi/10.1111/roiw.12101/full>> accessed 28 December 2016.

⁴⁹ See further discussion on this point: text to n 107.

⁵⁰ Lyman, Pickens, and Porteous (n 3); Pickens (n 33); Morawczynski and Pickens (n 28).

The section below responds to the limitations of existing empirical material on the benefits of mobile money by performing a functional comparison between cash and this service.⁵¹ This comparison illustrates the economic benefits unbanked people can gain when moving from cash to the electronic payment and storage functions which are available in mobile money.

1.2.1.3(b) Functional Comparison

Mobile money can provide a range of functional advantages over cash. Many of these functional advantages help explain the findings from surveys on the economic benefits of M-Pesa, discussed in Section 1.2.1.3 above. The material below examines advantages that accrue in relation to speed, safety, and financial inclusion, focusing on M-Pesa.⁵²

A first functional advantage of mobile money over cash is *speed*. This advantage does not substantially apply to an in-person payment in the context of the type of small-scale transactions that normally take place using cash.⁵³ In such payments it takes a trivial amount of time for the payor to hand cash to the payee. Depending on the ability of mobile money customers to use the service, it is likely to

⁵¹ This study involves considering Scott (2014) who focuses on seven desirable benefits of the retail payment system: (1) finality and reversibility; (2) universality (ability to use at point of sale and remotely); (3) recordkeeping; (4) liquidity (maximizing interest earning assets); (5) security and safety; (6) financial inclusion and access; and (7) fungibility and ease of use: Scott (n 31) 2.

⁵² From this point onwards, unless otherwise marked, the thesis focuses on ‘unbanked communities’ specifically, differentiating these from the broader category of ‘low-income communities’. This approach was not appropriate in the Part 1.2.1.3(a) (discussing the prior empirical literature) as prior surveys did not differentiate between the two types of communities. From this juncture, it is appropriate to focus on unbanked communities alone. This is because the thesis focuses on the relative benefits and costs for unbanked people moving from cash to mobile money. It does not specifically analyse the relative benefits and costs of using bank deposits, which ‘banked’ members of low-income communities use (see a discussion in Rutherford and others (2006) on ‘banked’ members of low-income communities).

⁵³ Note this does not apply to larger scale transactions because time must be spent counting cash: Scott (n 31) 37.

take a similar amount of time for the payor to insert the commands into her phone that are required to transfer funds to the payee.⁵⁴

The functional advantages of mobile money emerge in remote payments, namely where the payor and payee do not physically meet. Cash is less useful for remote payments. This is because it takes a non-trivial amount of time to move cash from the payer to the payee. During that time, the asset, cash, cannot be put to productive use.⁵⁵ Furthermore, cash is particularly vulnerable to theft, primarily because of its anonymity; cash itself leaves no trace of payment.⁵⁶

In contrast, through use of mobile phone technology, remote mobile money payments are instantaneous, or very close to instantaneous, regardless of the distance in question. This speed can be particularly useful for unbanked and low-income communities. Much of the income of people in rural areas – where unbanked and low-income people tend to live – relies upon remittances received from family members working in cities.⁵⁷ The instantaneous nature of mobile money payments means these transfers can be made rapidly and securely. Electronic systems such as mobile money can be hacked and customers' funds stolen while in transit between the payor and the payee.⁵⁸ However, the instantaneous nature of mobile money transactions means customers' funds are exposed to hacking for only a very brief period. The thesis proposes several measures that can reduce the risk of hacking.

⁵⁴ For a description of how mobile money payments are made: see text to 103.

⁵⁵ Scott (n 31) 40.

⁵⁶ *ibid* 37-38.

⁵⁷ Bethany Brown, 'Mobile Phones: Reshaping the Flow of Urban-to-Rural Remittances' (2010) Sustainable Development Law & Policy Research Paper Vol. 11: Iss. 1, Article 18, <<http://digitalcommons.wcl.american.edu/sdlp/vol11/iss1/18>> accessed 16 December 2016.

⁵⁸ Michael Klein and Colin Mayer, 'Mobile Banking and Financial Inclusion: The Regulatory Lessons' (2011) World Bank Policy Research Working Paper 5664 <<http://documents.worldbank.org/curated/en/516511468161352996/pdf/WPS5664.pdf>> accessed 29 September 2015, 15.

The speed and relative security of mobile money transfers compared to cash can smooth the consumption patterns and facilitate risk sharing amongst unbanked and low-income communities.⁵⁹ This is because family members and other actors in the network, whether they are situated nearby or in remote locations, can quickly send funds to a financially distressed person. She can use such funds to meet a pressing financial need without having to liquidate assets.⁶⁰

The speed of mobile money payments can also widen a person's economic network beyond those in her immediate vicinity, with whom she could trade in cash. This is because she can make payments to customers and participating merchants situated in remote locations.⁶¹ This combination can then increase the circulation of money, as discussed above in Section 1.2.1.3(a) of this Chapter.⁶²

Mobile money has *safety* advantages over cash. In this instance, safety describes protecting funds from loss in the process of performing payment and storage functions.⁶³ The speed of mobile money payments informs a component of its safety advantages over cash. Additional features of the service buttress its safety advantages. For example, unlike when using cash, a mobile money customer can immediately determine if her funds have reached the payee. This is because both the

⁵⁹ Jake Kendall and Roger Voorhies, 'The Mobile-Finance Revolution: How Cell Phones Can Spur Development' *Foreign Affairs* (Council on Foreign Relations, March/April 2014) 1; Morawczynski and Pickens (n 28).

⁶⁰ Kendall and Voorhies *ibid.* CGAP, 'Poor People Using Mobile Financial Services: Observations on Customer Usage and Impact from M-PESA' (August 2009) <<https://www.cgap.org/sites/default/files/CGAP-Brief-Poor-People-Using-Mobile-Financial-Services-Observations-on-Customer-Usage-and-Impact-from-M-PESA-Aug-2009.pdf>> accessed 7 April 2016, 3.

⁶¹ Creating what Klein and Mayer (2011) describe as new 'networks of trust': Klein and Mayer (n 58) 5.

⁶² Text to (n 40).

⁶³ See a discussion of 'security and safety' in the context of retail payment systems in Scott (n 31) 44-45.

payor and payee receive an immediate text message notifying them that the payment has been completed successfully.⁶⁴

Identity requirements also buttress the safety of mobile money in relation to both payments and storage. As discussed above in this Section, the anonymity of cash makes this asset particularly vulnerable to theft in the course of performing both functions. Mobile money contains several operational steps which can address this problem. For example, a customer must enter a personal identification number (PIN) for any deposit, payment, or withdrawal she wishes to undertake.⁶⁵ This requirement provides a degree of protection against the risk of physical theft that inheres in cash. This is because, unlike cash, the thief would require her phone and PIN in order to steal her funds.

Furthermore, mobile money uses extensive record keeping.⁶⁶ All payments and storage-related transactions, converting cash for e-money and vice versa, are recorded electronically. These records mean that, unlike cash, customers, MM firms, and public authorities can trace the path of funds through the system, including to a thief's account or a witting or unwitting receipt of stolen funds. In addition, the mobile money system tracks cash-out transactions performed by cash merchants, which enables customers, MM firms and public authorities to find the point at which funds stolen from a customer's mobile money account were cashed out.

⁶⁴ Safaricom, 'M-Pesa: Deposit Cash to Your Account' (*Safaricom*, undated) <<http://www.safaricom.co.ke/personal/m-pesa/get-started-with-m-pesa/deposit-cash-to-your-account>> accessed 14 April 2016.

⁶⁵ Mbiti and Weil (n 32).

⁶⁶ See a discussion on record-keeping in Scott (n 31) 36.

Mobile money can also have *financial inclusion* benefits over cash.⁶⁷ This is primarily because the functional advantages of mobile money over cash, discussed above, can encourage unbanked customers to begin using this electronic payment and storage services. It is a faster and safer tool through which an unbanked person can pay and store funds.

Furthermore, a person is potentially better protected from ‘opportunism’ when using mobile money rather than cash. For the purposes of the thesis, opportunism means failure to perform the terms of the agreement as promised.⁶⁸ A person is particularly exposed to opportunism when using cash alone, particularly when there is no contract documenting the agreement. For example, cash may be stolen from a bus driver who was transferring cash on behalf of a person. Alternatively, the bus driver may steal the funds. It may be difficult for the payor to determine which of these events occurred, or whether her funds were stolen through some other means.⁶⁹ When used for a storage function, the counterparty storing cash may simply refuse to return the funds.⁷⁰ In both cases, without a contract, the person may face high costs enforcing the terms of the agreement.

In contrast, in mobile money the agreement is formalised through a contract and the counterparty is a formal firm regulated by the state. This means, unlike cash,

⁶⁷ As discussed above, for the purposes of the thesis, financial inclusion involves connecting the unbanked to formal electronic payment and storage services: text to n 25.

⁶⁸ In doing so, the thesis follows the meaning of opportunism used Oliver Williamson (1993) of ‘self-interest seeking with guile’ In the context of contractual non-performance, this encompasses an actor failing to perform and then claiming this was due to circumstances beyond her control; if the other party has less information than her about the required performance, they will not be able to tell the difference.

⁶⁹ This is due to the anonymity of cash discussed above in Scott (n 31).

⁷⁰ Jake Kendall, ‘A Penny Saved: How Do Savings Accounts Help the Poor?’ (2010) Financial Access Initiative, Social Science Research Network (SSRN), 1 November 2010 <<https://www.microfinancegateway.org/sites/default/files/mfg-en-paper-a-penny-saved-how-do-savings-accounts-help-the-poor-2010.pdf>> accessed 23 December 2016, 5.

the customer can obtain the assistance of the state in enforcing the performance of the payment and storage function agreed in the contract. The availability and scale of this benefit depend on, amongst other factors, the extent to which mobile money actors actually deliver on their contractual commitments. In turn, this will depend on a range of factors, including the willingness and ability of the court system and government agencies to enforce contracts, as will be explored in the thesis.

1.2.2 Sustainability

The benefits unbanked people gain from using mobile money, discussed in Section 1.2.1.3 above, are premised on sustainability. This means mobile money needs to operate on an on-going basis so that unbanked people can repeatedly use this service.⁷¹ This repeated use is required for unbanked people to obtain the speed, safety, and financial inclusion benefits of mobile money on an on-going basis, which in turn generates the economic benefits for their lives. Put conversely, occasional use, or the provision of mobile money followed by its permanent removal from a community, limits the economic benefits an unbanked person might otherwise obtain from the service.

As a commercial – rather than donor-supported – enterprise, mobile money requires profitability to operate sustainably. This section explores the potential for mobile money to operate profitably and ultimately sustainably when serving unbanked populations. It has three parts. The first outlines the fixed costs which reduce the potential profitability of banking when serving unbanked people. This analysis is useful because it serves as a benchmark against which to explore the novel

⁷¹ Alexandre (n 41), 13.

features of mobile money which may enable it to profitably operate when used by unbanked people. The second explains how mobile money avoids many of these fixed costs and, through its business model, can generate economies of scale.

Before proceeding it is important to define two of the important terms introduced into the paragraph above: 'business model' and 'economies of scale'. The former is defined in a number of ways, including 'the rationale of how an organisation creates, delivers and captures value', 'the organisational structures used to enact a commercial opportunity', or even 'stories that explain how enterprises work'.⁷²

The thesis uses the phrase 'business model' to describe how the key actors in mobile money, the MM firm and cash merchants, can profit while providing the service.⁷³ The thesis focuses on these two mobile money actors only because there is no publicly-available information on how others, such as the mobile money holding

⁷² The business model in practice and its implications for entrepreneurship research. *Entrepreneurship Theory and Practice*: Gerard George and Adam Bock AJ, 'The Business Model in Practice and its Implications for Entrepreneurship Research' 35(1) *Entrepreneurship Theory and Practice*, 83
<https://papers.ssrn.com/sol3/papers.cfm?abstract_id=1490251> accessed 14 December 2016. The business creates value through this organisational structure Note however there is considerable disagreement over what constitutes 'business model': Andrea Ovans, 'What is a Business Model?' (*Harvard Business Review*, 23 January 2015)
<<https://hbr.org/2015/01/what-is-a-business-model>> accessed 14 December 2016. 'A business model describes the rationale of how an organization creates, delivers, and captures value': Alexander Osterwalder and Yves Pigneur, *Business Model Generation* (John Wiley and Sons, 2010)
<<https://www.intec.edu.do/downloads/pdf/vriv/emprendurismo-innovacion/recursos/business-model-generation-a-handbook-for-visionaries-game-changers-and-challengers.pdf>> accessed 28 December 2016. See more extensive definitions in, for example, Al-Debei, M. M., El-Haddadeh, R., & Avison, D. Mutaz M. Al-Debei, Ramzi El-Haddadeh, and David Avison, 'Defining the Business Model in the New World of Digital Business' (2008) *Proceedings of the Americas Conference on Information Systems (AMCIS)* (Vol. 2008, pp. 1-11)
<<http://bura.brunel.ac.uk/bitstream/2438/2887/1/AMCIS2008.pdf>> accessed 14 December 2016 and additional discussion in Joan Magretta, 'Why Business Models Matter' (*Harvard Business Review*, May 2002)
<<https://hbr.org/2002/05/why-business-models-matter>> accessed 14 December 2016 and

⁷³ This definition is consistent with Stewart and Zhao (2000) who describe business models as, 'a statement of how a firm will make money and sustain its profit stream over time.' Relevant decision variables include revenue sources, pricing methodologies, cost structures, margins, and expected volumes: David W. Stewart and Qin Zhao, 'Internet Marketing, Business Models, and public Policy' (2000) 19(2) (Fall) *Journal of Public Policy and Marketing* 287, 290. To repeat however, the thesis does not seek to provide a conclusive definition of the term, given the extensive confusion over what it might be, noted in Christoph Zott, Raphael Amit and Lorenzo Massa, 'The Business Model: Theoretical Roots, Recent Developments and Future Research' (2010) IESE Business School, University of Navarra <<http://www.iese.edu/research/pdfs/DI-0862-E.pdf>> accessed 23 December 2016, 5.

company (MMHC), wholesale cash merchants, and master cash merchants, profit within mobile money platforms.⁷⁴

The only publicly-available information on the drivers of mobile money profitability are fees charged to customers in the M-Pesa service.⁷⁵ Other material, such as marketing strategies and operational procedures used to reduce costs, are not available. There is also no publicly-available information on the methods by which other mobile money actors examined in the thesis, such as MMHC, wholesale cash merchants, and master cash merchants, profit from doing so. For this reason, the thesis focuses on how the MM firm and cash merchants profit based on the fees charged in M-Pesa. It is appropriate to focus on M-Pesa because, as explored below, this service, and its surrounding regulation in Kenya, is the baseline product for analysis.⁷⁶

The thesis makes an important assumption in relation to the component of the business model in M-Pesa that applies to cash merchants. As explained below, the M-Pesa system charges customers a fee for withdrawing funds from the system, which is performed at cash merchants. The author has not been able to obtain copies of the contracts that operate between the MM firm and its cash merchants. As a result, it is not clear how this fee is split between the MM firm and cash merchants. The analysis below assumes that the cash merchant and MM firm split this fee equally between

⁷⁴ Chapter 3 discusses the roles of the MMHC and MM firm. Chapter 5 discusses the role of cash merchants, wholesale cash merchants, and master cash merchants.

⁷⁵ Drawn from a combination of these two official Safaricom websites: Safaricom (author unclear) 'M-PESA Rates,' (2016) <<http://www.safaricom.co.ke/personal/m-pesa/get-started-with-m-pesa/m-pesa-tariffs>> accessed 23 December 2016; and M-Pesa Rates (author unclear) 'Safaricom M-Pesa RatesCharges & News' (2016) <<http://www.mpesarates.com/mpesa-charges-safaricom/>> accessed 17 December 2016. Note that this second source is official Safaricom material: see discussion with mobile money specialist, 15 March 2016.

⁷⁶ Text to n 213, Section 2.2.4.1 of Chapter 2.

each other. This assumption is appropriate because research suggests that this division of fees is used in mobile money sectors.⁷⁷

‘Economies of scale’ is another important term explored in the context of mobile money’s profitability. A firm must reach a critical revenue level in order to cover fixed costs and make a profit. After this point, the firm enjoys an economy of scale, in which cost per unit of output decreases with an increase in scale. This is because fixed costs become spread over a greater number of units of output.

The discussion now turns to factors which inhibit a bank’s profitability when serving unbanked communities. This serves as a comparison point to illustrate how mobile money can potentially profit when targeting the same people.

1.2.2.1 Banking’s Business Model

The unbanked are so called because they are not served by banks. The reluctance of banks to serve unbanked communities is a widespread, systemic issue across a large number of countries; studies estimate 2 billion people in the world are unbanked.⁷⁸ Banks operating in developing countries tend to provide deposits and loans to comparatively wealthy people who usually reside in urban areas rather than unbanked communities.⁷⁹

⁷⁷ For example, the 50% split exists in Pakistan: M. Yasmina McCarty and Roar Bjaerum, ‘Easypaisa: Mobile money innovation in Pakistan’ (2013), in *Mobile Money for the Unbanked Case Studies*, Groupe Speciale Mobile Association (GSMA), Mobile Money for the Unbanked (MMU), <http://www.gsma.com/mobilefordevelopment/wp-content/uploads/2014/02/2013_MMU_Compodium-of-case-studies.pdf> accessed 14 December 2016

⁷⁸ See Demirguc-Kunt and others (n 15), 13 and 59.

⁷⁹ See discussion in Alexandre, Mas and Radcliffe (n 41). A financial intermediary is an institution or individual that acts as a conduit for parties in a financial transaction, usually transferring surplus funds from savers to borrowers: see a discussion of the evolution of banks and financial intermediaries in Nicola Cetorelli, Benjamin H. Mandel and Lindsay Mollineaux, ‘The Evolution of Banks and Financial Intermediaries: Framing the Analysis’ (2012) FRBNY Economic Policy Review, July 2012 <<https://www.newyorkfed.org/medialibrary/media/research/epr/12v18n2/1207cet1.pdf>> accessed 20 April 2016. Also banks lend to large public and private actors rather than unbanked people: Paul L. Freedman, ‘Designing

This reluctance emerges because generally banks cannot profit from serving unbanked communities. This is because when serving unbanked communities banks must usually incur high fixed costs – particularly the expenses incurred in building and maintaining bank branches and automated teller machines (ATMs) – compared to transaction size. This is because, as discussed below in Section 2.3.3.1 of Chapter 2, unbanked people tend to live in remote, rural communities. A bank must incur considerable fixed costs building and maintaining bank infrastructure in such regions. Usually a bank cannot obtain a sufficient return on this investment due to the relatively low value of transactions made by unbanked communities, usually around £1-5.⁸⁰

For this reason, the outreach of banking infrastructure tends to be much lower in developing than developed countries. A 2007 study found branch penetration averages only two branches per 100,000 people in the poorest-country quintile of the study, which consisted of developing countries, compared with thirty-three in the richest-country quintile. Automated teller machines are even more scarce, averaging only 1.3 per 100,000 people in the poorest-country quintile, compared with 67 in the richest-country quintile.⁸¹

Loan Guarantees to Spur Growth in Developing Countries' (2014), U.S. Agency for International Development <http://pdf.usaid.gov/pdf_docs/Pnadb245.pdf> accessed 28 December 2016. See also: Paul Collier, 'Rethinking Finance for Africa's small firms', 1 SME Financing in Sub-Saharan Africa, Private Sector and Development, May 2009, 3

<http://www.proparco.fr/jahia/webdav/site/proparco/shared/PORTAILS/Secteur_privé_developpement/PDF/SPD1/SPD1_uk.pdf> accessed 28 December 2016.

⁸⁰ Alexandre, Mas and Radcliffe (n 41) 118.

⁸¹ *ibid* 118.

1.2.2.2 Mobile Money's Business Model

As explained above in Section 1.2.1.1, unlike banking, mobile money has a demonstrated capacity to serve unbanked and low-income communities. The thesis focuses on the variables which impact *potential* profitability of mobile money amongst unbanked people and its ability to operate sustainably. This approach is required because there is insufficient material to make a conclusive determination on the profitability of the sector. This is because mobile money is still a relatively new industry, particularly when compared to banking. Three-quarters of the 255 mobile money services currently in operation were launched after mid-2011.⁸² Of these, it is estimated that only 21 have become profitable.⁸³ In addition, there is no empirical material outlining the profitability of mobile money specifically amongst unbanked, rather than low-income, communities.

Industry material suggests profitability depends on 'internal' and 'external' factors, which presumably relate to actions taken by the MM firm and issues that are exogenous to the service, respectively. Internal factors include levels of investment in mobile money and organisational structures, and customer acquisition and distribution strategies. External factors include the levels of mobile penetration, different socio-economic factors, competition, and the regulatory architecture.⁸⁴ This material tends

⁸² Mobile Money Tracker (Groupe Speciale Mobile Association (GSMA), January 2015), cited in Janine Aron, "Leapfrogging": a Survey of the Nature and Economic Implications of Mobile Money', (2015) Centre for the Study of African Economies (CSAE) Oxford, 7 June 2015 <<http://www.sbs.ox.ac.uk/sites/default/files/research-projects/mobile-money/mobile-survey-leapfrogging-3.pdf>> accessed 15 December 2016, 22.

⁸³ Like other components of the service, much of the research industry is funded by industry and pro-growth donors, such as the Gates Foundation. See, eg, Susie Lonie, 'The mobile money paradox – if everyone wants it, why is it doing so badly?' (*Tomorrow's Transactions*, 16 May 2013) <<http://www.chyp.com/the-mobile-money-paradox-if-everyone-wants-it-why-is-it-doing-so-badly/>> accessed 23 December 2016; and Claire Pénicaud and Arunjay Katakam, 'State of the Industry 2013: Mobile Financial Services for the Unbanked' (2014) Groupe Speciale Mobile Association (GSMA) Mobile Money for the Unbanked (MMU) <http://www.gsma.com/mobilefordevelopment/wp-content/uploads/2014/02/SOTIR_2013.pdf> accessed 28 December 2016.

⁸⁴ Di Castri (2013) argues that successful deployments depend on how various internal and external factors influence adoption: Simone di Castri, 'Mobile Money: Enabling Regulatory Solutions' (2013), Groupe Speciale Mobile Association (GSMA), Mobile Money for the Unbanked (MMU), February 2013

to list potential variables rather than analyse them in depth or link them to profitability.

The discussion focuses on the potential profitability by highlighting three important features of mobile money. These are the way MM firms avoid key fixed costs faced by banks, the fee structure of the service, and potential synergies between mobile phone and mobile money services.

1.2.2.2(a) Fixed Costs

Mobile money can avoid the fixed costs a bank faces in building and maintaining branches and automated teller machines in rural areas where the unbanked live and work.⁸⁵ This is because the MM firm can contract with local retail outlets to operate as cash merchants on its behalf. As discussed above in Section 1.2.1.3(a) of Chapter 1 in relation to Safaricom, many of these retail outlets may well already be airtime sellers for the MM firm (as a phone company) and can add mobile money to their product offering at relatively low cost.⁸⁶

In addition, an MM firm, as a phone company, tends to have a large existing base of phone customers to which it can cross sell mobile money relatively inexpensively.⁸⁷ This gives an MM firm access to a potentially large number of prospective mobile money customers, many of whom may be beyond the reach of the banking system. The ability of MM firms to sell mobile money to existing customers is considered one of the main reasons behind the growth of mobile money into

<http://www.gsma.com/publicpolicy/wp-content/uploads/2013/02/GSMA2013_Report_Mobile-Money-EnablingRegulatorySolutions.pdf> accessed 14 December 2016.

⁸⁵ Mas and Radcliffe (n 12) 2.

⁸⁶ See Chapter 1: Text to n 36.

⁸⁷ Alexandre, Mas and Radcliffe (n 41) 118.

unbanked communities and its potential to spread further into the future.⁸⁸ Through its customer base of an MM firm may be able to directly reach a larger group of people than a bank; in developing countries phone companies have around 100–500 times more customers than a bank has depositors.⁸⁹ This is because over 2 billion people are unbanked but 1.6 billion of them have access to a mobile phone.⁹⁰

1.2.2.2(b) Fee Structure

As discussed in the introduction to Section 1.2.2.2 of this Chapter, this section aims to explain the potential profitability of mobile money when serving unbanked populations by focusing on the fees and economy of scale in the service. As will be explored in the thesis, the MM firm and cash merchants commit not to intermediate customers' funds. This means, unlike banking, the MM firm and cash merchants cannot generate revenues and ultimately profit from intermediation. Instead, mobile money aims to generate revenues from fees charged on the deposit, withdrawal, and payment of funds within the mobile money platform, as follows.⁹¹

In the case of M-Pesa the fee structure aims to encourage people to begin using the service by making it free to join and to deposit-funds.⁹² It is also free to withdraw and transfer small amounts of value; a customer pays no fee for withdrawing amounts up to Ksh50 (around £0.4) or making transfers of less than Ksh101 (around £0.80).⁹³

⁸⁸ See a discussion in Chapter 2 on the reasons usually given for the likely continued growth of mobile money into the future, particularly in Africa: text to n 169.

⁸⁹ Alexandre, Mas and Radcliffe (n 41) 118.

⁹⁰ ITU News, 'Focus Group on Digital Financial Services' (December 2015) <<https://itunews.itu.int/en/6027-ITU-Focus-Group-on-Digital-Financial-Services.note.aspx>> accessed 28 December 2016.

⁹¹ Mas and Radcliffe (n 12) 2.

⁹² M-Pesa Rates (n 75).

⁹³ *ibid.*

While there is no publicly-available evidence on this point, these transactions are likely to impose a cost on Safaricom. This is because the transactions are free and so cannot be a source of income for Safaricom. Furthermore, Safaricom incurs costs in gathering a customers' identification material, establishing her account, and complying with regulation that applies to this process (to the extent it exists).

These fixed costs are partially offset by fees that can be charged once funds are stored in the system. For example, customers are charged fixed fees for checking accounts and changing personal identification numbers. The fees are relatively small, fixed at Ksh1 (around £0.01) and Ksh22 (£0.17), respectively.

The primary source of the potential economy of scale and profitability of mobile money comes from payments and withdrawals. This is because customers are charged for performing these tasks, and on a sliding basis, which is designed to encourage customers to make larger transactions. For example, when making a payment of Ksh101 (£0.80) a customer pays a fee that is around 9% of the total amount transferred.⁹⁴ For payments of Ksh10,000 (around £78.00) this figure drops to 1.59%.⁹⁵ Similarly, for withdrawals of Ksh50 or less, a customer pays a fee of 20% of the amount withdrawn.⁹⁶ For a much larger withdrawal of Ksh50,001 this figure is reduced to just 0.66%.⁹⁷

This sliding fee structure is a source of economies of scale and profitability for M-Pesa. Once the MM firm has incurred the fixed costs to enable funds to enter the

⁹⁴ Ksh11 (£0.09): *ibid.*

⁹⁵ Ksh159 (around £1.24): *ibid.*

⁹⁶ Ksh10 (£0.08): *ibid.*

⁹⁷ Ksh330 (£2.62): *ibid.*

system (particularly cash merchants) and be transferred (through its own operating system), per unit costs decrease. This is because M-Pesa can process larger payment and withdrawal transactions which are sources of additional income for the MM firm without needing to expend proportionate additional expenditure on that system.

The fee structure in relation to withdrawals also enables cash merchants to generate an economy of scale and ultimately profit from providing mobile money. Like an MM firm, a cash merchant incurs fixed costs when providing mobile money services. For example, she must negotiate the contract with the MM firm, undertake training, and establish the accounting and other systems she needs to process mobile money transactions.⁹⁸ As discussed above in Section 1.2.2 of this Chapter, the cash merchant and MM firm each receive half of the fees charged on customers for withdrawals. This means, once the cash merchant incurs fixed costs involved in providing mobile money services and customers begin making larger and more regular withdrawals, her per unit costs decrease. This is because, like the MM firm, she obtains additional fees from larger withdrawals without needing to invest a proportionate amount in the systems she has established to process them.

Mobile money is also potentially subject to powerful network effects, particularly due to the payment function of the service. Similar to other retail payment systems, the addition of each additional mobile money user increases the value of the network to existing users.⁹⁹ This is because it means mobile money can be used by

⁹⁸ Neil Davidson and Paul Leishman, 'Building a Network of Mobile Money Agents' (2012), Groupe Speciale Mobile Association (GSMA), Mobile Money for the Unbanked (MMU) <<http://www.gsma.com/mobilefordevelopment/wp-content/uploads/2012/03/building.pdf>> accessed 28 December 2016, 10.

⁹⁹ Wilco Bolt and David Humphrey, 'Public Good Issues in TARGET: Natural Monopoly, Scale Economies, Network Effects and Cost Allocation' (2005) European Central Bank Working Paper Series 0505, July 2005

greater numbers of people and, due to its convenience and widespread acceptance, for a wider range of payments. In turn, this encourages existing users to make more use of the service, including the payment and withdrawal transactions through which fees are charged. The increased network of users then makes the service more attractive for non-users, which in turn can spur growth. For this reason, mobile money sectors are often characterised by network effects and monopolistic or oligopolistic competition. This point is particularly prevalent in relation to Safaricom in Kenya, as discussed above in Section 1.2.1.3(a) of this Chapter.¹⁰⁰

1.2.2.2(c) Synergies

Potential synergies between mobile phone and mobile money may also enable mobile money to operate profitably and substantially in unbanked communities. This is a tentative claim due to the lack of research on this topic. Empirical material suggests mobile money can become a new revenue stream for phone companies. In undeveloped mobile money systems, the service can contribute to around 5% of a phone company's overall income.¹⁰¹ In larger, more sophisticated schemes, mobile money can comprise a greater portion of overall revenues. For example, in 2010, the Vodacom subsidiaries in Kenya (which is Safaricom) and Tanzania generated over 18 percent of total revenues from their M-Pesa services.¹⁰²

These potential synergies are due to the bundling together of mobile phone and mobile money services. This is primarily because the phone company can

<<https://www.ecb.europa.eu/pub/pdf/scpwps/ecbwp505.pdf?723f95ca44505dc2a27086ef530abd29>> accessed 14 December 2016.

¹⁰⁰ A lack of interoperability may be a potential contributing factor to limited competition. See the discussion of interoperability in Chapter 6: text to n 572.

¹⁰¹ Pénicaud and Katakam (n 83) 42.

¹⁰² Aron (n 82) 23.

leverage administrative systems in relation to the former – which were a source of fixed costs – for additional use for the latter. For example, and as discussed above in Section 1.2.2.2(a), a mobile phone company will already have a customer base to which it can cross-sell mobile money, operating systems designed to sign up customers which can be leveraged for mobile money, and a network of airtime sellers which can become cash merchants.

Empirical material suggests adding mobile money may then benefit the phone company's phone service. For example, mobile money appears to reduce a phone company's costs incurred in selling airtime. Usually, a phone company must incur fixed costs in producing scratch cards which a customer can use to access airtime. The customer must scratch the card to view a code which she uses to get airtime sent to her phone. The phone company must also employ, train, and pay airtime sellers to sell scratch cards on its behalf.

Mobile money can reduce the need for and costs incurred in using scratch cards and airtime sellers. This is because a customer can purchase airtime directly from the phone company by using funds contained in her mobile money account. She simply enters instructions into her mobile phone.¹⁰³ Studies suggest this can reduce costs the MM firm faces in selling airtime by up to 9%.¹⁰⁴

¹⁰³ Paul Leishman, 'Is There Really Any Money in Mobile Money?', (2011) Groupe Speciale Mobile Association (GSMA), Mobile Money for the Unbanked (MMU), <<http://www.gsma.com/mobilefordevelopment/wp-content/uploads/2012/03/moneyinmobilemoneyfinal63.pdf>> accessed 15 December 2016.

¹⁰⁴ *ibid.*

In relatively small-scale mobile money schemes, phone companies sell up to 10% of their airtime through mobile money.¹⁰⁵ In more sophisticated schemes this figure is higher. For example, in 2013 Safaricom sold around 19% of its airtime on M-Pesa which contributed a total of 12% towards the firm's profits.¹⁰⁶

Empirical material suggests bundling together mobile money with mobile phone services may increase customer loyalty. For example, in 2010, MTN Uganda, an MM firm, reported a monthly turnover of customers (moving to other phone companies) of 0.2% per month for mobile money customers. This was much lower than the figure of 4.5% per month for non-mobile money customers.¹⁰⁷ In 2013, Safaricom reported that M-Pesa users were 10–30% more likely to stay with this firm than non M-Pesa users.

Collectively, savings from airtime disbursement and customer turnover could be considerable. The 2010 Ugandan survey discussed above found that the introduction of mobile money contributed to savings from airtime distribution, reduction in churn, and increased share of wallet for voice and SMS, which ultimately combined to account for 48% of MTN Uganda's gross profit.¹⁰⁸ The 2013 Kenyan report described above estimated that the increased loyalty of M-Pesa customers contributed to an annual saving to Safaricom of \$1.30-4.60 for every user.¹⁰⁹

¹⁰⁵ For example, Telesom's ZAAD in Somaliland reports that savings on airtime distribution have been significant, with almost 70% of Telesom airtime sold over ZAAD since April 2013: Mireya Almazán and Nicolas Vonthron, 'Mobile Money Profitability: A Digital Ecosystem to Drive Healthy Margins' (2014) Groupe Speciale Mobile Association (GSMA), Mobile Money for the Unbanked (MMU), November 2014 <http://www.gsma.com/mobilefordevelopment/wp-content/uploads/2015/11/2014_Mobile-money-profitability-A-digital-ecosystem-to-drive-healthy-margins.pdf> accessed 14 December 2016.

¹⁰⁶ Aron (n 82).

¹⁰⁷ Leishman (n 103).

¹⁰⁸ *ibid.*

¹⁰⁹ Jason Lamb, Megan Oxmen and Rodger Voorhies, 'Fighting Poverty, Profitably: Transforming the Economics of Payments to Build Sustainable, Inclusive Financial Systems', (2013), Bill and Melinda Gates Foundation Financial Services for the Poor, Special Report, September 2013.

Although there is no material on this point, presumably loyalty increases because of greater convenience; a customer can obtain a wider range of services through the one firm. Furthermore, a mobile phone customer may have already built up a degree of trust with the MM firm (as a phone company), which is increased further when she begins and then continues to use mobile money.

1.2.2.2(d) Conclusion

As discussed above in the introduction to Section 1.2.2.2, the early stage of the development of mobile money means there is insufficient empirical material to determine, with precision, the circumstances in which mobile money is likely to profit. However, the discussion above suggests that mobile money has the potential to operate profitably and, by extension, sustainably, amongst unbanked communities. This is because the MM firm can avoid key fixed costs faced by banks, the service uses a fee structure which encourages people to make more and larger payments and withdrawals, and there are potential synergies between mobile phone and mobile money.

The first two motivations have focused on the economic benefits of mobile money and the potential for the service to provide them sustainably to unbanked communities. The third and final motivation applies to the regulation of mobile money, as follows.

1.2.3 The Regulatory Lag

Section 2.1 above has explained the apparent functional advantages of mobile money over cash. However, it is important to emphasise that these are simply theoretical advantages only. As discussed above in Section 1.2.1.3(b), they assume that MM firms and their associates in the system, which include cash merchants, MMHCs, and different types of cash merchants, deliver on their contractual obligations. In doing so, mobile money can deliver the benefits of the service.

There is a non-trivial risk that the MM firm and its associates will not deliver on their contractual terms.¹¹⁰ This potential outcome, alongside other factors such as potential additional risks that are not addressed in contractual terms, can justify public regulation and oversight. The potential need for public regulation leads to the third motivation for this thesis, which is the ‘regulatory lag’ of mobile money. This term describes the way in which investment into and the design of mobile money regulation is taking place without an accompanying intellectual framework on how to regulate this sector. The section below explores the regulatory lag in three parts: the first discusses the investment into mobile money; the second explores regulatory confusion in the sector due to the initial framework used by the Central Bank of Kenya (CBK) in relation to M-Pesa; and the third claims that this regulatory lag is becoming an increasingly urgent problem for mobile money.

1.2.3.1 High Donor and Policy Enthusiasm for Mobile Money

The growth of mobile money and its apparent advantages over informal tools, as explained in Section 1.2.1.3(b), above means this service has generated considerable enthusiasm amongst international donor institutions and domestic policymakers.

¹¹⁰ This point is discussed throughout the thesis, particularly in Chapter 3.

Observing developments in Kenya and other countries with large mobile money sectors, a large number of countries have adopted financial inclusion as a stand-alone policy and regulatory goal. This term tends to be interpreted as extending financial services to the unbanked, as explained in Section 1.2.1.2 of this Chapter.

Since the launch of M-Pesa, financial inclusion has developed into a specific policy and regulatory objective for financial policymakers in over 30 developing countries.¹¹¹ Over 57 developing countries have signed the ‘Maya Declaration’, which involves making measurable commitments to take policy and regulatory actions that contribute to financial inclusion.¹¹²

In order to give effect to financial inclusion objectives many domestic policymakers support the spread of mobile money. This often manifests in issuing rudimentary mobile money-related regulation, if any. For example, it is particularly common for policymakers to issue letters of no objection to phone companies seeking

¹¹¹ Alfred Hannig, ‘Global Trends and Challenges on Financial Inclusion’ (Presentation at the AFI Conference on Financial Inclusion: Challenges and Issues for the Deposit Insurer, Manila, 20 June 2013) 7. A list of institutions and their commitments can be found from page 18 onwards in the Maya Declaration 2013 Progress Report: AFI, ‘Putting Financial Inclusion on the Map: The 2013 Maya Declaration Progress Report’ (AFI, September 2013) 18 <http://www.fgda.org/dati/ContentManager/files/Documenti_microfinanza/Afi-2013-Maya-Progress-Report.pdf> accessed 20 April 2016. For specific examples see Malaysia: Central Bank of Malaysia Act 2009, ss 5(2)(f), 49(b) <http://www.bnm.gov.my/documents/act/cba2009_01.pdf> accessed 1 October 2015; Nigeria: Central Bank of Nigeria, ‘National Financial Inclusion Strategy’ (October 2012) <http://www.microfinancegateway.org/gm/document-1.9.60413/Central%20Bank%20of%20Nigeria_NationalFIstrategy_Final.pdf> accessed 15 August 2015; Brazil: Banco Central Do Brasil, ‘Action Plan to Strengthen the Institutional Environment’ (May 2012) <http://www.bcb.gov.br/Nor/reincfin/Brazil_Financial_Inclusion_Action_Plan.pdf> accessed 29 September 2015; and India: the Reserve Bank of India has included financial inclusion in its mandate since the Annual Report of 2005–2006 (See, eg, Dr KC Chakrabaty, ‘Financial Inclusion: A Road India Needs to Travel’ (Article, Reserve Bank of India, 12 October 2011) <http://rbi.org.in/scripts/BS_SpeechesView.aspx?Id=607> accessed 29 September 2015).

¹¹² Actions designed to deliver financial inclusion cover the following four areas: create an enabling environment to harness new technology that increases access to and lowers the costs of financial services; implement a proportional framework that advances synergies in financial inclusion, integrity, and stability; integrate consumer protection and empowerment as a key pillar of financial inclusion; and utilise data for informed policymaking and tracking results: AFI, ‘Maya Declaration’ (AFI, Undated) <<http://www.afi-global.org/maya-declaration>> accessed 20 April 2016.

to provide mobile money, rather than develop substantive regulation for this sector. This approach was adopted in Kenya, Tanzania, and Uganda.¹¹³

Often policymakers provide a range of other initiatives to support the growth of mobile money. This support includes educating the unbanked and other low-income groups on the operation of mobile money through financial literacy programs.¹¹⁴ In addition, in conjunction with international donors, particularly the United Nations, many policymakers gather data on the consumer preferences of the unbanked, and provide them to MM firms. These initiatives are designed to reduce start-up costs MM firms face when determining which mobile money products are appropriate for unbanked people and how they can be most efficiently provided.¹¹⁵

International organisations are investing very large amounts of money into the growth of mobile money. For example, the Gates Foundation, MasterCard Foundation, and Omidyar Network provide a range of funding to the work of the

¹¹³ This approach was used by the Bank of Uganda (Central Bank of Uganda), see Stefan Staschen, 'Mobile Money Moves Forward in Uganda Despite Legal Hurdles' (2015) Consultative Group to Assist the Poor (CGAP), 9 March 2015 <<https://www.cgap.org/blog/mobile-money-moves-forward-uganda-despite-legal-hurdles>> accessed 15 December 2016; the Bank of Tanzania (Central Bank of Tanzania), see Simone di Castri S and Lara Gidvani, 'Enabling Mobile Money Policies in Tanzania' (2014) Groupe Speciale Mobile Association (GSMA), Mobile Money for the Unbanked (MMU), February 2014 <<http://www.gsma.com/mobilefordevelopment/wp-content/uploads/2014/03/Tanzania-Enabling-Mobile-Money-Policies.pdf>> accessed 8 April 2016, 2; and the Central Bank of Kenya: see Alliance for Financial Inclusion (AFI) 'Enabling Mobile Money Transfer: The Central Bank of Kenya's Treatment of M-Pesa' (2010) <http://www.afi-global.org/sites/default/files/publications/afi_casestudy_mpesa_en.pdf> accessed 20 April 2016.

¹¹⁴ For example, in December 2013, the Reserve Bank of Malawi (RBM) launched the country's first 'financial literacy week'. This event was designed to educate Malawians on the benefits of using formal financial services, including mobile money. See Nyasa Times, 'Reserve Bank of Malawi to Conduct Financial Literacy Week' (2013) <<http://www.nyasatimes.com/2013/12/06/reserve-bank-of-malawi-to-conduct-financial-literacy-week/>> accessed 7 April 2016. See also Greenacre, Malady and Buckley (n 32) 47.

¹¹⁵ For example, in Malawi, see USAID, 'Scaling Usage of Mobile Money to Boost Financial Inclusion in Malawi: Summary Action Plan' (2011) USAid <http://egateg.usaid.gov/sites/default/files/Malawi_MM_Action_Plan_FINAL.pdf> accessed 2 December 2013; USAID, 'Demand for Mobile Money Services: Survey Results and Report' (2011) USAid <http://egateg.usaid.gov/sites/default/files/Demand%20for%20Mobile%20Money%20Services_Malawi_FINAL.pdf> accessed 2 December 2013; FinMark Trust, 'Mapping the Retail Payment Services Landscape: Malawi' (2012) FinMark Trust <http://www.finmark.org.za/wpcontent/uploads/pubs/Rep_RPS_landscape_Malawi_2012.pdf> accessed 2 December 2013. Materials obtained from Greenacre, Malady and Buckley 2014 (n 32) 9.

GSMA, a network of mobile phone operators that aims to accelerate the spread of mobile money.¹¹⁶

1.2.3.2 Limited Scholarship About the Regulation of Mobile Money

A key challenge for mobile money is that the original regulatory framework used for this service does not fit neatly into existing, traditional payments and banking regulation.¹¹⁷ This framework was designed and used by the CBK when it first regulated M-Pesa. This section outlines the key features of the CBK's regulatory licence for M-Pesa and explains how scholarship is yet to properly analyse the effectiveness of this licence and mobile money regulation more generally.

1.2.3.2(a) The CBK's Licence for M-Pesa

The CBK took two key decisions when designing a regulatory licence for M-Pesa. Both decisions removed mobile money from traditional payments and banking paradigms, and have been replicated across a large number of countries. A first decision was to determine that financial inclusion was a worthy regulatory objective which should guide the CBK's policy towards M-Pesa. At the time Safaricom asked the CBK to approve the launch of M-Pesa, around 81% of Kenya's population was unbanked.¹¹⁸ The CBK decided this level of financial exclusion was too high, and M-Pesa was a useful method of connecting the unbanked to financial services, in this case, *payments*.¹¹⁹

¹¹⁶ For example, in 2015, the Gates Foundation, MasterCard Foundation and Omidyar Network provided £6.55 million to the GSMA to develop its Mobile Money program: see GSMA (n 7) 5.

¹¹⁷ For this sake of this thesis, 'traditional' regulation means the type of regulation used for payment and financial systems in developed countries such as the United States and United Kingdom.

¹¹⁸ See AFI (n 113).

¹¹⁹ *ibid* 3.

This was an innovative step. Financial inclusion has never been an explicit regulatory objective in traditional payments literature and policy.¹²⁰ The closest comparison is increasing the ‘convenience’ of payment systems.¹²¹ Generally this objective does not explicitly involve extending payment services to the unbanked. Furthermore, the objective of increasing the convenience of payment systems has not previously manifested in the type of institutional arrangement that emerged through mobile money, as follows.

A second key development related to institutional arrangements in M-Pesa. Banks sit at the base of all payment systems and have done so for much of the history of formalised trade.¹²² This is because banks provide the *storage* function that underpins all electronic payment systems. Banks are the account holders into which funds are deposited and stored.

Furthermore, banks often perform the *payment function* of actually moving funds from one bank account to another. More recently, retail payment providers have begun to perform this payment function, but these firms do not dislodge the privileged role of banks in providing the storage function.¹²³ This is because, at least under

¹²⁰ Objectives usually take the form ‘safe and efficient transfer of money’, promote liquid money markets, enhance the liquidity of the banking system and nonbank public, facilitate the conduct of monetary policy, and promote open and competitive financial markets: Jeffrey C Marquardt, ‘Payment System Policy Issues and Analysis’ in Bruce J Summers (ed), *The Payment System: Design, Management, and Supervision* (International Monetary Fund 1994) 2164-2165 (note Kindle page references).

¹²¹ See Armour and others (n 2) ch 18, 405.

¹²² The role of a bank in the interbank settlement will depend on the nature of the payment business that the institution chooses to be in: Hans Blommestein and Bruce Summers, ‘Banking and the Payment System’ in Summers (ed) (n 50) 427. See Goodfriend (1989) who states ‘It is thus the banking system, with the central bank at its head, which serves as the backbone of the cashless payment system’: Marvin Goodfriend, ‘Money, Banking and Payment System Policy’ in David Humphrey (ed) *The US Payments System: Efficiency Risk and the Role of the Federal Reserve* (Kluwer Academic Press 1990) 1. See a discussion of the evolution of banking and payments in Benjamin Geva, ‘The Payment Order of Antiquity and the Middle Ages’ (Hart Publishing 2011) 1-12 (draft). International payment standards still assume that funds are transferred between banks, which will be examined below in this Chapter.

¹²³ This does mean however that a distinction can be drawn in payments system. The large value or ‘inter-bank’ payment system is defined as the ‘contractual and operational arrangements that banks and other financial institutions use to transfer funds to each other’: Ruilin Zhou, ‘Understanding Intraday Credit in Large-value

current regulatory frameworks, retail payment providers and money transfer operators are usually only permitted to perform spot transactions – moving money from one bank account to the other – rather than storing the funds.¹²⁴

The CBK permitted a different institutional structure to emerge through the licence it imposed on Safaricom. The CBK wanted to minimise the compliance costs on Safaricom to better enable the firm to provide payment services to unbanked Kenyan communities.¹²⁵

To this end, the CBK classified Safaricom as a ‘payments provider’.¹²⁶ Consistent with this approach Safaricom marketed M-Pesa as a transfer and payment service.¹²⁷ Through additional consultations between the CBK and Safaricom, the MM firm was permitted to provide M-Pesa through a ‘special licence’. This licence comprised a series of contractual terms agreed between Safaricom and customers, and Safaricom and other associates in the system. The composition of these contractual

Payment Systems’ (undated) Federal Reserve Bank of Chicago, 1 <<file:///Users/Jono1/Downloads/3qep3-pdf.pdf>> accessed 19 April 2016. The ‘small-value’ or retail payments systems meets the payment needs of individuals and businesses for ordinary transactions in the economy: see Jurgen Pingitzer and Bruce J Summers, ‘Small-Value Transfer Systems’ in Summers (ed) (n 50) 2002. Even then however, funds are still moved from one bank account to another.

¹²⁵ The thesis uses the term ‘compliance costs’ whereas others may take use the term ‘regulatory costs’. The meaning of compliance costs is provided by Alfon and Andrews (1999) as ‘costs to firms and individuals of those activities required by regulators that would not have been undertaken in the absence of regulation.’ See Isaac Alfon and Peter Andrews, ‘Cost-Benefit Analysis in Financial Regulation - How to Do it and How it Adds Value’ (1999) FSA Occasional Paper Series 3, 16

<<http://citeseerx.ist.psu.edu/viewdoc/download?doi=10.1.1.201.978&rep=rep1&type=pdf>> accessed 20 April 2016. See the importance of minimal compliance costs for mobile money in Evans and Pirchio (2015) who explicitly link together light touch regulation and high levels of growth: David S. Evans and Alexis Pirchio, ‘An Empirical Examination of Why Mobile Money Schemes Ignite in Some Developing Countries but Flounder in Most’ (2015) Coase-Sandor Institute for Law and Economics Working Paper No. 723, 1 and 4.

¹²⁶ This description of Safaricom’s licence was used by the Communications Commission of Kenya: see ‘M-Pesa: Regulatory Framework’ (World Trade Organisation)

<http://www.wto.org/english/tratop_e/serv_e/wkshop_june13_e/wanjau_e.pdf> accessed 7 April 2016, 6.

¹²⁷ The Safaricom website states that the ‘core service’ of M-Pesa is ‘mobile money transfer’; Safaricom, ‘M-Pesa’, <<http://www.safaricom.co.ke/personal/m-pesa>> accessed 7 April 2016. The M-Pesa Terms and Conditions between the Safaricom and customer (‘M-Pesa Terms and Conditions’) also labels the service as a ‘Mobile Money Transfer Service’ (M-Pesa Terms and Conditions, Introduction and cl 1). The M-Pesa Amendment Deed, on which MPHC declares it holds customers’ funds on trust for customers states M-Pesa is an ‘electronic money service’ (M-Pesa Amendment Deed, cl 1). Note ‘M-Pesa’ is usually in capitals in M-Pesa legal materials. This thesis uses ‘M-Pesa’ when citing such material. This enables consistency between legal materials and the thesis.

terms and the special licence more generally is explored below in Section 2.3.2. The CBK took a ‘test and learn’ approach to this special licence, particularly in relation to the storage function: permitting Safaricom to provide mobile money and addressing risks if and when they arose.¹²⁸

This special licence regime used on M-Pesa unbundled the traditional, inter-bank payment model.¹²⁹ This is because customers could transfer funds by contracting directly with Safaricom, a non-bank, rather than a bank. A bank account was not needed. This was not novel per se, given that customers of retail payment providers and money transfer operators, which are also non-banks, can transfer funds without a bank account.

In addition, and more fundamentally, the M-Pesa model moved beyond retail payment and money transfer operators by providing a *storage* function. This is because, as explained above, a mobile money customer can store funds within the service and redeem them for her own consumption without any direct interaction with the banking system. This meant Safaricom, not a bank, provided an account into which funds would be paid, stored, withdrawn or transferred to others.¹³⁰

In M-Pesa, funds are stored in a bank.¹³¹ However, in other schemes this thesis will examine, banks are not involved at all and funds are invested in other liquid

¹²⁸ See AFI (n 42).

¹²⁹ Klein and Mayer (n 58) 10.

¹³⁰ This functionality moves further than stored value cards such as Starbucks gift cards. Usually such cards cannot be redeemed for the users’ own consumption. Furthermore, internet money transfer operators such as PayPal permit customers to store funds in their accounts. However, this service requires the banking system. This is because funds are paid into and out of the customers’ bank account: See PayPal, M-Pesa Terms and Conditions, cl 5, <<https://www.paypal.com/uk/webapps/mpp/ua/useragreement-full#3>> accessed 2 April 2016.

¹³¹ Klein and Mayer (n 58) 9. See also discussion with mobile money specialist, 15 March 2016.

assets. This is a novel development for payment systems because banks can be effectively removed from the institutional structure.

Finally, Safaricom was permitted to use *cash merchants* to perform cash-in and cash out functions. These actors are institutionally independent of Safaricom in that they are separate corporate entities. Cash merchants substitute bank branches and ATMs, enabling funds to be converted from cash into electronic form and vice versa. These actors further exclude banks from the institutional structure of this payment and storage system.

The three levels of unbundling move M-Pesa and later mobile money innovations outside the established framework of payments and banking scholarship. Retail payments scholarship is not, in itself, adequate for addressing mobile money because mobile money provides a storage, as well as payment, function. And inter-bank payments regulation cannot be directly applied to mobile money because the account holder is a phone company, not a bank, and cash merchants take the function of bank branches.

Unbundling also means mobile money does not fit within international payment standards such as *Core Principles of Systemically Important Payment Systems* produced by the Bank for International Settlements in 2001. This is because the standards assume that banks are account holders in payment systems, not non-banks such as phone companies.¹³² Other international standards, particularly those

¹³² The BIS principles define payment systems 'as the means by which funds are transferred among banks': Bank for International Settlements, 'Core Principles of Systemically Important Payment Systems' (January 2001) Bank for International Settlements, ss 1.1 and 3.0.1 <<http://www.bis.org/cpmi/publ/d43.pdf>> accessed 8 April 2016.

that address systemic risk, have not been applied to mobile money.¹³³ This has been labelled a potentially important ‘lacuna’ given the growing importance of mobile money in many countries in which it operates.¹³⁴

1.2.3.2(b) A Lack of Research

At the time, the CBK’s regulatory approach was not analysed in depth. This is because few actors foresaw that M-Pesa, and mobile money more generally, would grow to its current size.

As mobile money grew, calls began to be made for research into the institutional structure that underpins the service.¹³⁵ This is because it became

¹³³ In particular, international standards have been issued at the level of the Financial Stability Board, Basel Committee on Banking Supervision, and International Organisation of Securities Commission to identify systemic firms. Such firms can take the form of banks, traders, shadow banks, market infrastructure providers or any other type of institution. See for example, Werner Bijkerk, Shane Worner, Rohini Tendulkar, Siddhartha Sanghi, ‘Systemic Risk Identification in Securities Markets’ (July 2012) International Organization of Securities Commissions, 53

<<http://www.iosco.org/research/pdf/swp/Option%20for%20Systemic%20Risk%20Identification%20System.pdf?v=1>> accessed 8 April 2016; see Bank for International Settlements, ‘Global Systemically Important Banks: Assessment methodology and the Additional Loss Absorbency Requirement’ (November 2011) Bank for International Settlements, 4 <<http://www.bis.org/publ/bcbs255.pdf>> accessed 8 April 2016; see Financial Stability Board, International Monetary Fund, Bank for International Settlement, ‘Guidance to Assess the Systemic Importance of Financial Institutions, Markets and Instruments: Initial Considerations’ (October 2009) Financial Stability Board, International Monetary Fund, Bank for International Settlement, 3 <http://www.fsb.org/wp-content/uploads/r_091107c.pdf?page_moved=1> accessed 8 April 2016; and Basel Committee on Banking Supervision, ‘A Framework for Dealing with Domestic Systemically Important Banks’ (October 2012) Basel Committee on Banking Supervision, 2 <<http://www.bis.org/publ/bcbs233.pdf>> accessed 8 April 2016. Werner Bijkerk, Rohini Tendulkar, Samad Uddin and Shane Worner, ‘Systemic Risk Identification in Securities Markets’ (July 2012) International Organization of Securities Commissions (IOSCO) Research Department, Staff Working Paper 2012/1 <<https://www.iosco.org/library/pubdocs/pdf/IOSCOPD461.pdf>> accessed 15 December 2016

¹³⁴ John Armour and Daniel Awrey, *Prioritising the Implementation of International Financial Regulation* (The Commonwealth, Economic Papers Series, 2015). Concerns have been raised that mobile money may increase the velocity of payments in the money transfer system (see Klein and Mayer (n 58) 12). 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 and John Muellbauer, ‘Does Mobile Money Cause Inflation? Evidence from Inflation Models for Uganda: A Policy Brief’ (2015) Said Business School, Oxford University <<http://www.sbs.ox.ac.uk/sites/default/files/research-projects/mobile-money/Mobile-money-inflation-30April.pdf>> accessed 8 April 2016; Janine Aron, John Muellbauer, and Rachel Sebudde, ‘Inflation Forecasting Models for Uganda: is Mobile Money Relevant?’ (2015) Said Business School, Oxford University <<http://www.sbs.ox.ac.uk/sites/default/files/research-projects/mobile-money/inflation-forecasting-16April.pdf>> accessed 8 April 2016.

¹³⁵ Consultative Group to Assist the Poor, ‘Legal Environment for Branchless Banking, Including Mobile Payments, Implications for Financial Inclusion’, (2013) Presentation, UNCITRAL Colloquium on Microfinance, January <http://www.uncitral.org/pdf/english/colloquia/microfinance-2013/1701/CGAP_Presentation_UNCITRAL_Monica_Harutyunyan_2nd.pdf> accessed 14 April 2014.

recognised that mobile money did not sit easily within existing regulatory paradigms of payments and banking.¹³⁶

However, little substantive literature has emerged. Most research on this topic takes the form of reports written by consultants outlining the case for continued growth in mobile money. This material tends to feature little, if any, underlying academic rigour or unifying analysis. Continued disagreement over the meaning of fundamental terms is indicative of the fledgling and incoherent nature of the research. For example, many authors use ‘mobile money’ and ‘mobile banking’ synonymously, however, this thesis will help explain that, in fact, these terms have very different meanings.¹³⁷

A small set of materials identify the various risks in mobile money. These include USAid (2010) and a comprehensive literature review written by Aron (2015).¹³⁸ However, this material does not tend to examine potential regulatory responses and policy trade-offs involved in using them.

Overwhelmingly, literature discussing the regulation of mobile money argues for an ‘enabling’ approach.¹³⁹ This involves permitting experimentation to occur in

¹³⁶ Lyman, Pickens and Porteous (n 3) 5, 16.

¹³⁷ A key point to is that mobile banking generally means using a mobile phone to access regular services provided by a bank: see AFI (n 42) 3. The true significance of mobile money emerges because a bank account is not required. This point will be developed over the course of the thesis.

¹³⁸ USAid, ‘Mobile Financial Services Risk Matrix’ (2010) United States Agency for International Development, Washington, DC, USA, 23 July 2010 <<http://www.gsma.com/mobilefordevelopment/wp-content/uploads/2012/06/mobilefinancialservicesriskmatrix100723.pdf>> accessed 2 April 2016. Also, see Aron (n 82).

¹³⁹ Alexandre, Mas and Radcliffe (n 41) 4; Ignacio Mas, ‘Transforming Access to Finance in Developing Countries Through Mobile Phones: Creating an Enabling Policy Framework’ (2012) 27 *Banking and Finance Law Review* 285, 292.

mobile money and related products with few regulatory impediments.¹⁴⁰ Many of these studies are funded by organisations with strong financial inclusion and pro-growth agendas, such as the GSMA and the Alliance for Financial Inclusion (AFI).¹⁴¹

A smaller range of materials move further and seek to determine a conceptual base for mobile money regulation. Some studies propose that bank regulation should be adapted to mobile money.¹⁴² Others use telecommunications as a starting point to analyse mobile money regulation.¹⁴³ However, these studies do not provide a methodology for making this adaptation. Ultimately, most of the literature is aggregate in nature without delving into the basic operations of mobile money and its regulatory implications.¹⁴⁴

There are three notable exceptions to this broad trend. The first is Klein and Mayer (2011), who analyse the regulatory implications of M-Pesa.¹⁴⁵ They argue that M-Pesa unbundles the payments process into its component parts of exchange, storage, transfer, and investment of money.¹⁴⁶ Regulation needs to move from an

¹⁴⁰ *ibid.* See also David Porteous, 'The Enabling Environment for Mobile Banking in Africa' (2006) Department for International Development, 3-4 <http://bankablefrontier.com/wp-content/uploads/documents/ee.mobil_banking.report.v3.1.pdf> accessed 7 April 2016 ; Simone de Castri, 'Mobile Money: Enabling Regulatory Solutions' (2013) GSMA, 1-2 <<http://www.gsma.com/mobilefordevelopment/wp-content/uploads/2013/02/MMU-Enabling-Regulatory-Solutions-di-Castri-2013.pdf>> accessed 7 April.

¹⁴¹ See the mission statement of these two institutions: AFI, 'Who We Are' (AFI, 2015) <<http://www.afi-global.org/who-we-are>> accessed 29 September 2015; GSMA, 'About Us' (GSMA, 2015) <<http://www.gsma.com/aboutus/>> accessed 29 September 2015.

¹⁴² See eg Mas (2012) arguing that a banking regulator should have full oversight over mobile money: Mas (n 41) 285. See Alexandre, Mas and Radcliffe (2010) arguing that banking regulation should be applied in ways that enables banks, mobile operators and retail shops to experiment with new partnership models while still protecting the stability of the financial system as a whole, the integrity of transactions and the safety of customers' deposits: Alexandre, Mas and Radcliffe (n 41) 4.

¹⁴³ Arvind Ashta, 'Evolution of Mobile Banking Regulations' (2010) Journée de recherche CEREN- - CERMi Burgundy School of Business, 1, 5,8 <<file:///Users/Jono1/Downloads/SSRN-id1583080.pdf>> accessed 20 April 2016.

¹⁴⁴ Klein and Mayer (n 58) 6.

¹⁴⁵ *ibid.*

¹⁴⁶ *ibid.* 10.

institutional approach, focusing on a bank, to a functional one which targets the relevant function in question.¹⁴⁷

By explaining unbundling and emphasising the importance of a functional approach, Klein and Mayer (2011) make an important contribution to discussions of mobile money. It is by far the most comprehensive regulatory analysis of M-Pesa and, as will be explained in this thesis, their work informs much of the limited research in this field. However, this work does not address the plethora of new mobile money products and regulatory frameworks for this service that have emerged since this article was written in 2011. This thesis takes the concepts of unbundling and a functional approach to these more recent developments.¹⁴⁸

The second and third works are Greenacre and Buckley (2014) and Munoz, Solana, Buckley and Greenacre (2016), who explore how to protect funds gathered from customers in mobile money schemes across common law and civil law jurisdictions respectively.¹⁴⁹ These works contribute to discussions on the protection of customers' funds, which are of particular importance to mobile money. However, they do not provide a coherent framework through which mobile money regulation can be analysed.

¹⁴⁷ *ibid* 3 and 10-17. Occasionally these scholars discuss 'services' (at 3) but for most the paper use the word 'functions'.

¹⁴⁸ Note that the thesis defines 'functional approach' in text to n 170.

¹⁴⁹ Jonathan Greenacre and Ross Buckley, 'Using Trusts to Protect Mobile Money Customers', (2014) 2014(1) Singapore Journal of Legal Studies, 59; David Ramos Muñoz, Javier Solana, Ross P. Buckley and Jonathan Greenacre, 'Protecting Mobile Money Customer Funds in Civil Law Jurisdictions' (2016) 65(3) International and Comparative Law Quarterly, July 2016, 705
<https://www.researchgate.net/publication/303834556_PROTECTING_MOBILE_MONEY_CUSTOMER_FUNDS_IN_CIVIL_LAW_JURISDICTIONS> accessed 29 December 2016.

Ultimately then, Klein and Mayer (2011), Greenacre and Buckley (2014), Aron (2015), and Munoz, Solana, Buckley and Greenacre (2016) provide useful contributions, but by themselves, have not been able to stimulate the wider development of a coherent framework for mobile money regulation. This thesis aims to develop their work and build such a framework.

1.2.3.3 Why the Regulatory Lag Matters

This last section explains that the regulatory lag is becoming an increasingly important issue for mobile money. Early literature on mobile money argued strongly for a continuation of the ‘test and learn’ approach. On this view mobile money was so new and provides such important humanitarian benefits that regulation should be ‘light touch’ in nature to encourage rather than inhibit its growth.¹⁵⁰

Resistance to regulatory intervention in this ‘boom’ time of mobile money is broadly consistent with the political economy of the regulation of financial products.¹⁵¹ However, permitting continued development and growth in mobile money without adequate research will be an error; the history of finance suggests that rapid growth and innovation of the type experienced in mobile money without accompanying regulatory understanding can ultimately lead to financial disaster.¹⁵²

¹⁵⁰ Alexandre, Mas and Radcliffe (n 41). Note that some of this view is justified on the grounds that little is known about the unbanked and what financial services they actually want and need: Pickens, Porteous and Rotman (n 19) 3.

¹⁵¹ During times of economic growth a combination of voter apathy on financial issues and lobbying by the financial sector means that financial innovation can occur with limited effective oversight. In times of economic recession, the positions are reversed and politicians move to appease voter discontent by ‘punishing’ banks. A useful explanation of this tendency comes from Culpepper (2011) who provides an explanation of the operation of collective action on corporate control in Europe and Japan: see Pepper D Culpepper, *Quiet Politics and Business Power: Corporate Control in Europe and Japan* (Cambridge University Press 2011) 4. See discussion in Simon Johnson and James Kwak, *Thirteen Bankers: The Wall Street Takeover and the Next Financial Meltdown* (Pantheon Books 2010).

¹⁵² This point is put usefully in Armour and others (2016), who state ‘Reliance on financial innovations that promise much, through mechanisms that no one understands, has a history of ending badly’; Armour and others (n 2) ch 1, 7.

The Global Financial Crisis provides a number of useful examples of this trend, one of which is securitisation. Like mobile money, by taking advantage of regulatory freedom, securitisation grew rapidly. Without adequate understanding of securitisation, policymakers failed to spot the build-up of risks in the system and then had limited ability to address them when they emerged.¹⁵³

The regulatory lag has also operated in international development. This problem has been particularly pronounced in relation to micro-credit. Despite sporadic efforts, regulatory thinking did not keep up with the growth in this sector.¹⁵⁴ As with securitisation, the results were disastrous. In 2009, micro-credit sectors collapsed in India, Morocco, Nicaragua, and Pakistan. These failures exhibited similar features to the subprime meltdown in the United States in 2008, with major client over-indebtedness, rapidly growing client defaults, massive client withdrawals and ultimate closure of key micro-credit institutions.¹⁵⁵ Collapse in India was particularly severe. Many over-indebted borrowers committed suicide.¹⁵⁶

¹⁵³ Kathryn Judge, 'Fragmentation Nodes: A Study in Financial Innovation, Complexity, and Systemic Risk' (2012) 64(657) *Stanford Law Review*, March 2012 <<http://www.stanfordlawreview.org/wp-content/uploads/sites/3/2012/04/Judge-64-Stan-L-Rev-657.pdf>> accessed 15 December 2016; Lawrence J. White, 'Markets: The Credit Rating Agencies' (2010) 24(2) *Journal of Economic Perspectives*, Spring 2010 <<http://lamfin.arizona.edu/fixi/creditmod/papers/White2010.pdf>> accessed 15 December 2016; and Benjamin J Keys, Tanmoy Mukherjee, Amit Seru and Vikrant Vig, 'Did Securitization Lead to Lax Screening? Evidence from Subprime Loans' (2010) 125 *Quarterly Journal of Economics* 307. These sources were cited in Armour and others (n 2) ch 1, 8.

¹⁵⁴ Hennie van Greuning, Joselito Gallardo and Bikki Randhawa, 'A Framework for the Regulation of Microfinance Institutions' (1998) World Bank <<http://www1.worldbank.org/finance/assets/images/2755.pdf>> accessed 20 April 2016; and Leslie Theodore, 'The Experience of Microfinance Institutions with Regulation and Supervision' in Deborah Drake and Elisabeth Rhyne (eds), *The Commercialization of Microfinance* (The Kumarian Press 2002).

¹⁵⁵ The overwhelming excitement and enthusiasm in the international development sector about micro-credit means there is little material available on its market collapses. See Milford Bateman, 'The Rise and Fall of Muhammad Yunus and the Micro-Credit Model' (2014) *International Development Studies: Working Paper Series #001* January 2014 and Ha-Joon Chang, *Things They Don't Tell You About Capitalism* (Bloomsbury 2011) 51-52. Milford Bateman, 'The Rise and Fall of Muhammad Yunus and the Micro-Credit Model' (2014) *International Development Studies: Working Paper Series #001* January 2014 <<https://www.microfinancegateway.org/sites/default/files/mfg-en-paper-the-rise-and-fall-of-muhammad-yunus-and-the-microcredit-model-jan-2014.pdf>> accessed 15 December 2016.

¹⁵⁶ *ibid.*

The collapse of a major mobile money scheme could not create the sort of damage to the financial system caused by the failure of securitisation. This is because mobile money schemes mobilise a very small portion of household wealth in an economy.¹⁵⁷ For example, as of September 2013, the value of funds stored within M-Pesa's mobile money system, which in turn are placed in a bank account, comprised just 0.4% of Kenya's overall deposit base.¹⁵⁸ And usually mobile money only processes a relatively limited component of a country's overall payments. For example, mobile money in Kenya, which has one of the world's largest and most sophisticated mobile money sectors, processes just 7.4% of the value of the country's total payments.¹⁵⁹ Instead of systemic concerns, the regulatory lag is particularly important and motivates and informs the subject matter of the thesis, in two ways.

1.2.3.3(a) Economic Consequences for the Unbanked

Failure of an MM firm may cause severe economic consequences to an unbanked person. In particular, loss of the funds she handed over to a MM firm may destroy her entire asset base. Such a loss would comprise an economic shock that may inhibit her ability to move from poverty or cause her to fall back into it, should she have recently

¹⁵⁷ For example, Lauer and Tarazi (2012) state that non-bank mobile money providers do not present a systemic risk due to the limited funds involved: Kate Lauer and Michael Tarazi, 'Supervising Nonbank E-Money Issuers' (2012) Consultative Group to Assist the Poor (CGAP), July 2012 <<https://www.cgap.org/sites/default/files/CGAP-Brief-Supervising-Nonbank-Emoney-Issuers-Jul-2012.pdf>> accessed 20 April 2016, 1, 3 and 4.

¹⁵⁸ This is an approximation based on the following figures. In September 2013, Safaricom held 725,944,000,000 (Kenyan currency) in depositors from its M-Pesa service (see Safaricom 'M-Pesa Statistics' (*Safaricom*, undated) <<http://www.safaricom.co.ke/personal/tools/m-pesa-tools/m-pesa-statistics>> accessed 9 April 2016). In March 2013: Kenya's total depositor base was 1.8 trillion (see Central Bank, 'Kenyan Banking Sector Registers Improve Performance' (*Central Bank of Kenya*, 31 March 2013) <<https://www.centralbank.go.ke/index.php/news/296-kenyan-banking-sector-registers-improved-performance>> accessed 9 April 2016). Dividing Safaricom's deposits by Kenya's total depositor base comes to around 0.4%. See the discussion on the CBA below.

¹⁵⁹ Claire Alexandre, '10 Things You Thought You Knew about M-PESA' (2010) Consultative Group to Assist the Poor (CGAP), 22 November 2010 <<http://www.cgap.org/blog/10-things-you-thought-you-knew-about-m-pesa>> accessed 9 April 2016.

emerged. This is because in many countries in which mobile money operates, there is little, if any, surrounding social security net such as state-supported insurance.¹⁶⁰

There is another problem which arises even through failure of an individual MM firm in which the customer has stored her funds. This is due to a substitutability issue. In a developed country, in the event her bank fails, a bank depositor can eventually access an equivalent payment and storage services from another. In contrast, in developed countries, should one MM firm fail, an unbanked customer may be unable to access services provided by another. This is because, in many countries, the mobile money sector is still so under-developed that only one MM firm serves the entire population, including its unbanked community.¹⁶¹ In the event of its failure there may be a significant delay in the entrance of a second MM firm to fill the gap. Furthermore, there is a non-trivial chance that no other MM firm enters the sector, which means the unbanked customer permanently loses access to mobile money.¹⁶²

More generally, the unbanked customer is unable to substitute the banking system for mobile money. This is because banks usually find it unprofitable to serve poor communities in developing countries.¹⁶³

¹⁶⁰ See discussions of the challenges of providing social security in developing countries in Institute of Social Studies, 'Social Security in Africa' (2008) 10 Development Issues <http://www.iss.nl/fileadmin/ASSETS/iss/Documents/DevISSues/DevISSues_Volume_10__number_2__November_2008_01.pdf> accessed 20 April 2016.

¹⁶¹ However, see material in Chapter 6 about how multiple MM firms now operate in a significant number of markets: text to n 572.

¹⁶² However, gradually more MM firms are entering the mobile money sector, as discussed in the previous reference.

¹⁶³ As discussed earlier in this Chapter: text to n 80.

As a result, the collapse of mobile money means an unbanked customer must resort to the informal financial services she had previously used, which is likely to mean extensive use of cash. This means the unbanked person loses the economic benefits of using electronic payment and storage functions through mobile money, discussed above in Section 1.2.1.2 of Chapter 1. In turn, this will cause her economic networks to shrink, reduce her ability to hedge risks, raise her costs of liquidity, and generally impair her ability to meet her economic needs.¹⁶⁴

The potential economic harm to an unbanked person, particularly when her funds are lost, informs a key motivation for the thesis; research is required to design effective regulatory frameworks that protect such funds from loss. Such research is required because, as will be explored below, research into this topic is limited. In turn, this helps guide the focus of the thesis, which is to understand the key regulatory and policy issues in the protection of funds stored and transferred within mobile money platforms.

1.2.3.3(b) Additional Justifications

The thesis is also motivated by two other issues that relate to the consequences of the failure of mobile money and the regulatory lag. An indirect consequence of collapse of mobile money and loss of customers' funds may be an impairment to financial inclusion efforts of governments and international organisations. This is because such outcomes may cause unbanked customers to lose confidence in this service and possibly formal financial services more generally. A failure could have such an effect because usually the unbanked have much more experience in using informal rather

¹⁶⁴ See earlier in this Chapter for a discussion of the benefits that accrue to an unbanked person when she access mobile money and electronic financial services more generally: text to n 26.

than formal financial services.¹⁶⁵ For this reason, a disruption or failure of mobile money may have a disproportionate effect by encouraging customers to revert to their informal financial services.

Finally, research is required into the protection of customers' funds and mobile money generally because innovation is continuing to move mobile money further from existing regulatory paradigms. This innovation takes the form of additional levels of unbundling, in which responsibilities for providing the component parts of mobile money are shared across an ever greater number of actors. These functions, and their innovations, will be further explored later in the thesis, but are listed now to provide an overview of developments in the mobile money sector.

In particular, the funds conversion component of the service has been developed through the creation of larger, more extensive cash merchant networks. Early networks, such as the original M-Pesa service, were small and relied on the one type of cash merchant. This was a 'retail' cash merchant which performed all core services and was monitored directly by the MM firm.

More recently, cash merchant networks, pioneered by developments in Uganda, have become larger and more complex as a range of additional actors have become involved in providing components of the funds conversion service. For example, street cash merchants perform small-scale fund exchange transactions in market places and on streets. Wholesale cash merchants hold large amounts of e-money and cash, enabling cash merchants to obtain either when necessary for their

¹⁶⁵ Heather A Clark, *When There Was No Money: Building ACLEDA Bank in Cambodia's Evolving Financial Sector* (Springer 2006).

liquidity needs. And master cash merchants monitor the liquidity of groups of cash merchants.

In addition, the payment function has become enhanced. Kenya's mobile money sector is 'non-interoperable', meaning a customer can only transfer funds to another customer of the same MM firm. However, beginning in 2013, MM firms in other countries established 'interoperable' systems. This enables customers to transfer funds between different MM firms.¹⁶⁶ Interoperability has taken place in Bangladesh, Indonesia, Pakistan, Sri Lanka, and Tanzania.

Finally, the storage component of mobile money has also become more developed. As discussed above in Section 1.2.3.2(a) of this Chapter, in M-Pesa, customers' funds are ultimately stored in the form of a bank deposit. In other countries, policymakers have permitted or required MM firms to move beyond the M-Pesa model and store customers' funds in one or more asset classes, including central bank accounts, government and corporate bonds, and commercial bank deposits. The table below provides an overview of the different asset classes available across countries.¹⁶⁷

¹⁶⁶ Chapter 6 examines interoperability: text to n 571.

¹⁶⁷ Chapter 4 examines the policy implications of different trust assets: text to 431.

Table 1: 'Storage' Assets Purchased by MM Firms

Asset	Country
Central Bank Account	Colombia, El Salvador
Government and/or Corporate Bonds	Benin, Bolivia, Burkina Faso, Ivory Coast, Guinea-Bissau, the Philippines, Mali, Niger, Senegal, Togo
Commercial Bank	Kenya, Lesotho, Malawi, Namibia, Paraguay, the Philippines, Sri Lanka, Uganda, West African Economic and Monetary Union

These institutional developments are additional evidence of the on-going regulatory lag in mobile money and serve as additional motivation for this thesis. They are taking place with limited underlying research into both the risks to customers' funds and how they should be addressed. Moving forward, the thesis aims to better understand the regulatory issues that underpin mobile money in order to address potential regulatory deficiencies in current frameworks, particularly in relation to customers' funds. This is the task of the thesis. The next section outlines the structure used in the thesis to do so.

1.3 Structure

As discussed in the following Chapter, the thesis focuses on regulatory and policy issues that arise in relation to customers' funds when deposited, stored, and transferred within mobile money platforms rather than competition, financial crime, or other important issues. The thesis takes this focus for the reasons discussed above in Section 1.2.3.3(a), particularly the economic vulnerability of unbanked people should their funds be lost through mobile money platforms. Other regulatory issues

are of importance and should be the subject of future research, as discussed in Chapter 7.

The thesis explores regulatory issues involved with customers' funds through the following structure:

- Chapter 2: Aims, Methodology, and Claims;
- Chapter 3: Conflict of Interest Between Shareholders and Customers;
- Chapter 4: The Balance Sheet of the MMHC;
- Chapter 5: Funds Conversion;
- Chapter 6: Payment; and
- Chapter 7: Conclusion

The thesis uses the structure in chapters 3-6 to examine the risk profile of each specific component of mobile money. Each chapter examines a component of the service and assumes risks from the component examined in the previous chapter have been addressed, as follows. Storage is examined first because, as will be explored throughout the thesis, addressing risks of this function can simultaneously address many of the risks that might arise elsewhere in the service.

Two issues underpin the storage function, each of which are examined consecutively. These are that the MM firm and MMHC must commit to not engage in opportunism with customers' funds (Chapter 3) and then credit and liquidity risks to the MMHC based on its use of those funds must be addressed (Chapter 4).

Once funds are safely stored, various ‘bolt-on’ services and functions can be added which create limited additional risk to the system. For example, cash merchants can be added to mobile money, which enables the cash-in and cash-out function to be extended beyond the infrastructure of the MM firm (Chapter 5). Furthermore, once funds are safely stored, they can be transferred to others through a payment function (Chapter 6).

Chapter 7 concludes the thesis. It recaps on the main findings of the thesis, explores a socially desirable role for banks given the rise of mobile money, and briefly proposes next steps for research in this field.

The starting point for doing so is to outline the aims, methodology, and claims of the thesis. The next chapter performs this task.

CHAPTER 2: AIMS, METHODOLOGY, AND CLAIMS

This chapter has three main parts. The first explains the aims of the thesis. The second outlines the methodology the thesis uses to explore these aims. The third describes the key claims of the thesis.

2.1 Aims

Based on current projections, particularly in Africa, mobile money is likely to continue to grow.¹⁶⁸ Key reasons given for this likely growth are the continuing spread of mobile phone technology, on-going reluctance of banks to serve unbanked and low-income customers, as evidenced by the low penetration of banking infrastructure, and the growing number of profitable, sustainable mobile money services.¹⁶⁹ The thesis aims to understand the institutional and regulatory frameworks that can assist mobile money to grow safely, particularly in relation to the protection of customers' funds.

2.2 Methodology

The methodology used to address this aim consists of two components. The material below outlines each component and explains why they are useful for analysing the key regulatory and policy issues in mobile money in relation to the protection of customers' funds.

¹⁶⁸ Chapter 1 discusses the potential profitability of mobile money in low-income communities: text to n 82.

¹⁶⁹ The spread of mobile phone technology has been particularly remarkable. Mobile phones service is the most widely available type of infrastructure across Africa, outranking electricity, piped water, sewerage, and surfaced roads: Benjamin Leo, Robert Morello, and Vijaya Ramachandran, 'The Face of African infrastructure: Service Availability and Citizens' demands' (2015) Afrobarometer Working Paper No. 154, February 2015 <<http://afrobarometer.org/sites/default/files/publications/Working%20paper/Afropaperno154.pdf>> accessed 23 December 2016, 4.

2.2.1 Functional Approach

The thesis uses the *functional* approach to regulation. This approach involves focusing on the risks of a financial system or service based on its functions, rather than the institutions providing it.¹⁷⁰ Regulation then aims to address the risks caused by those functions.¹⁷¹

The functional approach is useful for this thesis because it captures the unbundling that underpins mobile money; as will be examined below in Section 2.3.1.2 of this Chapter, mobile money provides functionally equivalent payment and storage functions as a bank. However, these functions are provided by institutions that differ from banks in several important ways, as will be examined in the thesis. A functional approach facilitates an analysis of what functions of mobile money justify the imposition of different types of regulation rather than making this determination based on whether the firms involved are formally classified as phone companies, banks, or any other type of institution.¹⁷²

2.2.2 Economic Approach to Regulation

The second component of the methodology is the *economic approach* to regulation. This approach involves applying the analytic tools of economics to determine the legal and regulatory frameworks which can most usefully correct the failures of a

¹⁷⁰ Robert Merton and Zvi Bodie, 'A Conceptual Framework for Analyzing the Financial Environment' in Dwight Crane, Kenneth Froot, Andre Perold, Robert Merton and Peter Tufano, *The Global Financial System: A Functional Perspective* (Harvard Business School Press 1995). See also Armour and others (n 2) ch 1, 10-11.

¹⁷¹ *ibid* and at 13.

¹⁷² Klein and Mayer (n 58) 22.

financial system.¹⁷³ In particular, this involves addressing ‘market failures’, defined below, that impede the functioning of the financial system.¹⁷⁴

The economic approach to regulation provides a useful toolkit for examining the regulation of mobile money because of its universality. By focusing on markets, the economic approach can apply independently of the legal, political, and social system in question. This means insights from the thesis can apply across different models of mobile money and their surrounding jurisdictions. These insights can also be applied to new forms of mobile money that will arise in the future as the sector develops. The material below examines the economic approach in greater detail and how it is used in the thesis.

2.2.2.1 Starting Point for Regulation – The Efficiencies of Markets

Pursuant to the economic approach to regulation, the thesis focuses on determining instances in which regulation can improve efficiencies in mobile money platforms and what form it should take. Under the economic approach to regulation, the starting presumption is that a market should operate without public intervention unless there is clear evidence of its failure.¹⁷⁵ This benchmark exists on the grounds that in perfectly-functioning markets the invisible hand of competition guides market actors to create Pareto efficient outcomes.¹⁷⁶ In such an outcome, there are no alternative allocations

¹⁷³ Note, the presence of a failure only creates a prima facie case for regulatory intervention, as discussed in Part 2.2.2.2 below: text to n 190. See Armour and others (n 2) ch 1, 52.

¹⁷⁴ See Chapter 2, Section 2.2.2.1: text to n 178.

¹⁷⁵ Armour and others (n 2) ch 3, 51.

¹⁷⁶ The allocation of resources from perfectly competitive markets is Pareto Optimal: no one can be made better off without someone else being made worse off. Pareto defined efficiency as existing if there no alternative allocation of resources that could make at least one person better off while making no one worse off: V Pareto, ‘Il Massimo di Utilità Dato dalla Libera Concorrenza’ (1894) 9 *Giornale degli Economisti* 48, 58 <<http://www.jstor.org/stable/23219149>> accessed 9 April 2016, cited in Armour and others (n 2) ch 3, 51.

and uses of resources across activities, individuals, and time under which anyone would be better off.¹⁷⁷

Regulation may be justified in instances in which the market does *not* produce a Pareto efficient outcome. These instances are known as ‘market failures’. Such failures mean that markets do not yield outcomes that are efficient, in that there may be alternative allocations and uses of resources across activities, individuals and time which would make one or all parties ‘better off’. Market failures can also take the form of the absence of a deal altogether.¹⁷⁸

As with other services providing payment and storage functions, mobile money can be subject to a range of market failures. This section outlines the potential forms of these market failures.

Mobile money may be subject to *competition problems*, which can emerge when there is one (monopoly) or a small number (oligopoly) of producers. In such a situation, producers may be able to charge prices in excess of the cost of providing the goods and service. This means producers can choose to sell at a quantity below the competitive equilibrium. As a result, the gains from trade are not maximised.¹⁷⁹

¹⁷⁷ Note, in this context ‘efficiency’ has three meanings. The first is productive efficiency, which measures the extent to which an activity maximises outputs given a set of inputs. The second is allocative efficiency. This criteria measures the extent to which property rights are allocated to the party and activities that values them the most. The third, which is particularly relevant to financial markets, is dynamic efficiency. This term describes the allocation of resources between different points of time in ways in there is no alternative allocation that could make at least one person better off while making no one else worse off (Armour and others (n 2) ch 3, 51).

¹⁷⁸ See discussion in Oren Sussman, *First Principles of Financial Economics* (draft, 2013), 16.

¹⁷⁹ Christian M. Bender, Georg Götz and Benjamin Pakula, ‘Effective Competition: The importance and relevance for network industries’ (2010) 46(1) *Intereconomics: review of European economic policy* 4, October 2010 <<https://www.uni-giessen.de/fbz/fb02/fb/professuren/vwl/goetz/forschung/publikationenordner/beitraegezeitschriften/effectivecompetition>> accessed 15 December 2016.

A second important potential market imperfection is *behavioural problems*. This market imperfection relates to the way in which market actors process information. In a perfect market, individuals are ‘rational’. This means they are welfare maximising, making choices in a way that furthers their own self-interest.¹⁸⁰ However, in ‘real life’ people have limited cognitive abilities.¹⁸¹ For this reason, individuals may exhibit ‘behavioural problems’, in which they do not always negotiate a deal that is Pareto efficient and welfare maximising. Instead, their opinions may be biased, prejudiced, and swayed by herd mentality, rather than an objective cost-benefit analysis of their own interest.¹⁸² As a result, consumers often make financial decisions that are not welfare maximising.¹⁸³ Behavioural problems can contribute to inefficient trade. In the interests of maximising profits, producers cater to irrational preferences rather than correct them. This creates unnecessary and overpriced products, rather than the selling and purchasing of products that maximise the use of resources.¹⁸⁴

A third and final potential market failure in mobile money is *negative externalities*. In this instance, a deal is struck, but impacts parties not subject to the arrangement (‘third parties’).¹⁸⁵ In this instance, a negative externality arises in which a person or institution imposes costs on third parties for which the person or

¹⁸⁰ Put alternatively, a rational actor aims to rank alternatives according to the extent they give her what she wants: Robert Cooter and Thomas Ulen, *Law and Economics* (6th edn, Addison-Wesley 2016).

¹⁸¹ Amos Tversky and Daniel Kahneman, ‘Judgment under Uncertainty: Heuristics and Biases’ (1974) 185 *Science* 1124; Some Consequence of Having Too Little 682, 684, 1, cited in Armour and others (n 2) ch 10, 211.

¹⁸² For reviews, see Thomas Gilovich, Dale Griffin and Daniel Kahneman (eds), *Heuristics and Biases: The Psychology of Intuitive Judgment* (Cambridge: CUP, 2002); Daniel Kahneman, *Thinking, Fast and Slow* (Cambridge: CUP, 2011); Cass Sunstein, ‘Empirically Informed Regulation’ (2011) 78 *University of Chicago Law Review* 1349. These issues are discussed in more detail in Armour and others (n 2) ch 10.

¹⁸³ Matthew Martin, ‘A Literature Review on the Effectiveness of Financial Education’ (2007) Federal Reserve Bank of Richmond, Working Paper No. 07-03 <https://www.richmondfed.org/~media/richmondfedorg/publications/research/working_papers/2007/pdf/wp07-3.pdf> accessed 15 December 2016.

¹⁸⁴ Armour and others (n 2) ch 3, 61.

¹⁸⁵ Note a positive externality arises when a person or institution takes actions that create benefits for third parties, for which the benefiting party is not fully charged: *ibid* ch 3, 57.

institution is not fully charged.¹⁸⁶ These third parties are unable to assemble and develop an agreement with the party or parties imposing the costs.¹⁸⁷ This is because there are too many third parties and/or there are insurmountable challenges of determining how to address the costs in question. These same factors also mean it is not feasible for legal intervention to enable the affected third parties to design an agreement with the party or parties imposing the costs in question.

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. In this situation, disruption to financial activity can damage the financial system and have serious negative consequences for the real economy.¹⁸⁸

Chapter 1 has explained that the thesis focuses on the protection of customers' funds in mobile money systems. A key motivation for focusing on this topic is that loss of such funds may cause severe economic hardship for an unbanked person by destroying her asset base and requiring her to resort to informal payment and storage instruments. Loss of such funds may impair wider financial inclusion efforts by causing her and other unbanked people to lose confidence in mobile money and potentially formal financial services altogether.¹⁸⁹

¹⁸⁶ *ibid*; see also Cooter and Ulen (n 180) 7; and Sussman (n 178) ch 6, 10.

¹⁸⁷ Cooter and Ulen (n 180) 167-168.

¹⁸⁸ For example, gridlock in the global inter-bank payment system or a loss of confidence banks world wide would constitute 'a systemic failure in the global banking system' 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, 15 July 2005

<<http://citeseerx.ist.psu.edu/viewdoc/download?doi=10.1.1.167.3780&rep=rep1&type=pdf>> accessed 16 December 2016, 4.

¹⁸⁹ See a discussion on this point in Chapter 1: text to n 165.

For this reason, the thesis focuses on the key market failure that is directly relevant to the protection of customers' funds. This is asymmetric information rather than the market failures discussed above. Asymmetric information is defined and discussed in Section 2.3.2.2(a) after the general discussion of the economic approach to regulation, which continues in the Section directly below.

2.2.2.2 Responding to Market Failures

Identifying a market failure is the first stage of an economic analysis of regulation. The next is to determine the potential desirability of public intervention. This involves at least three stages.

The first involves determining the *aims* of regulation. Public intervention may be able to create a more efficient allocation of resources than those associated with the real life unencumbered market in question.¹⁹⁰ This legal intervention can involve establishing 'rules of the game' that can alleviate the market failure. These rules might have emerged through market forces alone if not for the transaction costs underpinning the market failure.¹⁹¹

To the extent that intervention is required, regulation should address the causes of market failures, which are often loosely termed 'transaction costs'. This term is used to refer to imperfections in 'real life' markets that arise in the course of designing and implementing agreements. These market imperfections are deviations

¹⁹⁰ Alternatively, the market may have created an efficient outcome, but the outcome may be undesirable on the grounds that there is not a 'fair' distribution of resources. The current distribution may involve the mistreatment and exploitation of various members of society: Armour and others (n 2) ch 3, 55.

¹⁹¹ An alternative explanation involves public intervention seeking to 'mimic rules that might evolve in a world of lower transaction costs imposed through private ordering': Niamh Moloney, Ellis Ferran and Jennifer Payne (eds), *The Oxford Handbook of Financial Regulation* (Oxford University Press 2015), 82.

from the type of idealised ‘perfect’ markets that produce efficient trade.¹⁹² When sufficiently high, transaction costs can cause market failures.¹⁹³ This means legal intervention should *reduce* the transaction costs which restrict efficient transactions. Put conversely, the aim is to use law to, as far as possible, enable markets to move closer to the type of ‘perfect’ markets which then facilitate efficient bargaining.¹⁹⁴

The second stage involves identifying the type of intervention that could be used. Intervention in market activity can be understood on a spectrum, classified by the amount of governmental participation involved and, within certain forms, the number of actors involved in negotiating them.¹⁹⁵ At one end is private ordering. These are rules that are designed and adopted entirely by private actors. A policymaker chooses this option if private ordering alone is able to address the market failure in question most efficiently. In particular, the market may have produced a second best solution that can address the market failure more efficiently than public ordering.¹⁹⁶

At the other end of the spectrum is public ordering. These are rules of law originated and put into force by sovereign governments. Public ordering is justified on

¹⁹² Subsequent scholarship tends to define transaction costs as all the impediments to bargaining or the ‘costs of exchange’: Cooter and Ulen (n 180) 74, 84 and 85. See also discussion in Ronald. H. Coase, ‘The Nature of the Firm’ (1937) 4(16) 386, *Economica*, New Series, November, 1937
<<http://www.colorado.edu/ibs/es/alston/econ4504/readings/The%20Nature%20of%20the%20Firm%20by%20Coase.pdf>> accessed 15 December 2016.

¹⁹³ Cooter and Ulen (n 180) 90.

¹⁹⁴ *ibid.* Note, because the thesis examines agency problems rather than externalities, regulation of the latter is not directly relevant to the analysis. For completeness, regulation can aim to address externalities by preventing coercive threats and eliminating the destructiveness of the agreement. In this instance, the policymaker should allocate property rights to parties that value them the most: Cooter and Ulen (n 180) 61, 79, 84, 90 and 93.

¹⁹⁵ For the purposes of ‘private ordering’ means rules adopted by private actors without government sanction or enforcement (Steven Schwarz, ‘Private Ordering’ (2002) *Northwestern University Law Review* 319, 324). ‘Public ordering’ takes the meaning of ‘regulation’ outlined above: Text to n 2. The thesis notes that normally private and public ordering exists on a spectrum, but adopts a binary approach due to space constraints (Schwarz, *ibid* 324).

¹⁹⁶ See discussion of this point in, amongst other sources, Ronald H. Coase, ‘The Lighthouse in Economics’, (1974) 17(2) *Journal of Law and Economics*, 357.

the view that private forces are unlikely to produce the rules that are required to facilitate efficient trading.

A range of tools exist within these two extremes, representing different combinations of private and public ordering.¹⁹⁷ These rules can arise in the following ways: adopted by private actors without government sanction or enforcement, originated and put into force by private actors pursuant to governmental delegation; originated by private actors but implemented by sovereign governments; and rules originated and put into force by sovereign governments.¹⁹⁸

Third, in order to increase efficiency, a policymaker should conduct a *cost-benefit analysis* to determine whether legal intervention, either through public intervention or in some combination with private ordering, is more likely to contribute to efficient outcomes than private ordering alone.¹⁹⁹ This stage of analysis is required because regulatory intervention can have its own costs which may mitigate against efficiency. This can arise due to the rule itself or problems implementing and supervising it due to political economy problems which this thesis will explore.²⁰⁰

In doing so, a policymaker will also need to consider potential trade-offs between regulatory objectives. For example, in financial regulation, public ordering designed to buttress investor and consumer protection may conflict with financial stability. In particular, micro-prudential rules designed to reduce agency costs

¹⁹⁷ See discussion in Schwarz, 2002 (n 195).

¹⁹⁸ *ibid.*

¹⁹⁹ For an alternative formulation of this point, see Calabresi and Melamed (1982) who explain that a policymaker should decide whether market transactions or collective fiat is more likely to bring market actors closer to the Pareto optimal result the perfect market would reach: Guido Calabresi and A. Douglas Melamed, 'Property Rules, Liability Rules, And Inalienability: One View of the Cathedral' (1972) Yale Law School Faculty Scholarship Series Paper, 1983 <http://digitalcommons.law.yale.edu/fss_papers/1983> accessed 16 December 2016.

²⁰⁰ Armour and others (n 2) ch 3, 52, and main discussion in ch 4.

amongst financial firms may channel large pools of capital into a restricted number of investment types and strategies. In doing so, investment choices between financial firms becomes correlated, which can reduce the system's resilience to shocks.²⁰¹

2.2.3 Applying the Framework to Mobile Money

The discussion in Section 2.2.2 informs the design of the framework which the thesis uses to understand the key regulatory and policy issues in the protection of funds stored and transferred within mobile money platforms. The thesis applies the framework to features of the service that raise particularly important and novel regulatory issues. These include the conflict of interest between shareholders of the MM firm and customers (Chapter 3), the balance sheet of the MMHC (Chapter 4), cash merchant networks (Chapter 5), and the payment function (Chapter 6). The framework consists of the following components.

2.2.3.1 Aim

Consistent with the analysis described in Section 1.2.3.3(a), the framework aims to increase the efficiency of trading in mobile money platforms.²⁰² The framework consists of the following four steps: functions, market failures and risks, private ordering, and proposals for and trade-offs involved in using additional public ordering. These steps enable a determination of the extent to which, if at all, public ordering can increase the efficiency in mobile money platforms beyond the level achieved through the operation of the private ordering.²⁰³ The sub-sections below examine each step in further detail.

²⁰¹ See a discussion of correlation and regulatory responses to it in Armour and others (n 2) ch 19.

²⁰² Note this is also comparable to Scott (2014)'s approach, who analyses whether particular types of regulation will interfere with payment system efficiency: see an introduction to his methodology in Scott 2014 (n 31) 15.

²⁰³ Calabresi and Melamed, 1972 (n 199), 1105.

2.2.3.2 Component Steps

2.2.3.2(a) Functions

First, what *functions* does mobile money provide? This question is most fundamental because, as explained above, the thesis adopts a functional rather than institutional approach to mobile money platforms. This step involves identifying whether the key component part in question is providing a payment or storage function.

2.2.3.2(b) Market Failures and Risks

Second, what potential market failures and risks arise through this function? This is a ‘state of nature’ analysis. It involves determining the market failures and risks that arise through the function in question *without reference to any ordering* in the scheme.

2.2.3.2(c) Private Ordering

Third, to what extent, if at all, does private ordering address agency problems and resulting liquidity, credit, and operational risks? The analysis of private ordering underpins much of the thesis. This is because the original regulatory framework for M-Pesa comprises private rather than public ordering. In 2007, when authorising the launch of M-Pesa, the CBK issued a letter of no objection to Safaricom requiring the firm to implement anti-money laundering systems, ‘adequate’ protection of customers’ funds and the implementation of methods to ensure customers were not mistreated.²⁰⁴ Safaricom was authorised to design private ordering which gave effect

²⁰⁴ AFI (n 113) 5.

to these principles.²⁰⁵ Public ordering for mobile money was not introduced until 2014 in the form of the National Payment System Regulations 2014 (NPS Regulations).²⁰⁶

Private ordering in M-Pesa has the following functional structure. A first component of private ordering in mobile money comprise *commitments* made by the MM firm and its associates (MMHC, cash merchants) on how customers' funds will be safeguarded for the purposes of payments and storage. Such commitments enable the MM firm to outline how it will deliver on principles imposed by a policymaker. In the case of M-Pesa, Safaricom can use these commitments to explain how it will introduce and maintain 'adequate' protection of customers' funds, as discussed above.

An important point is that in the MM firm commits to the customer through contract that it (the MM firm) will provide payment and storage functions.²⁰⁷ However, as will be explored in the thesis, the MM firm delegates some of the tasks involved in providing those functions to its associates, principally the MMHC and different types of cash merchants. This means that the customer is the principal, the MM firm is the agent, and the associates are sub-agents.

A second component comprises what Kraakman et al term '*governance strategies*'.²⁰⁸ These are contractual terms which customers (principals) can use to facilitate control over the MM firm's (the agent) behaviour – specifically, its propensity to deliver on the commitments described above.

²⁰⁵ *ibid.*

²⁰⁶ This view sees public ordering as complementary to private ordering. This means the thesis examines the risks in a state of nature, the extent to which private ordering addresses or even amplifies them, and then the opportunity for public ordering to address residual risks.

²⁰⁷ The thesis explores the particular commitments made at various points.

²⁰⁸ John Armour, Henry Hansmann, Reinier Kraakman and Mariana Pargendler, *Anatomy of Corporate Law* (draft, 3rd edn, 2016), ch 2, 4.

The functional arrangements described above, namely the commitments and governance strategies, are framed in a legal structure which emerges from the following documents:

- Trust Deed between MM firm and MMHC (containing the declaration of trust which will be examined below);
- Amendment Trust Deed between MM firm and MMHC (slightly amending the declaration of trust);²⁰⁹
- Contracts between the MM firm and cash merchants; and
- ‘Terms and conditions’, which is the contract between mobile money customers and the MM firm.²¹⁰

The governance strategies are contained in the terms and conditions. The thesis also examines the likely ability of unbanked people to make effective use of governance tools to monitor the mobile money agents.

The thesis examines commitments, governance strategies, and ability of customers to make use of governance strategies to determine the extent to which, if at all, private ordering addresses the risks that inhere in the agency problem in question. In turn, this enables a conclusion to be made on residual agency costs. These are the agency costs that cannot be addressed through the private ordering discussed in this section.

²⁰⁹ M-Pesa customers consent to be bound to these trust deeds through agreeing to the M-Pesa Terms and Conditions: M-Pesa Terms and Conditions, cl 2.9.

²¹⁰ The Terms and Conditions are a contract, as evidenced in cls 2.5 and 18.3.

2.2.3.2(d) Public Ordering

Fourth, what *public ordering* should be used to address residual agency problems in mobile money platforms? This component of the analysis involves determining the extent to which, if at all, public ordering should address the residual agency problems identified in the third component of the framework. Pursuant to the economic approach to regulation used in the thesis, the aim is to determine the extent to which, if at all, such public intervention will increase the efficiency of mobile money systems.

This component of the framework involves reviewing public ordering contained in Kenya's *National Payment System Regulations 2014* (NPS Regulations). These regulations contain detailed rules for MM firms, including Safaricom, providing mobile money services.²¹¹ Where necessary, it also involves proposing additional regulatory tools not contained in the NPS Regulations.

In exploring this component of the framework, the thesis examines the feasibility of different governance and regulatory strategies based on the *likely significant resource constraints* on the policymaker in question. It also involves examining the potential policy *trade-offs* that arise in public ordering. Pursuant to the economic approach to regulation, public ordering in the framework is assessed against one or more objectives, each of which can be used to assess the merits of different regulatory strategies.²¹² These trade-offs operate between three relevant regulatory objectives: consumer protection, financial stability, and financial inclusion. Various

²¹¹ See NPS Regulations, reg 2.

²¹² See a discussion of different regulatory objectives in Armour and others (n 2), ch 3, 61.

conflicts can operate between these objectives, constituting ‘boundary issues’ that are examined in the thesis.

2.2.4 Subject Matter and Assumptions

Mobile money already exhibits considerable variation in business models and regulatory approaches, as will be explored in the thesis. And the service continues to grow in both size and complexity. This thesis has insufficient length to consider regulatory issues in all variations of this service. For this reason, the thesis focuses on the following subject matter.

2.2.4.1 Materials for Analysis

The thesis uses private and public ordering in relation to M-Pesa, outlined in Section 2.2.3.2(c) of this Chapter above, as a base example. This is an appropriate approach because, as the world’s first and still one of the most sophisticated mobile money services, most publicly available information focuses on M-Pesa. The thesis also uses examples of private and public ordering used in mobile money platforms in other jurisdictions to illustrate particular points related to the policy and regulation of this service.

The author has obtained information on private and public ordering in Kenya and elsewhere through desk-based research and in the course of providing legal advice on the regulation of mobile money to the United Nations Capital Development Fund, the central banks of Fiji, Papua New Guinea, Samoa, Tonga, and Vanuatu (2012 and 2013) and the Reserve Bank of Malawi (2013 and 2014). The author visited Malawi twice (December 2013 and May 2014) in order to study the regulatory

environment for mobile money in the country. The author also obtained primary material in India and Indonesia in the course of conducting fieldwork into mobile money regulation in both countries (both in April 2013).

2.2.4.2 Assumptions and Areas of Focus

The thesis makes seven assumptions. First, it assumes that mobile money provides only its original, *core services*.²¹³ These include sign-up, loading e-money, transfers and payments, and withdrawing funds.²¹⁴ The thesis adopts this focus because, again, these are the original core M-Pesa products and so are subject to the most publicly available information. More recent services such as the M-Pesa Pay Bill account (providing short term fundraising) and the KCB M-Pesa account (savings and loans service) are so new that there is inadequate literature on their operation and regulatory issues.²¹⁵ However, the thesis notes that future research should extend to these services.

Second, the thesis assumes the unbanked are the *only* customers of mobile money. The thesis focuses on these customers because their economic vulnerability means it is particularly important to prioritise scholarship on the risks they face when using this service.

Third, the thesis assumes that *all* MM firms follow the same private ordering used in the M-Pesa model. Again, this assumption is required because there is little, if any, publicly available information on private ordering used in other mobile money

²¹³ See a discussion on available transactions in cl 5.1 of the M-Pesa Terms and Conditions and M-Pesa Amendment Deed, cl B(3)).

²¹⁵ These services are listed on Safaricom, 'M-Pesa' (*Safaricom*, undated) <<http://www.safaricom.co.ke/personal/m-pesa/do-more-with-m-pesa>> accessed 9 April 2016.

services. This means the actors in the scheme comprise an MM firm (which in M-Pesa is Safaricom), an MMHC (the M-Pesa Holding Company (MPHC)), cash merchants, and a bank in which customers' funds are stored (the 'bank').²¹⁶ The thesis then explores variations from that base model at various points in the thesis.

Fourth, the thesis assumes that the *central bank* is responsible for regulating mobile money. This is also based on the M-Pesa model, in which the CBK is ultimately tasked with supervising the service, as part of its jurisdiction over payment systems.²¹⁷ Furthermore, it is also the most common approach used in other countries, although there has been considerable confusion over regulatory jurisdiction for mobile money because the service traverses telecommunications, payments, banking, and competition.²¹⁸

Fifth, the thesis assumes that unbanked people behave rationally and do not face behavioural problems.²¹⁹ This is a strong assumption but is required because the thesis focuses on agency, rather than behavioural problems, as defined and discussed below. By behaving rationally, the unbanked have stable preferences and act on the basis of available information to maximise the satisfaction of their preferences. The thesis also assumes that unbanked people behave in a similar way to depositors in relation to runs on the system. This means, like depositors, unbanked people will run to redeem their funds when faced with signals, or perceived signals, of solvency

²¹⁶ The thesis uses the abbreviation of MPHC (and MMHC when discussing mobile money generally) because the M-Pesa Holding Company does not, in fact, appear to fit the description of a 'holding company'. This is because it does not appear to buy and own the shares of Safaricom.

²¹⁷ See National Payment System Act 2011, s 31(2).

²¹⁸ Increasingly the need for such collaboration in mobile money policy and regulation often results in memorandum of understanding between policymakers. As of March 2014, Malawi such memoranda operate between the Reserve Bank of Malawi (RBM), Malawi Communications Regulatory Authority (MACRA) and Ministry of Finance; the Competition and Fraud Trading Commission and MACRA; and the RBM and MACRA. See Greenacre, Malady and Buckley (n 32) 17.

²¹⁹ Chapter 7 proposes that additional research should be conducted on this topic: n to 657.

problems in the actor storing their funds, which in mobile money is the MMHC. These tendencies are examined in greater detail below.

Sixth, the thesis assumes the policymaker can only use private or public ordering. For this reason, the thesis does not focus on the different combinations of private and public ordering discussed above in Section 2.2.2.2 of Chapter 2. It takes this approach because, to this author's knowledge, there is no alternative substantive, binding form of ordering in mobile money, such as self-regulation amongst market participants.

Seventh, the thesis assumes that trust instruments can be enforced in the common law countries under examination. This is an important assumption because, as will be discussed in the thesis, trusts are central to private ordering in mobile money.

Eighth, the final assumption of the thesis is that reputation will not address the agency problem. For this reason, reputation is not expressly considered. Chapter 7 proposes that reputation be examined in future research on mobile money.²²⁰

2.3 Claims

The thesis makes three main claims. First, mobile money operates as a *shadow retail deposit* system. Second, mobile money provides equivalent payment and storage functions as a bank, but through lower credit and liquidity risks, particularly due the commitments through which the MM firm and its associates credibly commit to

²²⁰ Text to n 681 (Section 7.3.5 of Chapter 7).

safeguard the funds of the mobile money customers for the purposes of providing payment and storage functions only. Third, public ordering can increase efficiency by taking an ‘active approach’ which involves monitoring a range of credit, liquidity, and operational risks on their behalf. This section below examines each claim as follows.

2.3.1 Mobile Money: A Shadow Retail Deposit System

The first claim is that mobile money is a *shadow retail deposit system*. This claim can be broken into three components.

2.3.1.1 Shadow

The system is *shadow* in nature because a customer contracts with a non-bank phone company rather than a bank, as outlined by Awrey and van Zwieten (2016).²²¹ Furthermore, mobile money uses its own infrastructure when transferring customers’ funds, namely a series of bilateral transfers between the customers of one MM firm (in a non-interoperable system) or between customers of different MM firms (in an interoperable system). In neither case does mobile money directly interact with the inter-bank clearing system.

2.3.1.2 Deposit

As outlined above in Section 1.2.3.2(a) of Chapter 1, M-Pesa was launched and marketed as a transfer and payments service. Safaricom’s marketing materials continue to classify M-Pesa in the same way.²²² However, this classification misses the full functionality of M-Pesa and comparable mobile money schemes. A deeper

²²¹ Dan Awrey and Kristin van Zwieten, ‘Law and the Shadow Payment System’ (2016) Oxford Legal Studies Research Paper 55/2016 <https://papers.ssrn.com/sol3/papers.cfm?abstract_id=2843772> accessed 23 December 2016, 4.

²²² Text to n 127.

analysis reveals that mobile money is a deposit rather than payments product.²²³ This is because a mobile money account provides the equivalent customer-facing electronic payment and storage functions as a bank deposit, as follows.

The starting point for analysing this claim is to explore the operation and functionality of a bank deposit. Armour et al (2016) explain that a bank deposit provides liquidity to depositors, as follows (with emphasis added to the text in italics):

[A bank provides liquidity] which allows its investors to access money of known value for consumption purposes, a ‘sum certain.’ It does this in two ways: by providing *access to notes and coins* and by allowing its liabilities, in the form of cheques drawn on the bank, to be used as a means of *payment*.²²⁴

This description of a bank deposit can be unpacked into three components. The section below explains the similarities between banking and mobile money in relation to each component, as follows.

2.3.1.2(a) Nominal Value

The first component is the concept of a ‘sum certain’. As discussed in Armour et al, a depositor can access money of ‘known value’ or ‘nominal value’. This means that (subject to fees, deposits, payments, and withdrawals) while stored with the bank, the stated value of the deposit remains constant or ‘fixed’. This value does not vary with

²²³ Previous policy papers written by Ehrbeck and Tarazi (2011) and Radcliffe and Voorhies (2012) have recognised the customer-facing functional similarities between a mobile money account and bank deposit but have not discussed these similarities in depth. See Tilman Ehrbeck and Michael Tarazi, ‘Putting the Banking in Branchless Banking: Regulation and the Case for Interest-Bearing and Insured E-Money Savings Accounts’ (2011) World Economic Forum ‘Mobile Financial Services Development Report’ <<https://www.fdic.gov/about/comein/june11one.pdf>> accessed 20 April 2016, 2; Dan Radcliffe and Rodger Voorhies, ‘A Digital Pathway to Financial Inclusion’ (2012) Report, Bill and Melinda Gates Foundation <https://www.responsiblefinanceforum.org/wp-content/uploads/Pathway_Financial_Inclusion.pdf> accessed 20 April 2016, 12.

²²⁴ Armour and others (n 2) ch 13, 277.

the creditworthiness of the bank (unlike bonds), nor is it influenced by changes in the value of a bank's assets (unlike money market mutual funds).²²⁵

In mobile money a customer can also access a sum certain and access money of nominal value. This is because the MM firm commits to maintain a 1:1 relationship between customers' funds, stored in highly liquid assets, and e-money claims.²²⁶ This means, like a bank deposit, for so long as funds are stored in the mobile money system, the value of the customer's e-money claim remains fixed.²²⁷ This enables a mobile money customer to enjoy a claim having the same feature of being a 'sum certain' as does a bank depositor.

The next component of analysis involves determining the functions that are facilitated by the sum certain. As outlined above, Armour et al (2016) state that a bank deposit provides liquidity. While liquidity can be defined in a number of ways, for the purposes of this thesis, this term describes the ability of a party to sell any asset for other assets or cash for *full value, at will*.²²⁸

²²⁵ See a comparison to bonds in Armour and others (n 2) ch 14, 290.

²²⁶ This 1:1 relationship between customers' funds, stored in highly liquid assets, and e-money, helps distinguish mobile money from recent block chain technologies such as Bitcoin. Mobile money services such as M-Pesa do not 'create' money. Instead, though the 1:1 relationship, this service simply enables one form of fiat currency, cash, to be converted into and out of electronic currency: which is a claim against the assets of the MPHC. Fiat currency is any legal tender designated and issued by a central authority that people are willing to accept in exchange for goods and services because it is backed by regulation and because they trust this central authority. Fiat money is similar to commodity-backed money in appearance and usage, but differs in that it cannot be redeemed for a commodity, such as gold (European Central Bank 2012). The actual 'money' involved remains regulated and ultimately supervised by the Central Bank. By contrast, virtual currencies such as Bitcoin involve unregulated, digital money, usually issued and controlled by its developers, and used and accepted among the members of a specific virtual community: Sarah Rotman Parker, 'Bitcoin v Electronic Money' (*CGAP*, 23 January 2014) <<http://www.cgap.org/publications/bitcoin-vs-electronic-money>> accessed 20 April 2016.

²²⁷ This is central to the disclosure in M-Pesa, namely that *all* of customers' cash is held 'on trust' and can be redeemed: see M-Pesa Terms and Conditions, cls 1 ('[E]-money' means the electronic monetary value depicted in your M-Pesa account representing an equal amount of Cash held by the Trustee and which may be redeemed through an M-Pesa Cash Merchant for an equal amount of Cash' and 'Trust Deed' means together the Declaration of Trust dated 23rd January 2007 and the M-Pesa Amendment Deed dated 19th June 2008 executed by the Trustee constituting the trusts under which the Trustee holds all amounts of cash received for your Account') and 2.9 ('Your cash represented as e-money is held in trust for you').

²²⁸ The 'ability of a party to sell any asset for other assets or cash for *full value, at will*' comes from Katharina Pistor, 'A Legal Theory of Finance' (2013) 41(2) *Journal of Comparative Economics*, Columbia Public Law Research Paper 13-348, 9 May 2013 <https://papers.ssrn.com/sol3/papers.cfm?abstract_id=2262936> accessed 23

Two functions inhere in the way in which a bank deposit and, as will be explained, a mobile money account provides the type of liquidity outlined in the excerpt above from Armour et al (2016). These are payments and storage. It is appropriate to distinguish these functions because they present unique regulatory issues. Furthermore, they can be unbundled and provided by different actors. For example, as discussed in Section 1.2.3.2(a) of Chapter 1 above, retail payment providers such as Western Union and PayPal enable participants to make payments.²²⁹ However, these services do not provide a storage function. Banks perform both functions.

2.3.1.2(b) Payment

A payment is a transfer of value between agents.²³⁰ This is one of the two main economic functions of a bank deposit. Usually, bank payments can be made to a wide range of actors, such as other depositors, merchants, and governments.²³¹

December 2016. See also John Maynard Keynes, who defines 'liquidity preferences' as 'a schedule of the amounts of his resources, valued in terms of money or of wage-units, which he will wish to retain in the form of money in different sets of circumstances' (John Maynard Keynes, 'The General Theory of Employment' (1937) 51(2) Quarterly Journal of Economics, 209). See also Mehrling (2011, at 5/6) who associates liquidity with shiftability: Perry Mehrling, *The New Lombard Street: How the Fed Became the Dealer of Last Resort* (Princeton University Press 2011), 38. Keynes and Mehrling cited in Pistor, *ibid.* The concept of 'full value' comes from Awrey and van Zwieten 2016 (n 221) 8 who cite Markus K. Brunnermeier and Lasse Heje Pedersen, 'Market Liquidity and Funding Liquidity' (2009) 22(6) Review of Financial Studies, June 2009, 2201.

²²⁹ See text to n 130.

²³⁰ A payment is a transfer of value between agents: see Benjamin Lester, Stephen Millard and Matthew Willison, 'Optimal Settlement Rules for Payment Systems' in Haldane, Millard and Saporta (n 23), 1891. A payment system is 'the set of rules, institutions, and technical mechanisms for the transfer of money': Summers (ed) (n 50) 112. See a similar definition in Geva B, 'The Concept of Payment Mechanism' (1986) 24 Osgoode Hall LJ 1 <<http://digitalcommons.osgoode.yorku.ca/ohlj/vol24/iss1/1/>> accessed 15 December 2016.

²³¹ However, this situation does not necessarily apply in developing countries where banks often cannot make payments between each others and/or mobile money. See, for example, <http://www.biztechafrika.com/article/malawi-switch-go-live-december/6775/>

Mobile money also provides a payment function. In M-Pesa Safaricom commits to provide a payment function, as demonstrated through the following contractual term to which the customer agrees by using the service:

Safaricom operates the M-Pesa mobile money transfer service that allows you to send and receive money through your registered mobile phone.²³²

...

You may send E-Money to any Participant on the M-Pesa system.²³³

Like a bank deposit, M-Pesa and other mobile money services enable customers to make payments to a wide range of actors through bill payments, salary payments, and government transfers.²³⁴ For reasons discussed above, in some countries, such as Kenya, the ease and convenience through which a customer can make payments and the range of potential payees means mobile money has largely eliminated pre-existing informal and formal payment services.²³⁵ The next section claims that mobile money provides an electronic storage function.

2.3.1.2(c) Storage

This sub-section has two components. The first outlines the storage function that is available in mobile money. The second introduces several boundary issues created through this storage function that will be explored in the thesis.

2.3.1.2(c)(i) Functions

Armour et al (2016) explain that a bank provides ‘access to notes and coins’ to a

²³² M-Pesa Terms and Conditions, cl 2.1. This type of payment means mobile money is a ‘payment mechanism’ because, like inter-bank payments, this service facilitates the transmission of money. See definitions of payment system outlined above in n (x). Note ‘M-Pesa’ is usually in capitals in M-Pesa legal materials. This thesis uses ‘M-Pesa’ when citing such material. This enables consistency between legal materials and the thesis.

²³³ M-Pesa Terms and Conditions, cl 8.3.

²³⁴ See outline of payments options in M-Pesa Terms and Conditions, cls 5.1.5 (airtime, including cl 1 (definition of ‘Pre-paid Airtime’)), 5.1.6 (utility bills), and 5.1.7 (goods purchased from participant merchants). In Malawi mobile money can be used to make the following type of payments, amongst others, top-up of airtime, bill payments, salary payments and government transfers Greenacre, Malady and Buckley (n 32) 4.

²³⁵ Text to n 235.

depositor, as outlined above. This means a bank deposit provides a storage function to depositors. This is because a bank enables depositors to store money in electronic form. A depositor can add funds and consume them at a later time later time for a range of purposes such as payment, or household or business investment.²³⁶

Mobile money also provides a storage function. This is because, like a depositor, a customer can deposit cash into her deposit account and redeem it on demand. Also like a depositor, she can use the money for payments and her own consumption. The discussion below provides examples of contractual terms that enable her to access a storage function.

Mobile money enables customers to access a storage function that is functionally equivalent to the type provided through a bank deposit. This point can be better understood by comparing three key features of bank deposits and mobile money accounts, as follows.

First, a depositor can convert funds that have been stored electronically back *into cash*. This feature of a deposit distinguishes this instrument from closed loop payment cards that can store value, but funds are only redeemable for products or services.²³⁷ Examples of these forms of stored value devices include Amazon and Starbucks gift cards.

A mobile money customer can also convert electronic funds into cash. Like a

²³⁶ Rutherford (n 24); Collins (n 24).

²³⁷ Three Questions for Determining if a New Product is a Deposit. Juan Carlos Izaguirre, Claire McGuire and Dave Grace, 'Three Questions for Determining if a New Product is a Deposit' (2015) Consultative Group to Assist the Poor (CGAP) <<https://www.cgap.org/blog/three-questions-determining-if-new-product-deposit>> accessed 23 December 2016.

bank deposit, the redeemability for cash is usually considered a key feature that differentiates mobile money from other forms of non-bank stored value products. It tends to be central to the definition of mobile money.²³⁸

Second, unless the bank is in financial distress, a depositor's funds stored with a bank retain their full '*nominal value*' or '*face value*'.²³⁹ A mobile money account also provides this functionality, because, as explained above in Section 2.3.1.2(a), an MM firm commits to maintain a 1:1 relationship between funds received from customers, stored as liquid assets, and e-money.

Third, the depositor can access her funds at any time. This is *instant redeemability*.²⁴⁰ A mobile money customer can also access her funds upon demand.²⁴¹ Safaricom commits to provide this functionality in the following clause of the M-Pesa Terms and Conditions:

The balance of your M-Pesa account is redeemable at any time and shall be disposed of only in accordance with your instructions given via the M-Pesa System.²⁴²

Overall then, mobile money provides the same customer-facing functions as a bank deposit. These are access to a sum certain, which in turn facilitates the conversion of electronic funds into cash, for full value of funds, at any time. The next section examines important boundary issues that arise through the storage functionality of mobile money.

²³⁸ See AFI definition above, discussing e-money as convertible into cash: AFI 2013 (n 4). See also Izaguirre, McGuire and Grace 2015 (n 335).

²³⁹ Izaguirre, McGuire and Grace (n 335).

²⁴⁰ *ibid* (n 335).

²⁴¹ Catia Batista, Felix Simone, and Pedro Vicente, 'International Experiences of Mobile Banking Regulation' (January 2012) Country Policy Note, IGC Mozambique, 1 <<http://www.theigc.org/wp-content/uploads/2014/09/Vicente-Et-Al-2012-Policy-Brief.pdf>> accessed 13 April 2016.

²⁴² M-Pesa Terms and Conditions, cl 2.11.

2.3.1.2(c)(ii) Boundary Issues

Permitting mobile money to perform bundled payment and storage functions creates two important regulatory questions. First, the storage function creates much of the regulatory confusion that underpins the service. As explained above, in Kenya and other early mover countries in Africa, mobile money was initially supervised through a letter of no objection and classified as a ‘payments’ product. However, the storage component of mobile money moves the service beyond payments. This is because storage can be entirely functionally separated from payments, as follows.

Storage and payment functions can be linked. For example, a person can use a storage instrument to accrue the funds required to honour a payment. She then accesses a payment function when she actually transfers the funds to another person. However, storage can also be completely functionally separate from payments. This is because a person may store funds without ever intending to transfer them to others. Instead, she simply accrues funds that she later uses for her own consumption. As will be explored in the thesis, storage can generate additional regulatory issues that are not addressed in traditional payments regulation.

As a result, policymakers and international donors are increasingly concerned about the protection of customers’ funds that are stored in mobile money platforms.²⁴³ However, there is little understanding of the risks that attach to customers’ funds and which tools should be used to address them. A central task of this thesis involves

²⁴³ Donors’ concerns has resulted in the funding of a range of research projects into the protection of customers’ funds, including: Consultative Group to Assist the Poor (CGAP), ‘Legal Environment for Branchless Banking, Including Mobile Payments, Implications for Financial Inclusion’ (UNCITRAL Colloquium on Microfinance, January 2013) <https://www.uncitral.org/pdf/english/colloquia/microfinance-2013/17-01/CGAP_Presentation UNCITRAL_Monica_Harutyunyan_2nd.pdf> accessed 23 December 2016, 10; Greenacre and Buckley 2014 (n 149). See also policymaker’s concerns: Richard J. Malisa (Tanzania Deposit Insurance Board), ‘Deposit Protection Framework for Mobile Money: Experiences and Initiatives – The Case of Tanzania’ (IADI Africa Regional Committee Conference, Zanzibar, 1-3 September 2016).

determining the extent to which, if at all, public ordering is required beyond current private ordering and payments regulation in order to address risks that arise from the storage function.

The second key boundary issue involves distinguishing between storage and investment functions in mobile money. An investment function means forwarding money to a firm with the expectation of achieving a profit.²⁴⁴ One of the key methods through which a person directly profits from an investment is interest payments on the funds invested.²⁴⁵

Storage creates the potential for mobile money to provide an investment function. This is because customers' funds could be intermediated into a range of assets that are capable of providing interest payments, such as bonds.²⁴⁶ However, as discussed in Section 1.2.3.2(a) of Chapter 1, for financial inclusion purposes, the CBK wanted to impose a lighter regulatory burden on Safaricom than banks operating in Kenya. For this reason, to avoid M-Pesa meeting a legal definition of a bank under Kenyan legislation, the CBK required Safaricom to ensure interest from customers' funds were paid to charity rather than used within M-Pesa or passed on to customers.

²⁴⁴ See the definition of 'investment' as it applies to finance: 'put money into financial schemes, shares or property with the expectation of achieving a profit.': See Catherine Soanes and Angus Stevenson, eds., *Concise Oxford English Dictionary*, 11th ed. (Oxford: Oxford University Press, 2008) at 748, cited in 'Definition of "Investment" - A Voice from the Eye of the Storm' Michael Hwang S.C. and Jennifer Fong Lee Chengy.

²⁴⁵ See the relevance of interest payments to definitions of an investment in, for example, international arbitration. In this field, the basic features of an investment have been described as involving a certain duration, a certain regularity of profit and return, assumption of risk, a substantial commitment and a significance for the host State's development (1387) in *International Centre for Settlement of Investment Disputes* Washington, D.C. in the proceeding between FEDAXN.V. Claimant and The Republic of Venezuela http://www.italaw.com/sites/default/files/case-documents/ita0315_0.pdf.

International Centre for Settlement of Investment Disputes Washington, D.C. in the proceeding between FEDAXN.V. Claimant and The Republic of Venezuela, 11 July 1997 <http://www.italaw.com/sites/default/files/case-documents/ita0315_0.pdf> accessed 23 December 2016. ... I had no idea how to cite this one, but I added the date (1997). Another potential method by which a customer could 'profit' directly from storing funds in her mobile money account would be capital gain. However, as discussed in Chapter 2, the value of a mobile money customers' account remains fixed, subject to deposits and withdrawals.

²⁴⁶ See a discussion of these different trust assets in Chapter 4.

As a result of the CBK's decision, M-Pesa customers cannot access an investment function through mobile money. Customers can profit indirectly from mobile money through accessing payment and storage functions that have a range of advantages over informal tools, as discussed in Section 1.2.1.3(b) of Chapter 1. However, customers cannot profit directly through an investment function because no interest is payable on their funds.

More recently, Tanzania and other countries have begun to liberalise mobile money regulation and permit interest payments to be passed on to customers.²⁴⁷ In doing so, mobile money in Tanzania moves further than Kenya by enabling the service to provide an investment function. Given the thesis focuses primarily on M-Pesa, for the purposes of analysis it is assumed that mobile money provides payment and storage functions only, not investment. However, the thesis explores the potential benefits and costs of permitting mobile money to perform an investment function, particularly in the context of additional regulation that may be required.

2.3.1.3 Retail

Mobile money can be classified as a *retail* system for two main reasons. First, mobile money meets the payment needs of individuals and businesses for ordinary transactions in the economy.²⁴⁸ It is not used for large-scale transfers of the type that are ordinarily made through the inter-bank payment system.²⁴⁹

²⁴⁷ *ibid.*

²⁴⁸ See the definition of retail payment system above in n 124.

²⁴⁹ See the definition of the inter-bank system above in n 124.

Second, as a related point, the transaction characteristics in mobile money fit the description of a retail payment system. Usually in such a system transactions are large in volume and small in value.²⁵⁰ Mobile money transactions normally take this form. For example, as outlined in Section 1.2.3.3 of Chapter 1, the combined value of mobile money transactions is small, comprising just 7.4% of the value of Kenya's total payments.²⁵¹

As a result, mobile money is often regulated as a retail payments service. For example, in Kenya, the NPS Regulations, which did not apply to M-Pesa when it was originally launched, now classify mobile money as a retail transfer service.²⁵² As explained above, this classification usually understates the storage function of mobile money.

Overall, mobile money comprises a *third tier* of the banking system. Mobile money provides a bank-like deposit function to unbanked and other low-income customers who are beyond the reach of the banking and retail payment systems.²⁵³ The diagram on the next page explains this point in pictorial form.

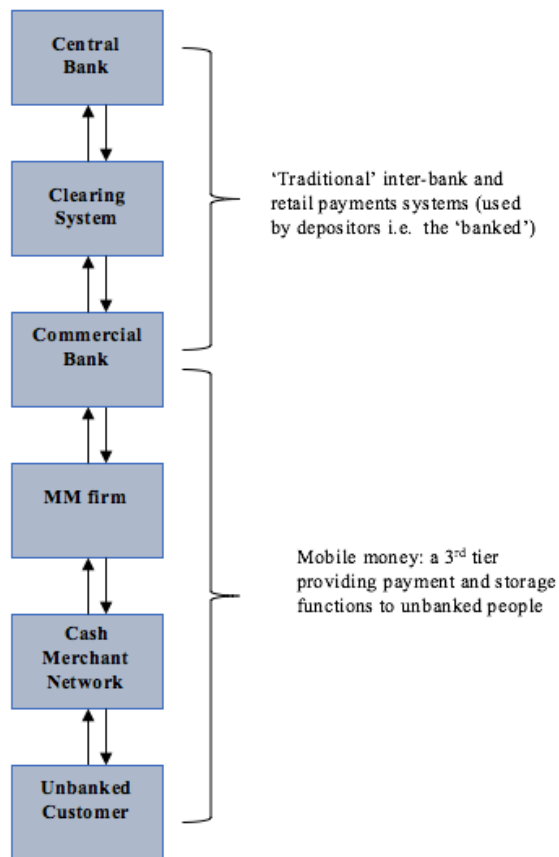
²⁵⁰ See a discussion in European Central Bank 'Revised Oversight Framework for Retail Payment Systems' (Undated) European Central Bank, 2
<https://www.ecb.europa.eu/pub/pdf/other/Revised_oversight_framework_for_retail_payment_systems.pdf?983906a191ce946301c0803fa2e6d422> accessed 19 April 2016.

²⁵¹ Alexandre, Mas and Radcliffe (n 41). See also di Castri and Grossman, 2015 (n 29) 18.

²⁵² NPS Regulations, reg 2.

²⁵³ The retail payment system is beyond the reach of unbanked customers because, as explained above in relation to Pay Pal, a bank account is required to use the service.

Diagram 2: Mobile Money as an Extension of the Banking System



Given the functional similarities between banking and mobile money, it may be assumed that regulation from the former can apply to the latter. The section below examines this assumption in greater detail.

2.3.2 Legal Structure

This second claim of the thesis is that mobile money provides *functionally equivalent* electronic payment and storage functions as a bank deposit through a *different legal structure*. This structure is a species of private ordering established through the commitments and governance structures introduced in Section 2.2.3.2 of this Chapter,

above. Collectively, the commitments are a means through which the MM firm (the ‘agent’ in the service) and its associates credibly commit to safeguard the funds of the mobile money customers (the ‘principals’) for the purposes of providing payment and storage functions only.

The section explores the legal structure through the framework used in the thesis. As explained above, this framework involves the following four components: functions, market failures and risks, current private ordering, and proposals for and trade-offs involved in using public ordering.

2.3.2.1 Functions

As explained above, mobile money provides the customer-facing functions of a bank deposit. These functions are payment and storage.

2.3.2.2 Market Failures and Risks

This subsection has three components. First, an explanation of the key market failure analysed in the thesis, which is asymmetric information. Second, an application of asymmetric information to the protection of customers’ funds in mobile money platforms, focusing on agency problems. Third, a more detailed discussion of agency problems.

2.3.2.2(a) Asymmetric Information

The thesis focuses on asymmetric information. This involves situations in which one party has better information than the other. For example, in the context of purchasing

financial products, a buyer is generally less well informed about a particular financial product than the seller.²⁵⁴

2.3.2.2(b) Application of Asymmetric Information to the Protection of Funds

This section explores how asymmetric information is relevant to the protection of customers' funds in mobile money platforms. One consequence of asymmetric information is adverse selection.²⁵⁵ Consistent with the introduction to asymmetric information, discussed above, the seller knows more about the product than the buyer, including its defects. The seller, aware of this, tends to offload defective products onto the (unsuspecting) buyer. If the buyer cannot ascertain the quality of the product, she offers no more than the prevailing price for a product of average quality. In turn, the seller only offers products whose real value is at best equal to, and likely less than, the average price that they are being offered. This process then drives the average quality of products on the market and the price purchasers are willing to pay further down. In turn, this can mean that the only available products on the markets are 'lemons'. The end result is potentially unfair treatment of buyers and potential collapse of the market.

The thesis focuses on risks to customers' funds that arise *after* she has handed them over the MM firm, which she cannot easily observe. For this reason, it is more useful to focus on another consequence of information asymmetries, agency problems, which focuses on these risks and explores methods to address them. An agency problem arises when one party – the principal – delegates decision making to another – the agent – in circumstances in which the agent knows more than the

²⁵⁴ Armour and others (n 2) ch 3, 55.

²⁵⁵ George A Akerlof, 'The Market for "Lemons": Quality Uncertainty and the Market Mechanism' (1970) 84 *Quarterly Journal of Economics* 488, cited and discussed in Armour and others (n 2) ch 3, 55.

principal about her (the agent's) actions. As a result, the agent may take actions that benefit her own interests, rather than deliver on the terms of the agreement.

Where there are agency problems, parties must incur costs addressing information asymmetry. Usually costs arise through establishing monitoring mechanisms (in which the principal tries to keep track of what the agent is doing) and designing bonding mechanisms (establishing mechanisms that align the agent's incentives with those of the principal).²⁵⁶ Furthermore, monitoring and bonding techniques are unlikely to perfectly alleviate the information asymmetry, resulting in a third set of 'residual' costs. These are ways in which the agent's actions destroy value through failing to deliver on the terms of the agreement.²⁵⁷

Agency problems arise in relation to the protection of customers' funds. This is because the customer (the principal) has begun using mobile money and delegated the payment and storage of funds to the MM firm (the agent). Asymmetric information in this context means the MM firm may take action in relation to those funds which the customer cannot easily observe.

2.3.2.2(c) The Agency Problem

The section above has explained that the key market failure for analysis is asymmetric information giving rise to an agency problem. Consistent with the functional approach in the thesis, this subsection explores agency problems and their resulting risks when customers' funds, handed over to the MM firm, are used for payment and storage

²⁵⁶ Michael Jensen and William Meckling, 'Theory of the Firm: Managerial Behavior, Agency Costs and Ownership Structure' (1976) 3 *Journal of Financial Economics* 305, 5-6.

²⁵⁷ *ibid.*

functions. The thesis then examines how these agency problems and risks manifest in mobile money and how they can be addressed.

An agency problem arises in the *payment* function because the payor customer (the principal) delegates the task of performing the payment to the payment provider (the agent). This delegation creates an agency problem between these actors because the customer may not be capable of readily observing the actions of the payment provider.²⁵⁸

As a result of the agency problem, in the time between the payor customer making her payment request and it reaching the payee customer, she is exposed to credit, liquidity, and operational risks at the payment provider. Credit risk means the payment provider is either unable to make the payment or can only convey a portion of the funds. It arises through insolvency of the payment provider.²⁵⁹ Liquidity risk connotes a delay in making the payment. It emerges because the payment provider has insufficient liquid assets to make the payment, but it may be able to do so in the future.²⁶⁰ Operational risks emerge through internal administrative procedures within the payments provider. This risk includes fraud, theft, misuse, negligence, or poor administration such as technical malfunctions or operational mistakes.²⁶¹

²⁵⁸ *ibid* 308.

²⁵⁹ Rhys Bollen, 'Best Practice in the Regulation of Payment Services' (2010) Thesis, 39-42 <<https://researchbank.rmit.edu.au/eserv/rmit:7919/RhysBollen.pdf>> accessed 15 April 2016. Benjamin Geva 'Payment System Modernisation and Law Reform in Developing Nations: Lessons from Cambodia and Sri Lanka' (2009) 126(5) *Banking Law Journal*, 402.

²⁶⁰ Ronald Mann, *Payment Systems and Other Financial Transactions: Case, Materials and Problems* (5th ed, Aspen Publishers 2011) 21. See also Bollen *ibid* 39-40 and Geva *ibid* 427.

²⁶¹ See the discussion in European Union, Solvency II Directive (2014) Brussels, 67 <http://ec.europa.eu/internal_market/insurance/docs/solvency/solvency2/delegated/141010-delegated-act-solvency-2_en.pdf> accessed 19 April 2016. Operational risk may cause liquidity or credit risks. For example, a major theft of customers' funds may cause the payment provider to become insolvent, which then causes a realisation of credit risk for the customer.

The *storage* function also involves a potential agency problem. This is because, like payment, the customer (the principal) delegates a task – in this case safekeeping funds – to another actor (the agent).²⁶² In this case, the principal may be unable to effectively observe how the agent stores her (the principal's) funds. This means the principal is exposed to the same set of credit, liquidity, and operational risks that arise in the payment function. The difference is that realisation of these risks impairs the ability of the customer to make full use of her funds for her own consumption rather than transfer them to others through the payment function.²⁶³

The thesis explores two types of risks which can emerge from the storage function. One, which is main focus of the thesis, is the type of *credit, liquidity, and operational risks* discussed in the paragraph above. The other is *loss of confidence* in the service. Depending on the legal and financial structure, by providing the same storage function as a bank, mobile money may be exposed to the same types of runs that arise in banking. Depositors can engage in a 'fundamentals run'. In this case, the bank does, in fact, have a solvency problem which disrupts its sum certain. In this instance, coordination problems mean depositors cannot contract together to produce an efficient outcome, namely one that maximises the value of the firm in insolvency.

Alternatively, depositors can engage in a 'pure panic' run. In this case, the bank has a liquidity problem.²⁶⁴ However, depositors, unable to distinguish between

²⁶² Like with the payment function, the principal faces difficulties and incurs costs in seeking to monitor the actions of the agent, in this case storing, rather than transferring funds.

²⁶³ For the sake of completeness, this means she a potential credit risk (the counterparty is permanently unable to repay the full amount of funds), liquidity risk (the counterparty has insufficient liquid assets to repay the full amount of funds when she needs them), and/or operational risk (failed operational procedures mean some or all of her funds are lost).

²⁶⁴ The liquidity and maturity transformation means that a bank performs means in the event a large number of depositors withdraw their investments the bank may be unable to meet their demands by liquidating assets and cashing in long-term investments: Armour and others (n 2).

liquidity and solvency problems, run to the bank. This outcome can then cause the bank to become insolvent. The thesis also explores the circumstances in which, if any, mobile money customers might engage in fundamentals or pure panic runs.²⁶⁵ The thesis also explores how differences in the legal structure, particularly the financial arrangements, will dissuade customers from running to redeem their funds.

As discussed above in Section 2.3.1.2(c)(ii) of Chapter 2, storage and payment can be linked. However, they can be entirely functionally independent. As a result, impairment to storage also impairs payment. This is because loss of funds means they are unable to be returned to customers (through impairment to the storage function) and cannot be transferred to others (which inhibits the payment function). However, failure of the payment function does not necessarily impact storage. For example, collapse of the operating system used to process payments does not necessarily mean a customer cannot convert those funds for her own consumption. She may still be able to convert her funds into a liquid form for her own consumption even if she cannot transfer them to others. Put conversely, this means addressing agency problems in storage can simultaneously address many of the risks that impair the payment function. This point will be explored throughout the thesis.

Other market failures discussed in Section 2.2.2.1 of Chapter 2 (monopolies, behavioural issues, and externalities), above, may be relevant to mobile money.²⁶⁶ However, for the reasons discussed above, asymmetric information giving rise to agency problems is the most relevant market failure and so is the object of analysis in

²⁶⁵ Armour and others (n 2) ch 13, 279.

²⁶⁶ Chapter 7 discusses these potential market failures in greater depth.

the thesis. The thesis now examines how the legal structure of mobile money impacts upon the agency problem in the service and the risks it creates.

2.3.2.3 Private Ordering

Consistent with the economic approach to regulation, this component of the framework examines the extent to which private ordering can address agency problems and the resulting credit, liquidity, and operational risks. This ordering is the legal structure upon which the thesis focuses.

The legal structure means mobile money provides functionally equivalent electronic payment and storage functions to a bank deposit but primarily creates operational, rather than credit and liquidity, risks. This is because the combined operation of the commitments requires the MM firm to maintain a 1:1 relationship between customers' funds, stored in highly liquid assets, and e-money claims.

The sections below explore this claim in three parts. The first examines the commitments made by the MM firm and its associates which collectively require the MM firm to establish and maintain the 1:1 relationship between customers' funds, stored in highly liquid assets, and e-money claims. In doing so, this section explains the different risk profile between banking and mobile money, explaining that the latter is primarily a cause of operational risk. The second explores the risks to the scheme that remain once these commitments have been introduced.

2.3.2.3(a) Commitments

Five of these commitments are particularly important to the 1:1 relationship between customers' funds, stored in highly liquid assets, and e-money claims.

2.3.2.3(a)(i) Delegation of Storage

First, the MM firm undertakes to store customers' funds on their behalf. As discussed in Section 2.3.1.2(a) of this Chapter, this takes a functionally equivalent form to a bank deposit, in that customers' funds are stored at their 'nominal value', and can be converted into cash for their nominal value, at any time.

Mobile money customers may be concerned that rather than storing the funds, the MM firm may use them for its own business purposes, which may involve investing them in risky or illiquid investment assets. The MM firm commits to safeguard funds for the purposes of storage and payment. It does so by delegating the storage of customers' funds to the MMHC, an institutionally independent company. This is because it commits for all customers' funds to be paid directly to the MMHC. In the case of M-Pesa, Safaricom delegates the storage of funds to an MMHC which, as discussed in Section 2.2.4.2 of this Chapter above, is a firm called the 'M-Pesa Holding Company'.²⁶⁷

2.3.2.3(a)(ii) Trust Fund

Second, the MPHC declares that it stores all customers' funds on trust for customers.²⁶⁸ This means, while the MMHC takes legal title to customers' funds,

²⁶⁷ See M-Pesa Amendment Deed, Clause (B)(4), (C)(4), (E). This follows an approach loosely termed as 'custodians', in which one firm delegates the safekeeping of funds to another: Joanna Benjamin, *Financial Law* (Oxford University Press 2007).

²⁶⁸ M-Pesa Amendment Deed, Clause (E); M-Pesa Trust Deed, Clause 2(i).

customers retain beneficial ownership.²⁶⁹ The quantum of this beneficial interest is the amount of each depositor's funds in her mobile money account.²⁷⁰ This means mobile money customers have a proprietary claim to trust assets held by the MMHC. Thus the trust fund is different to a typical bank account, in which the bank obtains both legal and beneficial ownership of depositor's money on deposit, and the depositor has only a personal claim against the bank.²⁷¹

The holding company and trust structure aim to make the MM firm's commitment to safeguard customers' funds credible. The holding company structure means the MMHC, not the MM firm, stores customers' funds. Furthermore, the trust deed requires the MMHC to only use funds for payment and storage functions; the MMHC cannot loan out funds or earn interest on returns as would a bank. This structure means customers are not exposed to the risks associated with credit intermediation that arise in banking. The MMHC (and by extension, the MM firm which cannot access these funds) commit not to make use of customers' funds – which are trust assets – in the course of its business. Doing so would be a breach of trust and mobile money customers could assert a proprietary claim to funds in the hands of the MMHC in priority to the MMHC's general creditors.²⁷²

²⁶⁹ This is central to the operation of a trust, as follows. A trust is a legal relationship, in which legal title in property is given to a 'trustee'. The trustee holds the property (the 'trust property' or 'trust assets') on behalf of a third person – the beneficiary, who holds beneficial interest in the property: Frederic William Maitland, *Equity: A Course of Lectures* (University Press, 1969) at 44; David J. Hayton, Paul Matthews, and Charles Mitchell: *Law Relating to Trusts and Trustees* (17th Edn, LewisNexis 2007) at 2; *Re Marshall's Will Trusts* [1945] Ch 217 at 219. Properly constituted, a declaration of trust is a means by which a trust can be established. It involves a person (who becomes the trustee) declaring that it holds property on trust for the beneficiary: Glanville L Williams, "The Three Certainties" (1940) 4(1) *Modern L Rev* 20 at 20; *Stapleton v Stapleton* (1844) 60 ER 328.

²⁷⁰ E-money is defined as electronic monetary value depicted in the customer's M-Pesa account (definition of E-Money in cl 1). M-Pesa Holding Company limited holds an equivalent amount of cash on the customers' behalf (definition of "Account" in cl 1). The customers' cash represented is held on trust (cl 2.9). The customer acknowledges the sufficiency of the M-Pesa Trust Deed as creating a valid trust over the funds (cl 2.9).

²⁷¹ See a discussion of the relationship between a depositor and her bank in Nikoletta Klefouris 'Meeting the Rationale of a Deposit Protection System', (2014) 22(4) *Journal of Financial Regulation and Compliance* 300.

²⁷² *Re English and American Insurance Co Ltd* [1994] 1 BCLC 345 and *Re Kayford Ltd* [1975] 1 WLR 279 would suggest that trust property (in this instance customers' funds) does not form part of the company's estate and so is not available for creditors.

The trust arrangement means that customers' funds are free from credit risk which might otherwise arise through insolvency of the MMHC. In the event of the MMHC's insolvency, customers' funds do not form part of the company's estate and so are not available for other creditors.²⁷³ This means the holding company structure and trust arrangements render customers' funds protected from insolvency of both the MM firm (which never takes legal title over customers' funds) and the MPHC (which takes legal title but stores them on trust).

2.3.2.3(a)(iii) Narrow Bank

Third, restrictions on the use of funds in the trust deed mean the MMHC operates as a *narrow bank*.²⁷⁴ This is because the MMHC must store customers' funds solely in highly liquid assets. Like the holding company structure and trust arrangement, this narrow banking component of mobile money means it creates a different risk profile to banking. In banking, funds received from depositors are intermediated into long-term assets, creating potential liquidity and maturity mismatches. Mobile money avoids such a mismatch by requiring the MMHC to operate on a narrow bank model. This means mobile money does not directly involve maturity and liquidity transformation and associated risks from these functions.

²⁷³ *ibid.*

²⁷⁴ Narrow banks would focus on the functions that the financial system offers to the non-financial economy, such as payment systems and deposit taking from individuals and non-financial enterprises. Narrow banks could offer consumer lending, but funding for such activities would have to come entirely from the bank's own capital and wholesale markets, not deposits: John Kay, 'Narrow Banking' (2009) Centre For the Study of Financial Information <<http://www.johnkay.com/2009/09/15/narrow-banking>> accessed 20 April 2016, 4, 51, 62. See discussion in Friedman (1965) proposing that banks be split into two institutions – a deposit-taking bank holding an equal amount of central bank reserve to consumer deposits and an investment trust acquiring capital by selling shares or securities Milton Friedman, 'A Program for Monetary Stability' in Marshall D. Ketchum and Leon T. Kendall (eds) *Readings in Financial Institutions* (Houghton Mifflin 1965), 189-209; Biagio Bossone 'Should Banks be Narrowed?' (2002) Levy Economics Institute, Working Paper No. 354 <<http://www.levyinstitute.org/pubs/wp354.pdf>> accessed 9 April 2016. See also Ronnie Phillips and Alessandro Roselli, 'How to Avoid the Next Taxpayer Bailout of the Financial System: the Narrow Banking Proposal' (2009) Networks Financial Institute, Policy Brief No.5, 14 <https://papers.ssrn.com/sol3/papers.cfm?abstract_id=1459065> accessed 12 April 2016.

Collectively, these three commitments mean customers sign up to the service and enter funds into a mobile money platform in the following way. A customer must register before she can deposit funds in her M-Pesa account. She does so at a cash merchant. The customer obtains a Safaricom SIM card, completes the M-Pesa Registration Form, and provides appropriate identification.²⁷⁵ The cash merchant creates an M-Pesa account for the customer.

A customer loads funds onto her mobile money account at the merchant's premises.²⁷⁶ To enter funds on the system there is a trade of e-money for cash. The customer hands cash to the cash merchant. In return, the cash merchant adds an amount of e-money to the customer's M-Pesa account which is equivalent in value to the cash received from her.²⁷⁷

At this point, absent private or public ordering to the contrary, by providing funds to the MM firm the customer would be an unsecured creditor of this firm, like a depositor and a bank.²⁷⁸ However, the three commitments discussed above mean that the customer obtains a beneficial interest in the trust fund that is equivalent to the

²⁷⁵ M-Pesa Terms and Conditions, cls 2.3 and 3.1.2.

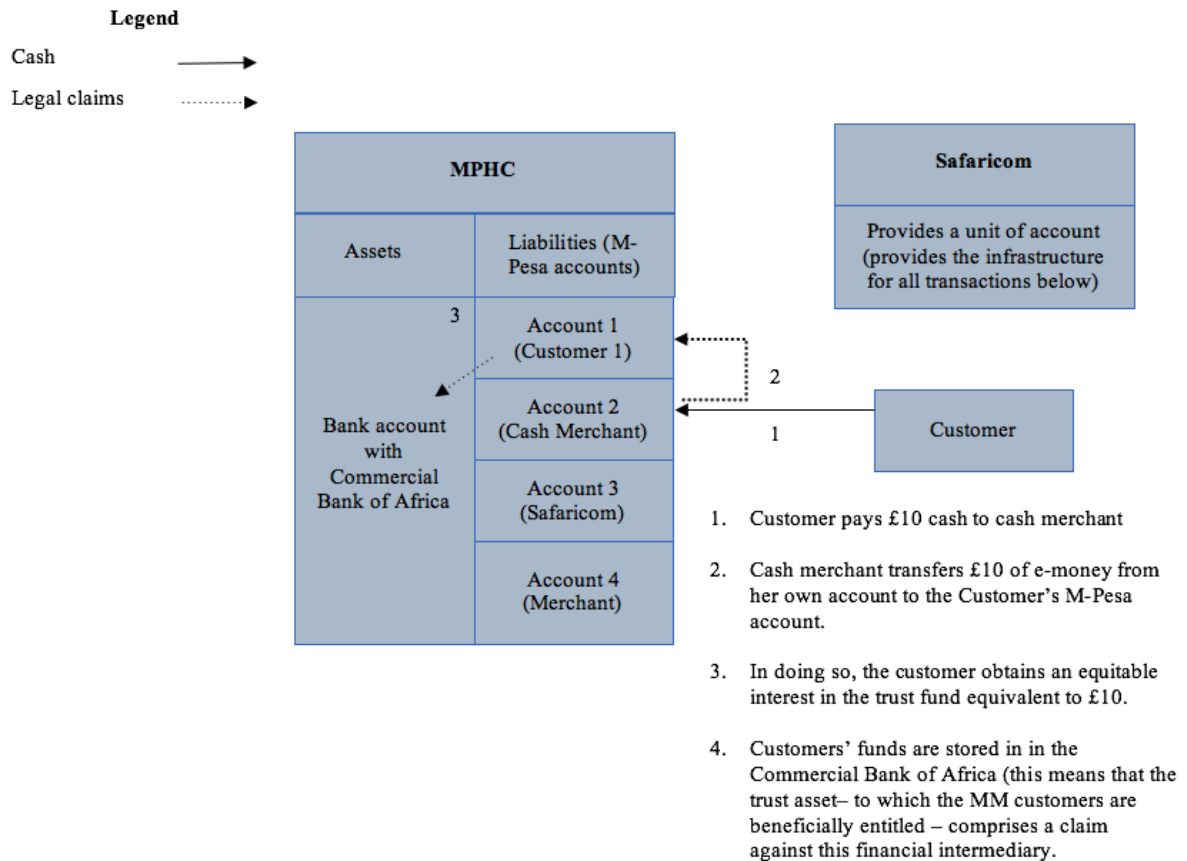
²⁷⁶ The customer can also perform this funds conversion service at a Safaricom retail outlet: see M-Pesa Terms and Conditions, cl 2.7. The thesis assumes that all or substantially all funds conversion transactions are performed at cash merchants rather than retail outlets of Safaricom. This is for two reasons. First, given the very large size of cash merchants in M-Pesa and other mobile money systems and general recognition of their importance to the growth of mobile money (see discussion in Chapter 5, below), it is reasonable to assume that the majority of funds conversion transactions are performed at cash merchants. This is a largely intuitive assumption because there is no empirical material outlining the proportion of fund exchange transactions made in cash merchants and retail centres. Second, cash merchants create important regulatory issues that require examination (see Chapter 4).

²⁷⁷ M-Pesa Amendment Deed, cl B3-4; M-Pesa Terms and Conditions, cls 5.1.1 (load e-money), 7.2 (security verification and verification proceeds), and 7.3 (sign the log book). See also M-Pesa Amendment Deed, Clause (B)(4) and (C)(4).

²⁷⁸ See a discussion of how, at least in the US, PayPal customers are unsecured creditors of this firm: Awrey and van Zwieten (n 221) 29.

amount of cash she gave to the cash merchant. The process is outlined in the diagram below.

Diagram 1: The Entry of Funds to M-Pesa



When the customer makes a payment she simply transfers this beneficial interest to another customer.²⁷⁹ When a customer wants to redeem e-money for cash she performs a reverse of the transactions discussed in the paragraph above. She transfers her beneficial interest to the account of the cash merchant who provides an equivalent amount of cash to her.²⁸⁰

²⁷⁹ M-Pesa Amendment Deed, cl 4.2.1; M-Pesa Terms and Conditions, cls 8.9, 8.10 and 9.1.

²⁸⁰ M-Pesa Amendment Deed, cls (b)(5) and (C)(5).

2.3.2.3(a)(iv) Cash Merchant's Own Funds

Fourth, the MM firm typically transacts with customers through agents known as 'cash merchants'.²⁸¹ A customer can convert cash for electronic funds and vice versa at a cash merchant. This raises a question of how the service as a whole can maintain a 1:1 relationship between customers' funds, stored in highly liquid assets, and e-money claims. Mobile money aims to address this point by requiring each cash merchant to commit to use her *own e-money and cash in the scheme*. By committing to use her own e-money and cash for these transactions, rather than those of the MMHC or MM firm, a cash merchant does not intermediate funds. As a result, the cash merchant is a 'liquidity island'; any failure on her part to maintain sufficient amounts of e-money or cash will have no direct impact on the liquidity of other cash merchants in the scheme. Furthermore, the insolvency of a cash merchant does not trigger any credit risk to other agents in the mobile money service, particularly other cash merchants, the MMHC or MM firm, or the customer.

2.3.2.3(a)(v) 1:1 Relationship

Fifth, each cash merchant commits to maintain a *1:1 relationship* between cash physically stored on her premises and e-money in her account. This means the cash merchant should never cause liquidity risk; she will always have sufficient e-money or cash to process fund conversion requests.

²⁸¹ Note literature and contractual terms usually describe these actors as 'agents': see eg, Lyman, Pickens, and Porteous, 2008 (n 3); M-Pesa Amendment Deed, cl B(2); and M-Pesa Trust Deed, cl 1 (ix). However, this thesis uses the term 'cash merchant' for two reasons. First, in a legal sense it is unclear whether 'agent' is an appropriate term for such an actor. An agency relationship arising when the principal uses an agent to act on his (the principal's) behalf (Eric Rasmusen, 'Agency Law and Contract Formation' (2001) Harvard Law School Discussion Paper No. 323 05/2001, 1 <http://www.law.harvard.edu/programs/olin_center/papers/pdf/323.pdf> accessed 20 April 2016). Such a relationship *may* arise depending on whether the cash merchant performs a role on behalf of the MM firm (see Klein and Mayer (n 58) 7-8). Such a relationship appears to exist in the sign-up function, because the cash merchant signs up a customer to the mobile money service on behalf of the MM firm. However, an agency relationship does not, in itself, arise for the funds conversion service. This is because cash merchants trade using their own balances of e-float and cash. They do not do so on behalf of the MM firm. Second, the thesis discusses the economic agency problem extensively. For conceptual clarity it is important to distinguish the agency problem in economics from mobile money 'agents', which can be done through adopting the term 'cash merchants'.

The combination of these commitments establishes and maintains a 1:1 relationship between customers' funds, stored in highly liquid assets, and e-money claims. In turn, this enables the MM firm and its associates to credibly commit to safeguard customers' funds for the purposes of providing payment and storage functions only. In so doing, the commitments mean mobile money does not intermediate funds and so will not cause the same type of credit and liquidity risks that arise when a bank provides payment and storage functions.

2.3.2.3(b) Remaining Risks

Commitments made by the MM firm and its associates do not go so far as to create a risk-free electronic payment and storage service. Mobile money remains subject to risks from three principal sources: operational failure, indirect intermediation and interoperability. These sources can create a range of credit, liquidity, and operational risks, as follows.

2.3.2.3(b)(i) Operational

First, a primary source of risk is operational in nature. This is the risk that one or more of the mobile money agents do not deliver on their commitments or fail to perform other components of the service. As a result, key components of the legal structure that underpins mobile money can become impaired, or appear to become impaired, which in turn can cause a range of credit and liquidity risks.

In particular, *co-mingling assets* between the MM firm and MMHC may be taken to indicate that the MMHC did not actually establish a trust over the customers'

assets. This would leave customers as mere unsecured creditors, exposed to one or more credit risks.

Furthermore, *collapse of the cash merchant operating system* may create a mass liquidity problem for customers who cannot access their funds. Although such a liquidity problem would be caused by an operational failure, customers may interpret its occurrence as signifying a breakdown of the holding company and trust structures discussed above and a resulting solvency problem for the MMHC. Like a pure panic run in banking, such confusion between liquidity and solvency problems could mean that customers ‘run’ before funds are exhausted paying out other creditors, including other customers (Chapter 5).

Finally, the operating system designed to process payments may collapse. In such an event customers cannot make payments to each other (Chapter 6).

2.3.2.3(b)(ii) Indirect Intermediation

As discussed in Section 2.3.2.3(a)(ii) of this Chapter above, under the trust deed, the MMHC cannot intermediate funds and must store them in a trust. The MMHC must also store customers’ funds separately from its own assets. The MMHC commits to store the funds in safe and liquid assets, as above. This aims to eliminate intermediation and maturity and liquidity risks, respectively. However, customers may be *indirectly* exposed to intermediation. This is because the ‘safe’ asset in which the MMHC typically ‘stores’ customers’ funds may well consist of a bank deposit. This means that the trust asset – to which the MM customers are beneficially entitled – itself comprises a claim against a financial intermediary. In turn, this means the

MMHC, and through it, customers' funds, are exposed to intermediation and various forms of credit and liquidity risks.

This indirect intermediation is most pronounced where the MMHC deposits the funds with a commercial bank, which is used in the M-Pesa model. However, approaches vary on the storage of customers' funds. In some mobile money platforms funds are stored in high-grade government and corporate bonds (Chapter 4). In others, the MMHC stores funds with the central bank, which does not expose customers to indirect intermediation and its resulting risks.

2.3.2.3(b)(iii) Interoperability

A third source of risk emerges in specific types of mobile money payment structures. The payments function of the original M-Pesa model does not create any additional credit or liquidity risks beyond those that arise in the storage function. This is because contagion is not possible; as discussed above in Section 1.2.3.3(b) of Chapter 1, Kenya is a non-interoperable mobile money system.

However, in Tanzania, mobile money has become interoperable. This means payments can be made between different MM firms. This extension to the M-Pesa model creates potential credit and liquidity risk because failure of one MMHC could impact other MMHCs in the system.

2.3.2.4 Public Ordering

The framework next examines the capacity of public ordering to increase efficiencies in mobile money platforms. This involves exploring the extent to which, if at all, public ordering enables the MM firm and its associates to *more credibly* commit to

safeguard customers' funds for the purposes of providing payment and storage functions only.

Pursuant to the economic approach to regulation, public intervention should address the two transaction costs that cause the agency problem that underpins the protection of customers' funds in mobile money systems. The first set of transaction costs are information asymmetries. Unlike a perfect market, in the 'real' world information is not free and universally available. Instead, one party, usually the seller, knows more about the good than the buyer.

The second set of transaction costs are coordination problems. These can arise when large numbers of dispersed actors, which are subject to the agreement in question, try to communicate and coordinate their trading actions.²⁸² Sufficiently high coordination costs can lead to a collective action problem. In such a situation, efficient trading is possible in theory, but does not occur because parties fail to determine how to co-ordinate their activities.²⁸³ Nevertheless, it may be feasible for legal intervention to reduce coordination costs to the point that the parties involved can address the coordination costs and engage in efficient trade, which will be explored below.²⁸⁴

²⁸² Like other transaction costs described in this paper, coordination problems exist on a spectrum and it is not clear when they become sufficiently high to impede efficient trading. The coordination required to negotiate a deal is usually small when it involves two parties, particularly when they are located near each other. However, coordination problems become more significant as more parties become involved in and seek to negotiate with each other: Russel Cooper and Andrew John, 'Coordinating Coordination Failures' in N. Gregory Mankiw and David Romer (eds.), *New Keynesian Economics* (MIT Press 1991) 4; Gregory N. Mankiw, 'New Keynesian Economics' (2008) *The Concise Encyclopedia of Economics*, Library of Economics and Liberty, 7 October 2010. <<http://www.econlib.org/library/Enc/NewKeynesianEconomics.html>> accessed 23 December 2016.

²⁸³ The costs involved in performing the required steps it makes it implausible that any individual can or will undertake and solve it alone: Keith Dowding, *Power* (Open University Press 1996) 3

²⁸⁴ Reducing coordination costs is one of the key purposes of corporate law: Kraakman and others (n 208) ch 1, 2 and ch 2, 2-3.

Coordination and collective action problems can exacerbate market failures. Ex ante, collective action problems can amplify agency costs, particularly where principals suffer from free rider problems.²⁸⁵ With multiple principals, each has limited incentive to monitor agent activity given her limited stake in the outcome. Knowledge of each principal's inadequate monitoring may then embolden the agent to engage in additional value-destroying activities. For example, large numbers of dispersed shareholders may have limited incentives to gather information on managers' activities. As a result, managers of the firm can engage in opportunism.²⁸⁶

The thesis follows the type of cross-benefit analysis discussed in Section 2.2.2.2 in Chapter 2. This involves examining different types of regulatory tools available, and performing a cost-benefit analysis of using them as opposed to permitting the market to operate unencumbered. The thesis makes a stand-alone claim in relation to regulation, as discussed in the section below.

2.3.3 The Active Approach

The third claim of the thesis is that public ordering should take an '*active approach*' in order to increase the efficiency of the commitments in addressing risks. In doing so, public ordering can enable the MM firm and its associates to more credibly commit to safeguard customers' funds for the purposes of providing payment and storage functions only.

²⁸⁵ Armour and others (n 2) ch 26, 589. Note the thesis uses the classification adopted by Armour and others (2016): Ex ante regulatory strategies apply from the moment at which the investment is made or the activity carried out. Ex post strategies apply only if something goes wrong: Armour and others (n 2) ch 3, 72.

²⁸⁶ See discussion in Adolf A. Berle and Gardiner C. Means, *The Modern Corporation and Private Property* (first published MacMillan, 1932; Harcourt, Brace and World, 1967).

The active approach involves monitoring a greater range of risks and more closely than what might be expected in other comparable principal-agent relationships, such as retail investors and financial intermediaries, and depositors and banks. The implementation of the active approach must respond to three issues: the likely minimal abilities of unbanked customers to make effective use of governance strategies, resource constraints, and the need to design public ordering that simultaneously serves systemic risk, consumer protection, and financial inclusion objectives. The sub-section below examines each of these issues.

2.3.3.1 Limited Ability to Use Governance Strategies – an ‘Active’ Approach

First, the active approach should respond to likely limited abilities of unbanked customers, as principals of mobile money, to make effective use of governance strategies and monitor actions taken by the MM firm, MMHC, and cash merchants. Unbanked customers are likely to have limited abilities to use governance strategies because they (the customers) will be subject to two transaction costs which are likely to be more severe than in principal-agent relationships from traditional settings, such as depositors and banks, or investors and firms.

First, there is likely to be an extensive information asymmetry between unbanked customers and actors in the mobile money system. Usually, mobile money is an unbanked customers’ first experience with formal financial services.²⁸⁷ This means there will be a strong information asymmetry between a customer and mobile money actors about how the service, and financial services more generally, are

²⁸⁷ This is primarily because, as discussed in Chapter 1, it is not profitable for banks to serve such communities. And usually there are no other formal financial services available: Boston Consulting Group, ‘Mobile Financial Services in Africa Not as Advanced as Some Might Think’ (How We Made it in Africa, 11 March 2015) <<http://www.howwemadeitinafrica.com/mobile-financial-services-in-africa-not-as-advanced-as-some-might-think/>> accessed 3 January 2017.

designed to operate. This lack of experience and information asymmetry means the customer will have limited ability to monitor and assess the performance of actors in the mobile money scheme.

Market forces are unlikely to alleviate this information asymmetry to the point that customers can effectively use governance strategy and monitor actions of the MM firm, MMHC, and cash merchants and address risks. This is because unbanked customers are likely to have little, if any, formal education. A significant portion of customers will be unable to read.²⁸⁸ As a result, the unbanked are unlikely to make effective use of disclosed material, whether issued on the actors' own volition or in responses to public ordering. In turn, this is likely to lead to strong information asymmetries between unbanked customers and MM firms and other actors in the mobile money system.

The second likely transaction costs are significant coordination problems. Sociological studies suggest that unbanked people are highly dispersed; around 85% of unbanked people reside in rural areas.²⁸⁹ Usually these rural areas are far from

²⁸⁸ This is because the unbanked tend to be the 'poorest of the poor'. They also tend to work in the informal sector or be self employed: Manroth and Solo (n 33) 45; Pickens (n 33) 1-2. See also comparable studies in developed countries, eg the United States: Marianne Bertrand, Sendhil Mullainathan and Eldar Shafir, 'A Behavioral-Economics View of Poverty' (2004) *American Economic Review* 94(1): 419-423 <<https://dash.harvard.edu/handle/1/2907437>> accessed 14 December 2016.

²⁸⁹ The Global Multidimensional Poverty Index 2014, assembled by Oxford University's Department for International Development, calculates across 780 sub-national regions across 69 countries that 85% of the world's poor live in rural areas: Sabina Alkire, Mihika Chatterjee, Adriana Conconi, Suman Seth and Ana Vaz, 'Global Multidimensional Poverty Index 2014' (2014) Oxford Department of International Development <<http://www.ophi.org.uk/wp-content/uploads/Global-MPI-2014-an-overview.pdf>> accessed 27 December 2017. Stefan Dercon, 'Rural Poverty: Old Challenges in New Contexts' (2009), Oxford University Press on behalf of the International Bank for Reconstruction and Development, 9 April 2009 <<http://documents.worldbank.org/curated/en/156151468159608168/pdf/767910JRN0WBRO00Box374387B00PUBLIC0.pdf>> accessed 27 December 2016, 1 There is some slight variation in developing regions. For example, in Western and Central this figure is 75%: International Fund for Agricultural Development (IFAD) 'Assessment of Rural Poverty: Western and Central Africa' (2001) IFAD Project Management Department <<https://www.ifad.org/documents/10180/60b3019f-9334-470e-8adc-b51f756523fc>> accessed 27 December 2016, 2. See industry research in Jennifer Frydrych and Hege Aschim, 'Extending reach: Mobile Money in Rural Areas' (2014) GSMA <http://www.gsma.com/mobilefordevelopment/wp-content/uploads/2014/10/2014_DI_Extending-reach_Mobile-money-in-rural-areas.pdf> accessed 19 April 2016.

commercial and social centres where people tend to congregate, such as banks, churches, and other community centres.²⁹⁰ This dispersion reduces the ability of unbanked people to coordinate their trading actions in mobile money platforms.²⁹¹ This inability creates collective action problems, which can amplify agency problems.²⁹² This will make it less likely unbanked people will coordinate their activities and ultimately effectively monitor the actions of mobile money actors.

The combination of likely strong information asymmetries and coordination problems mean unbanked customers are unlikely to make effective use of governance strategies. The thesis has insufficient space to determine the extent of their abilities. However, for the reasons discussed above, it is likely to be lower than the abilities of 'retail investors' normally the subject of investor protection schemes in developed countries.

Public ordering needs to respond to this market context by authorising the policymaker to monitor credit, liquidity, and operational risks on behalf of these communities. This involves an 'active' approach, in which the policymaker monitors a greater range of risks and more closely than what might be expected in other comparable principal-agent relationships, such as retail investors and financial intermediaries, and depositors and banks.

The active approach informs appropriate strategies in responding to risks from mobile money. It may appear that governance strategies would be sufficient for

²⁹⁰ Manroth and Solo (n 33) 45.

²⁹¹ Sociological research is beginning to explore how the spread of the mobile phone facilitates communication between unbanked and low-income people: see Assa Doron and Robin Jeffrey, *The Great Indian Phone Book* (Harvard University Press, 2013).

²⁹² Kraakman and others (n 208) ch 2, 2.

mobile money due to the relative simplicity of the scheme, at least when compared to banking. This is primarily because, as explained above, the prohibition on liquidity, maturity, and credit transformation means that mobile money does not directly involve the opacity that inhibits depositors' monitoring of banks and then justifies a component of bank regulation.²⁹³

However, the likely severe information asymmetries and coordination costs described above means regulatory strategies are more appropriate for unbanked customers using mobile money and should underpin the active approach. Regulatory strategies dictate substantive terms that constrain the agent's behaviour directly by governing the content of the principal-agent relationship.²⁹⁴

Policymakers have gradually shifted from governance to regulatory strategies for mobile money. Initially, policymakers issued letters of 'no objection' to potential MM firms. As discussed above in Section 1.2.3.2(a) of Chapter 1, the CBK took this approach when determining how to regulate M-Pesa. However, over time, policymakers have moved towards regulatory strategies. The key jurisdictions have drafted more substantive rules that govern how an MM firm provides a mobile money service. For example, Malawi issued Mobile Money Guidelines 2013, Kenya passed the NPS Regulations 2014, Tanzania has passed the E-Money Regulations 2015 and Payment Systems Licensing and Approval Regulations 2015, and Ghana passed the Guidelines for E-Money Issuers in Ghana 2015.

²⁹³ Armour and others (n 2) ch 13, 276.

²⁹⁴ Kraakman and others (n 208) ch 2, 4.

2.3.3.2 Resource Constraints

Second, resource constraints may mean a policymaker has limited monitoring abilities. Resource constraints describe limitations on staffing, equipment, and other resources that are necessary to regulate and supervise regulated firms, consumers, and activities.²⁹⁵

Resource constraints are a function of two intertwined components: the complexity of the product or system and the ability of the policymaker to understand that complexity.²⁹⁶ Both variables of resource constraints apply to many developing countries in which financial inclusion is relevant.

First, regulation and supervision related to financial inclusion create increased complexity in the system and require additional drafting and monitoring expertise.²⁹⁷ This is primarily because financial inclusion enables unbanked people to access financial services. As discussed above in Section 2.3.3.1, unbanked people are unlikely to make effective use of governance strategies that come with these financial services. This is because of the likely severe information asymmetries between unbanked customers and the MM firm and its associates. It is also due to the likely coordination problems between unbanked people. As a result, a policymaker needs to monitor many risks on their behalf. In turn, this requires the imposition of regulatory strategies and resulting supervision.

²⁹⁵ The broad distinction between them is that regulation refers to the written rules that define acceptable behaviour and conduct for actors in the mobile money sector. Supervision refers to the enforcement of these rules: <https://www.stlouisfed.org/in-plain-english/introduction-to-supervision-and-regulation>.

²⁹⁶ The latter tends to be particularly overlooked in the context of developing, as discussed below: text to n 300.

²⁹⁷ For example, see the discussion in Columbia that more regulation on access requires additional monitoring capacity on the Superintendencia Bancaria: Manroth and Solo (n 33).

Additional resources are also required due the nature of the product. As explained above, in mobile money, a non-bank provides functions not normally provided by banks. Policymakers have to invest considerable resources obtaining information on the new risk profiles introduced through this service. This is because the recent launch and growth of mobile money means, unlike banking, policymakers have limited previous or comparative guidance to draw on.

Second, policymakers are likely to have limited resources to understand complexity. Central banks in developing countries tend to exhibit lower levels of capability than their developed country counterparts.²⁹⁸ Central banks and other government agencies are likely to receive little support from surrounding institutions such as the judiciary.²⁹⁹ This is because in many developing countries, the judicial system faces wide-ranging problems of corruption, inefficiencies, and inadequate expertise.³⁰⁰

Public ordering should respond to likely regulatory constraints of policymakers in three ways. Each method has been used for mobile money as follows.

²⁹⁸ An emerging line of scholarship is increasingly suggesting that policy and regulatory institutions in developing countries tend to have a much lower capacity than commonly assumed: Lant Pritchett, 'The Problem with Paper Tigers: Development Lessons from the Financial Crisis of 2008' (Harvard Kennedy School and Non-Resident Fellow, Center Global Development, 28 November 2009)

<<http://mfile.narotama.ac.id/files/Jurnal/Jurnal%202010/The%20Problem%20with%20Paper%20Tigers%3B%20Development%20Lessons%20from%20the%20Financial%20Crisis%20of%202008.pdf>> accessed 28 December 2016. See additional discussion of policymakers' concerns about monitoring the trust arrangements in mobile money, discussed in Chapter 3. See also text to n 302.

²⁹⁹ See discussion in Jonathan Greenacre, 'Independent Regulators in Low-Income Banking Markets: A Bridge Too Far?' (2013) 28(3) *Banking and Finance Law Review* 409.

³⁰⁰ See a discussion of the limitations of institutions in developing countries, such as schools, clinics, police and courts: Collins and others (n 24). Edgardo Buscaglia, *Judicial Corruption in Developing Countries: Its Causes and Economic Consequences* (United Nations Office for Drug Control and Crime Prevention 2001); Göran Hyden, Julius Court, and Kenneth Mease, *Making Sense of Governance: Empirical Evidence from Sixteen Developing Countries* (Lynne Rienner Publishers 2004).

2.3.3.2(a) Simple Products

The first component is to prioritise the launch of products that are less complex than the type of sophisticated financial instruments that are prevalent in many developed countries, such as collateralised debt obligations. As far as possible, products should aim to provide the financial functions of banks but through products that create, as far as possible, operational rather than prudential risks. To this end, financial inclusion related products should involve little, if any, lending. Such products should also have transparent and simple interlinkages with the financial system.

The benefit of this approach is it reduces monitoring costs on the policymaker, which is appropriate given the likely resource constraints of this institution. This is because a policymaker can address operational risks through a series of low-cost methods, such as monitoring the system used to process payments and deposits and withdrawals, and monitoring conflict of interest issues. This is a less intensive process than designing and supervising prudential regulation. This is because for the latter type of regulation, a policymaker must invest considerable resources to determine the riskiness of assets and assess system-wide risks through complex macro-prudential regulation.³⁰¹

Furthermore, policymakers can use rules, rather than standards, to regulate and supervise products that create operational risks.³⁰² This can reduce the overall resources required to monitor compliance.³⁰³ It also means local courts have less need

³⁰¹ Klein and Mayer (n 58) 11.

³⁰² This is because there is not the need for the discretionary approach that is often required for prudential regulation, as discussed in Klein and Mayer (n 58) 11.

³⁰³ *ibid.*

to become involved in assessing corporate decisions ex post.³⁰⁴ This is particularly useful in the context of mobile money given the likely inefficiency of the domestic judiciary.

The commitments adopted by the MM firm and its associates mean the service fits the description of simplicity proposed in this section. This is because, as discussed above in Section 2.3.2.3 of this Chapter, above, mobile money creates primarily operational rather than credit and liquidity risks.³⁰⁵ There is less need to impose and supervise more resource-intensive prudential regulation.

2.3.3.2(b) Ex Post Tools

Resource constraints should also inform the design and use of ex post tools, such as accelerated resolution schemes and deposit guarantee schemes, may not be feasible in many of the countries in which mobile money operates. Low resource constraints may mean a policymaker is unable to effectively design and implement such tools. This should be considered on a case-by-case basis in terms of the tool and policymaker involved.

2.3.3.2(c) Principles-Based Regulation

The third component that responds to resource constraints emerges in relation to the costs incurred in designing and monitoring rules. A policymaker must have a degree of sophistication and expertise to design effective rules ex ante.³⁰⁶ Likely resource constraints discussed above mean the policymaker is unlikely to have that discretion and expertise. As a result, a policymaker is likely to face a strong information

³⁰⁴ Kraakman and others (n 208) 6.

³⁰⁵ See comparison to narrow banking licences: see Phillips and Roselli (274) 17.

³⁰⁶ Kraakman and others (n 208) ch 2, 20.

asymmetry against the firm which designed the mobile money product. This information asymmetry can mean the policymaker has insufficient understanding of the product to design effective and proportionate regulation. It may also mean rules are not supervised effectively and the MM firm and other actors in the system engage in creative forms of regulatory arbitrage.³⁰⁷

Policymakers should respond to this problem by drafting rules through principles-based regulation.³⁰⁸ This strategy aims to reduce the information asymmetry through an on-going relationship between the policymaker and regulated firms. The policymaker delegates at least some responsibility for achieving regulatory objectives to the firm. This is because the policymaker identifies goals in relation to a product in question.³⁰⁹ The firm can develop internal operating procedures that can meet those goals.³¹⁰

This model harnesses potential incentives of both the policymaker and firm to share information in order to ultimately design effective rules. The regulated firm will want to design effective operating systems and share them with the policymaker. This is because failed operating systems can result in more intrusive public ordering, which may ultimately impose greater compliance costs on the firm.³¹¹ The on-going engagement between firms and policymaker also helps reduce the information asymmetry between these institutions. This is because, in the course of designing the

³⁰⁷ For the purpose of this thesis, regulatory arbitrage involves a firm restructuring of a financial activity so that it no longer falls within the domain of certain regulation or so that it falls under a different, less costly regulation: Armour and others (n 2) ch 4, 84.

³⁰⁸ See a discussion of this approach in Armour and others (n 2) ch 24, 549.

³⁰⁹ *ibid.*

³¹⁰ *ibid.*

³¹¹ Market participants tend to be more conservative when managing compliance risk in order to not have to face more extensive compliance costs: *ibid* 551.

rules, there is a gradual information transfer and sharing from the firm to the policymaker.

Many of these features existed in the relationship between CBK and Safaricom. In March 2007, Safaricom proposed the launch of M-Pesa to the CBK. At that point, the interests of these institutions happened to be aligned; after a range of tests Safaricom believed launching M-Pesa would increase its profits. The CBK viewed M-Pesa as a means of delivering on financial inclusion objectives.³¹²

However, an information asymmetry existed between these institutions; as the originator of the product, Safaricom knew more about M-Pesa than the CBK. Furthermore, given that mobile money had never been launched in any other country, the CBK had no existing resource and regulatory practice to draw upon.³¹³

The nature of the relationship that developed between the CBK and Safaricom can be described as a principles-based approach in nature although it was not explicitly described as such at the time.³¹⁴ Consistent with the principles-based approach, the CBK and Safaricom undertook activities that aimed to enable the CBK to better understand the operations and risk profile of mobile money.³¹⁵ In doing so, these activities reduced the information asymmetry between the two institutions. In doing so, the CBK could regulate and supervise M-Pesa effectively, but minimise compliance costs so that Safaricom could more profitably serve unbanked people.

³¹² AFI (n 113).

³¹³ *ibid.*

³¹⁴ *ibid.*

³¹⁵ *ibid.*

To this end, the CBK established basic rules and principles. As discussed above in Section 1.2.3.1, these rules and principles were contained in a letter of no objection from the CBK and Safaricom. This letter notified Safaricom that in the course of providing M-Pesa the firm must implement anti-money laundering systems, ‘adequate’ protection of customers’ funds and the implementation of methods to ensure customers’ were not mistreated.³¹⁶ However, Safaricom was permitted to design internal operating procedures that contributed to those objectives, including those in relation to its large cash merchant network. The design process of rules involved an on-going engagement. Safaricom was required to meet with the CBK repeatedly in order to explain its operating system. Safaricom was also obliged to send regular reports to the CBK.³¹⁷

The principles-based approach represents an effective method of ensuring that the policymaker can overcome its resource constraints and effectively monitor the risks from mobile money. However, the principles-based approach has its limitations. The close proximity between the MM firm and policymaker raises the potential for regulatory capture. This is because the frequency and interaction between them means the MM firm is in a position to influence the policymaker.³¹⁸ The thesis has insufficient space to investigate potential regulatory capture in M-Pesa and other mobile money services. Chapter 7 further considers the potential for regulatory capture in mobile money and the need for research on this topic.

This thesis assumes that the principles-based approach is used when designing and implementing public ordering proposed in each chapter. The thesis also provides

³¹⁶ *ibid.*

³¹⁷ *ibid.*

³¹⁸ Armour and others (n 2) ch 24, 551.

additional examples beyond Safaricom and the CBK when market participants and the policymaker followed what can be characterised as a principles-based approach.

2.3.3.3 Policy Trade-Offs

A third important component of public ordering in the context of mobile money involves potential conflicts between regulatory objectives. The following regulatory objectives are relevant in most countries in which mobile money operates.

The first is consumer protection. This goal is because, like regular consumers such as depositors, mobile money customers are interacting with the formal financial system in a manner that is different to investing (which would otherwise justify investor protection).³¹⁹ This is because consumers are using mobile money for payment and storage purposes.

The second main regulatory goal is financial stability. As explained above, on current regulatory paradigms it is unlikely that mobile money causes negative externalities and systemic risk. However, certain forms of public ordering and supervision may cause these problems to arise, as explored below.

The third regulatory objective is ‘financial inclusion’. This objective tends to directly inform the design of mobile money regulation in a large number of countries.³²⁰ As discussed above in Section 1.2.1.2 of Chapter 1, financial inclusion

³¹⁹ *ibid* ch 24, 64.

³²⁰ For example, financial inclusion informed the design of the first licence ‘special licence’ used by M-Pesa. See the discussion in Chapter 1 on this point.

means enabling unbanked people to access formal payment and storage instruments, including through mobile money platforms.³²¹

The addition of financial inclusion as a regulatory goal has important impacts on determining the effectiveness of regulation. This is because it means ‘efficiency’ is not judged in relation to intermediation, as is commonly the case in financial regulation. Instead, regulation is assessed by its ability to enable customers to access payments and storage functions.

Financial inclusion can conflict with traditional objectives, particularly in relation to consumer protection. For example, public ordering tools which will be explored in the thesis may protect customers’ funds. However, such tools can create a tension between customers ‘at the margins’, who are people who may be able to afford the service depending on its cost, and existing customers. Public ordering that protects existing customers can raise compliance costs on actors in the mobile money platform, particularly the MM firm, MMHC, and cash merchants. Such costs may be passed onto customers in the form of higher fees. In this situation, customers at the margins may be unable to afford the service.

This tension between financial inclusion and consumer protection has been described as the regulator’s dilemma; whether to implement measures that may hinder expanding access to non-users in the interests of protecting those who already have

³²¹ Text to n 25.

access.³²² The thesis explores this tension at various points and, to the extent feasible, provides proposals for relieving it.

Financial inclusion can potentially contribute to systemic risk through the commitment of the policymaker to monitor agency problems on behalf of customers. This active approach enables customers to free ride off the policymaker's monitoring rather than doing it themselves. This may result in a reduction in private monitoring and, unless public monitoring is effective and buttressed by other regulatory tools, moral hazard problems amongst actors in the mobile money system.

The thesis explores these claims through the structure outlined in Section 1.3 of Chapter 1. Pursuant with this structure, the thesis now turns to the storage function. It examines opportunism that can impair this function, particularly the conflict of interest between shareholders of the MM firm and customers, as follows.

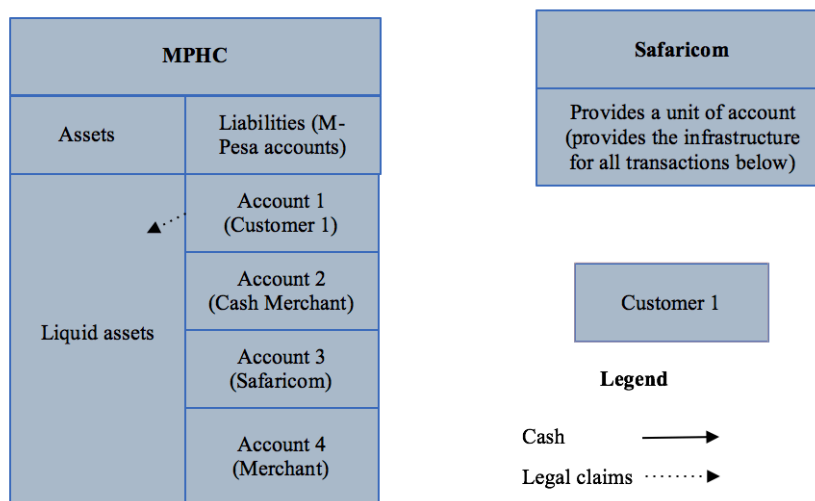
³²² David Porteous, 'The Regulator's Dilemma' (2006) FinMark Trust, July 2006 <http://www.finmark.org.za/wp-content/uploads/2016/01/Rep_RegulatorsDilemma_2006.pdf> accessed 29 December 2016, 5.

CHAPTER 3: CONFLICT OF INTEREST BETWEEN SHAREHOLDERS AND CUSTOMERS

Introduction

This chapter examines the potential conflict of interest between shareholders of the MM firm and its customers. This is a species of agency problem which arises through the storage function of mobile money, in which the MM firm commits to store customers' funds and return them upon demand. The storage function operates through the following steps.³²³ The customer converts cash for e-money. The customer can leave this e-money in her account, add to her balance through additional deposits, and transfer it to others in the form of payments. At a later period, the customer redeems any remaining e-money in her account for cash. The diagram below highlights the component of the M-Pesa model that is particularly relevant to storage.

Diagram 3: Conflict of Interest Between Shareholders of the MM Firm and Customers



³²³ See contractual terms in: text to n 276.

The storage function creates an agency problem because the customers may not be able to observe what the MM firm does with funds they have paid over to it. The agency problem may manifest in a conflict of interest between the shareholders of the MM firm and customers. This conflict could result in the MM firm using customers' funds in ways that puts them at greater risk of loss than the customers want.

The MM firm and its associates make commitments which aim to address the conflict of interest between shareholders and customers. These commitments are central to the legal structure through which the MM firm and its associates credibly commit to safeguard customers' funds for the purposes of providing payment and storage functions only. The MM firm commits to only access funds for the purposes of payment and storage by delegating the storage of customers' funds to the MMHC, an institutionally independent company. In addition, the MMHC declares that it stores customers' funds on trust for customers. Provisions in the trust deed prohibit the MMHC from lending customers' funds and receiving interest on returns. Finally, under the trust deed, the MMHC commits to store customers' funds solely in highly liquid assets, and so operate as a narrow bank.

These commitments raise four questions for analysis. First, to what extent do these commitments address the conflict of interest between shareholders and customers? Second, what risks arise if the MM firm and/or MMHC shirk rather than deliver on these commitments? Answers to these questions facilitate a determination of the residual agency problems in the scheme. Third, what additional public ordering, if any, can address residual agency problems and enable mobile money to provide its

storage function more efficiently? And fourth, what are the policy trade-offs in imposing such regulation, if any?

This chapter assumes for the purposes of its analysis that the assets of the trust, which are customers' funds, are stored in a central bank, and so do not create any substantial credit or liquidity risk. This assumption is relaxed in Chapter 4. Using this assumption, the chapter claims that the holding company, trust, and narrow banking commitments address a range of risks to customers' funds. In particular, the prohibition on intermediation contained in the trust deed means customers' funds are not exposed to risks associated with credit transformation that arise in banking. Furthermore, by storing funds in highly liquid assets, mobile money does not directly involve maturity and liquidity transformation and associated risks from those functions.

However, the holding company, trust, and narrow banking commitments do not remove all risks from storage. The MMHC will not be subject to special resolution schemes of the types used on banks. As a result, despite the use of a trust, in the event of the MMHC's insolvency, customers may experience a delay in receiving their funds. Furthermore, civil law jurisdictions do not have directly replicable trust instruments. The effectiveness of alternative trust instruments used in civil law countries is unclear.

Furthermore, the trust arrangement itself is a governance strategy. It relies upon customers, as beneficiaries, to use trust-related tools to monitor and sanction the MMHC, as trustee, for a failure to deliver on the terms of the trust deed. The likely

severe information asymmetries between unbanked customers and the MM firm and MMHC, and coordination problem between individual customers, means they are unlikely to make effective use of these tools. As a result, customers' funds are exposed to a non-trivial operational risk that the MM firm and/or MMHC may not deliver on one or more of the three commitments that underpin the storage function. In particular, the assets of the MMHC – customers' funds – may be co-mingled with those of the MM firm. This could impair the effectiveness of the holding company and trust commitments and expose customers' funds to a range of credit and liquidity risks.

Public ordering can and should be used to increase the efficiency of the holding company, trust, and narrow banking commitments in addressing agency problems. Doing so will buttress the credibility of these commitments in addressing the conflict of interest between shareholders and mobile money customers. The chapter proposes several *ex ante* and *ex post* tools which can contribute to addressing the conflict of interest.

The chapter explores these claims through using the framework proposed in Chapter 2. This means it has four parts. The first outlines the storage function that inheres in mobile money. The second examines the potential conflict of interest between shareholders and mobile money customers. The third analysis the efficiency of private ordering in addressing this agency problem and the resulting risks from the scheme. The fourth examines the role for public intervention in increasing the efficiency of private ordering in addressing the conflict of interest between shareholders and customers.

3.1. Function

3.1.1 Introduction

Mobile money provides a storage function. This is because a customer can deposit funds in her mobile money account. However, unlike accounts with payment providers such as Western Union, she does need to immediately transfer funds to other customers. Instead, the customer can build up funds in her account. Furthermore, she can later convert her remaining balance of e-money back into cash for her own consumption or use it to pay other participants in mobile money platforms.³²⁴

As outlined in the claims section, a mobile money account provides a functionally equivalent storage function to a bank deposit. This is because, as with a deposit, a mobile money customer can convert funds that have been stored electronically back into cash and when she does so she obtains the full ‘face value’ of funds in her account. Furthermore, as discussed in Section 2.3.1.2(c)(i) of Chapter 2, Safaricom specifically commits to enabling a customer to redeem her funds ‘at any time’.³²⁵

3.1.2 Limited Policy Attention to Storage

In Kenya, the CBK and Safaricom have tended to downplay the storage function of mobile money. This may be because, under banking legislation in Kenya and other countries, by enabling funds to be redeemed upon demand, a mobile money account provides an equivalent function to a bank deposit. Under Kenyan law, this would

³²⁴ Chapter 2 contains a more detailed discussion on the functions of mobile money: text to n 222.

³²⁵ Text to n 240.

mean, by definition, mobile money should attract the prudential regulation that normally applies to banks.³²⁶ The CBK and Safaricom wanted to avoid such an outcome in the interests of minimising compliance costs, which in turn would enable Safaricom to reach the unbanked and deliver on financial inclusion objectives.³²⁷

The CBK took a number of policy decisions to de-emphasise the significance of the storage function, each of which have been replicated across a large number of countries. The first and most obvious decision was to classify M-Pesa as a ‘payments service’ and Safaricom as a ‘payments provider’. In doing so, Safaricom would not be subject to banking regulation. The CBK emphasised that mobile money was a payments service by prohibiting the provision of interest payments on mobile money accounts, and failing to explicitly guarantee that it would extend ex post regulatory support to MM firms or MMHCs in the event of their collapse.³²⁸

Second, and also in the interests of avoiding prudential regulation, Safaricom markets M-Pesa as a payments and transfer service.³²⁹ It discloses to customers that Safaricom is neither a bank nor a deposit-taking institution.³³⁰ Safaricom also emphasises that M-Pesa customers do not enjoy some of the functions that may arise in a bank deposit. For example, customers do not receive interest payments, a feature that might be available on a bank deposit.³³¹ This approach is similar to that used by

³²⁶ See the definition of ‘banking business’ in Kenya: The Banking Act s 2(1): (a) the accepting from members of the public of money on deposit repayable on demand or at the expiry of a fixed period or after notice; (b) the accepting from members of the public of money on current account and payment on and acceptance of cheques; and (c) the employing of money held on deposit or on current account, or any part of the money, by lending, investment or in any other manner for the account and at the risk of the person so employing the money.

³²⁷ See a description above in AFI (n 42).

³²⁸ Instead, interest on customers’ funds must be used in accordance with trust legislation and in consultation with the CBK, which usually means paid to charity (NPS Regulations, regs 25 (5)).

³²⁹ See a description of how M-Pesa Terms and Conditions, M-Pesa Trust Deed, M-Pesa Amendment Deed, and M-Pesa website emphasise that M-Pesa is a transfer and payment service: Text to n 127.

³³⁰ M-Pesa Terms and Conditions, cl 2.12.

³³¹ See provisions that interest payments must be for own costs, not passed onto customers: M-Pesa Trust Deed, cls 4 and 5; and M-Pesa Amendment Deed, cl. 6.1. See calls for changes on this point: Ehrbeck and Tarazi (n 223).

money market mutual funds (MMMFs) in developed countries, although usually this disclosure is less explicit.³³²

Third, the CBK authorised the launch of *linked mobile money-bank deposits*. These products encourage a customer to use her linked bank deposit as a place for storing funds, not her mobile money account. The policy intention is that a customer will store only small amount of funds in her mobile money account and transfer any funds earmarked for ‘savings’ to a deposit provided by a prudentially regulated bank.

Perhaps most famous is a partnership between Safaricom and the CBA, launched with the CBK’s approval on 27 November 2012.³³³ A customer can transfer funds from her M-Pesa account to a linked M-Shwari bank deposit provided by the CBA. Unlike M-Pesa, M-Shwari was specially designed, regulated, and marketed as a savings service.³³⁴ A customer can obtain an interest rate of 6% through her M-Shwari deposit and her funds are fully protected by bank regulation.

Despite the efforts of policymakers and MM firms, customers appear to be storing larger amounts of their personal wealth in mobile money than originally envisaged. Instead of zero, or near zero, balances that would apply if mobile money

³³² This approach appears similar to that used by money market mutual funds (MMMFs) in developed countries, although usually this disclosure is less explicit. Usually, such disclosure focuses on alerting investors that their funds will not automatically receive the sort of ex post regulation that applies to banks, particularly depositor guarantees schemes. For example, MMMF sponsors are required to disclose to their customers that agencies of the United States government neither insure nor guarantee investments in the fund, and that their investments may lose principal. However this disclosure does not extend as far as M-Pesa to explicitly distinguishing mobile money accounts and bank deposits, although some scholars have suggested this should take place See Daniel E. Levin, ‘Breaking The Buck: The End For Money Market Mutual Funds as We Know Them’ (2009) 28 Review of Banking and Finance Law 747, 771; Jonathan Macey, ‘Reducing Systemic Risk: The Role of Money Market Mutual Funds as Substitutes for Federally Insured Bank Deposits’ (2011) Yale Faculty Scholarship Series. Paper 2020 <http://digitalcommons.law.yale.edu/cgi/viewcontent.cgi?article=3100&context=fss_papers> accessed 16 December 2016, 56.

³³³ Vodafone, ‘Safaricom Launches M-Shwari - Offering Interest and Loans - On M-Pesa’ (*Vodafone*, 27 November 2012) <<http://www.vodafone.com/content/index/media/vodafone-group-releases/2012/m-shwari.html>> accessed 9 April 2016. As explained in Chapter 1, ‘CBA’ is an abbreviation for the Commercial Bank of Africa.

³³⁴ *ibid.*

were a payments-only service, such as Western Union, studies suggest customers store around £3.30 on their mobile money accounts.³³⁵ This may constitute a significant proportion of the household wealth of unbanked customers.

This point can be further explored by examining the relative saving rates of customers in mobile money accounts and linked bank deposits. A 2015 study found that customers store a roughly similar amount of funds on their M-Pesa and M-Shwari accounts.³³⁶ This suggests that, regardless of disclosure, regulatory classification, and whether interest payments are available, customers see mobile money as a safe place for savings, and make use of its storage function.

3.1.3 Limited Research on Storage

Perhaps because private and public ordering have sought to downplay the storage function of mobile money, there is limited research on the risks it creates and how to address them. Literature often advocates for a full legal separation between customers' funds and the MM firm's assets and activities.³³⁷ Often, this material also advocates for the imposition of mechanisms that enable funds to be returned to customers.³³⁸

However, scholarship on methods of achieving legal separation and developing redemption mechanisms has been slow to emerge. Greenacre and Buckley (2014) focus on the use of trusts to segregate customers' funds from the mobile money service. Tarazi and Breloff (2010) and Tarazi and Lauer (2012) outline a series

³³⁵ GSMA (n 17) 9.

³³⁶ GSMA (n 17) 58.

³³⁷ Mas (n 139) 285.

³³⁸ *ibid.*

of tools that can be used to protect customers' funds.³³⁹ Munoz, Solana, Buckley, and Greenacre (2016) explain how a combination of fiduciary contracts, mandate contracts, and direct regulation can protect customers' funds held in civil law countries.³⁴⁰

This chapter develops this literature in several ways. It examines and analyses the main legal tools proposed by the scholars above and those currently used by regulators. Furthermore, by taking an economic, functional approach, the chapter explores the incentives of actors to deliver on private ordering and the regulatory significance of the relative lack of ex post regulatory regimes, and makes proposals to address these issues.

3.2 Market Failures and Risks

By providing a storage function, mobile money involves the basic agency problem discussed in Section 2.2.2.1 of Chapter 2. Also as outlined in Chapter 2 but repeated here for clarity, the agency problem arises in mobile money because the MM firm (the 'agent') undertakes to store funds on behalf of the customers (the 'principals'). The customers may not be able to observe what the MM firm does with funds they have paid over to it.

A particular species of agency problem can arise, which is a conflict of interest between creditors and shareholders of a firm. This agency problem is relevant

³³⁹ See discussions in Michael Tarazi and Paul Breloff, 'Nonbank E-Money Issuers: Regulatory Approaches to Protecting Customer Funds' (2010) Consultative Group to Assist the Poor (CGAP) Focus Note 63, July 2010 <<http://www.gsma.com/mobilefordevelopment/wp-content/uploads/2013/09/fn63rev.pdf>> accessed 20 April 2016.; Lauer and Tarazi (n 157); and Greenacre and Buckley (n 149).

³⁴⁰ Muñoz and others (n 149) 710 and 725.

to mobile money because, absent any ordering to the contrary, by providing funds to the MM firm the customers would be unsecured creditors of this firm.³⁴¹

Customers want their funds to be stored safely. This is because the customers need the funds to be available so they can make use of the full functionality of mobile money services, such as redeeming the funds for cash (through the storage function of mobile money) and payments (through the payment function).³⁴²

In contrast, shareholders of the MM firm want maximum return on their equity. The business model of mobile money, discussed in Chapter 1, means the MM firm will derive revenues from the fees it charges customers for withdrawals and payments.³⁴³ Subject to applicable private and public ordering, shareholders desiring additional returns beyond fees charged for those transactions will want the managers of the MM firm to use customers' funds for purposes other than storage.

In particular, shareholders will want the funds to be invested in ways which may increase profits but put them at greater risk of loss than customers might want. For example, the MM firm may invest customers' funds in risky rather than safe assets, such as complex financial products instead than government bonds.³⁴⁴ This

³⁴¹ Text to n 277.

³⁴² The next Chapter explores this assumption in greater detail, namely by exploring the extent to which customers may want funds invested in more speculative investments in the interests of obtaining interest payments, even at the potential cost of safety.

³⁴³ See the fee structure in M-Pesa, discussed in Chapter 1.

³⁴⁴ See a discussion of the potential for managers of firms to take such steps in William W. Bratton, 'Bond Covenants and Creditor Protection: Economics and Law, Theory and Practice, Substance and Process' (2006) Georgetown Business, Economics and Regulatory Law Research Paper No. 902910 <<http://scholarship.law.georgetown.edu/cgi/viewcontent.cgi?article=1575&context=facpub>> accessed 27 December 2016, 6-8; Magdalena Jerzemowska, 'The Main Agency Problems and Their Consequences' (2006) 14(3) Acta Oeconomica Pragensia, 9 <http://econpapers.repec.org/article/prgjnlaop/v_3a2006_3ay_3a2006_3ai_3a3_3aid_3a73_3ap_3a9-17.htm> accessed 27 December 2016, 11-15; and Andre Shleifer and Robert W. Vishny, 'A Survey of Corporate Governance' (1997) 52(2) Journal of Finance, June 1997 <<http://scholar.harvard.edu/files/shleifer/files/surveycorp.gov.pdf>> accessed 27 December 2016.

type of investment can raise risk of default and possible insolvency of the MM firm. Absent any effective ordering to the contrary, such an outcome is not in customers' interest. This is because their funds will be used to satisfy debts owing to secured creditors of the MM firm.³⁴⁵

The MM firm may also invest customers' funds in illiquid business assets relating to its mobile phone or mobile money service, such as a new phone tower. Such an investment may increase the reach of a mobile money service into new areas of the country and ultimately profitability. However it may create a liquidity risk to customers. This is because the MM firm may be unable to liquidate such assets in time to honour customers' redemption requests.³⁴⁶

3.3 Private Ordering

This section examines the efficiency of private ordering in addressing agency problems that arise in the storage function of mobile money. This section has two parts. The first examines the extent to which commitments contained in contractual terms between the MM firm and customer, which are a specie of private ordering, address this conflict of interest.³⁴⁷ The second analyses the likely effectiveness of these commitments in achieving this aim.

3.3.1 Commitments

³⁴⁵ This describes instances in which the value of a firm's assets sinks below its liabilities. It comprises insolvency on a balance sheet tests: Armour and others (n 2) ch 14, 290.

³⁴⁶ This means the firm has an inability to pay debts as they fall due: *ibid.* In this case, it involves an inability to repay mobile money customers on demand. This comprises insolvency on a cash flow test.

³⁴⁷ Chapter 5 explores commitments made between the MM firm and cash merchants.

The MM firm and its associates – which for the purpose of this chapter is the MMHC, which is a sub-agent of the MM firm – use a combination of commitments to address the conflict of interest between shareholders and customers. The legal structure which emerges from these commitments is a key way through which the MM firm and its associates credibly commit to address the conflict of interest between customers and shareholders. This structure is central to the commitment the MM firm and its associates safeguard customers' funds for the purposes of providing payment and storage functions only. In particular, through the structure the MM firm commits to establish and maintain a 1:1 relationship between cash received from customers, stored within the system as highly liquid assets, and e-money which customers use in the mobile money service.

3.3.1.1 Holding Company

The MM firm delegates the storage of customers' funds to the MMHC (making it a sub-agent), an institutionally independent company. The MM firm retains contractual rights to facilitate certain transactions in relation to customers' funds, which is explored below in Chapter 3. However, by delegating the storage function to the MMHC, the MM firm commits to not invest customer's funds in risky or illiquid business assets relating to its mobile phone or mobile money service. This commitment buttresses the credibility of the MM firm's commitment to safeguard customers' funds for the purposes of providing payment and storage functions only.

This holding company structure also protects customers' funds from credit risk that might arise through insolvency of the MM firm. This because the holding company structure means customers' funds form part of the estate of the MMHC, not

the MM firm. As a result, customers' funds are not available to creditors of the MM firm in the event of this firm's insolvency.³⁴⁸

3.3.1.2 Trust Arrangement

The MMHC stores customers' funds on trust. In M-Pesa this is achieved through the MMHC declaring that it holds funds on trust for customers.³⁴⁹ This approach is used in mobile money schemes across a large number of common law countries, such as Ghana, Kenya, Lesotho, Malawi, and Namibia.³⁵⁰

The commitment to store customers' funds in a trust safeguards them for the purposes of storage in three main ways. First, the trust deed provides a series of rules which tightly constrains what can be done with customers' funds. In particular, the MMHC, as trustee, cannot use the funds for any purpose other than storage and processing redemption request.³⁵¹ This means the MMHC cannot make use of customers' funds – which are trust assets – in the course of its business. Doing so would be a breach of trust and mobile money customers could assert a proprietary claim to funds in the hands of the MMHC in priority to the MMHC's general creditors.³⁵²

Second, the trust deed requires the MMHC, as trustee, to store customers' funds in highly liquid assets, rather than invest them in risky or illiquid assets. This is because, unlike in banking, the trust deed prohibits the MMHC from intermediating

³⁴⁸ Text to n 271.

³⁴⁹ Text to n 268.

³⁵⁰ These obligations are often buttressed in public ordering. See, eg, Ghana: E-Money Guidelines, art 7(4); Kenya: NPS Regulations, reg 25; Lesotho: Guidelines on Mobile Money, app 10); Malawi: Guidelines for Mobile Payment Systems, art 8.

³⁵¹ Lauer and Tarazi (n 157) 1; and Tarazi and Breloff (n 342) 3.

³⁵² Text to n 269.

customers' funds. The MMHC cannot earn interest on returns, as would a bank. This structure means customers' funds are not exposed to the risks associated with credit intermediation that arise in banking

Third, customers' funds are protected from credit risk that might otherwise arise through insolvency of the MMHC. This is because the trust structure means, unlike bank depositors, customers are not unsecured creditors of the MMHC. This is because, while the MMHC takes legal title to customers' funds, customers retain beneficial ownership.³⁵³ The quantum of this beneficial interest is the amount of each depositor's funds in her mobile money account. In turn, this means mobile money customers have a proprietary claim to trust assets held by the MMHC. Put alternatively, the trust facilitates a form of asset segregation.³⁵⁴ Trust property – in customers' funds – does not form part of the MMHC's estate and so is not available for creditors.³⁵⁵ The trust fund is different to a typical bank account, in which the bank obtains both legal and beneficial ownership of depositor's money on deposit, and the depositor has only a personal claim against the bank.³⁵⁶

The combined effect of these commitments is to protect customers' funds from a range of credit risks. In particular, customers' funds cannot be invested in the MM firm's business or in other risky assets which addresses that component of the

³⁵³ Text to n 269.

³⁵⁴ Asset segregation separates an organization's assets from its owners' personal creditors. It prevents the customers' funds being used to subsidise the firm's business activities. This is a form of asset partitioning in the sense of putting assets into different pools for the purposes of segregating creditors' claims: Henry Hansmann, Reinier Kraakman and Richard Squire, 'Incomplete Organizations: Legal Entities and Asset Partitioning in Roman Commerce' (2014) European Corporate Governance Institute, Law Working Paper 271/2014, October 2014 <https://papers.ssrn.com/sol3/papers.cfm?abstract_id=2506334> accessed 16 December 2016; Henry Hansmann and Ugo Mattei, 'The Functions of Trust Law: A Comparative Legal and Economic Analysis' (1998) 73 *New York University Law Review* 434 <<http://www.nyulawreview.org/sites/default/files/pdf/NYULawReview-73-2-Hansmann-Mattei.pdf>> accessed 29 December 2016. This is often labelled 'fund isolation' in literature on this topic: Tarazi and Breloff (n 342) 6; and Lauer and Tarazi (n 157) 3.

³⁵⁵ *Ibid.*

³⁵⁶ *Ibid.*

conflict of interest between shareholders of the MM firm and customers. This is because customers' funds cannot be intermediated. This also means, unlike banking, customer' funds are not exposed to credit intermediation and the risks from that function. In addition, customers' funds are protected against insolvency of the MM firm (through the use of the MMHC) and the MMHC (through the trust arrangement).³⁵⁷ Collectively, assuming rationality on the part of customers, the multiple-layer protection from intermediation and insolvency means customers' funds are always protected from credit risk and so a fundamentals run should not occur.

The prohibition on intermediation in the trust deed also protects customers from the risk that the MM firm or MMHC might invest funds in *illiquid* assets. In turn, this means the MMHC cannot engage in maturity or liquidity transformation and so should not face a liquidity problem when seeking to honour customers' redemption requests. In turn, this should mean a pure panic run should not occur. However, this protection offered through the trust arrangement will depend upon where funds are stored, as examined below.

3.3.1.3 Narrow Banking

Funds received from customers, placed in the trust, must still be stored in some way. One option is to require the MMHC to store customers' funds in cash. However, the security limitations of storing large amounts of cash (which in the case of M-Pesa was £4.8 billion in 2013) means this storage option is impractical.

³⁵⁷ This double level of protection means the inability of unbanked customers to monitor the financial decisions of the MMHC is less important. This is because the asset segregation rules mean even if the customers do not effectively monitor and the system fails, her funds are still protected from loss.

Instead, the MM firm commits to a ‘narrow banking’ structure in which the MMHC must store customers’ funds solely in highly liquid assets, for example, a central bank account.³⁵⁸ This approach is a form of narrow banking, in which all deposits are secured on safe assets or backed by full reserves.³⁵⁹

The narrow banking commitment creates a financial structure which in turn means mobile money provides a different risk profile to banking. In banking, funds received from depositors are intermediated into long-term assets, creating potential liquidity and maturity mismatches. The narrow banking commitment means funds are stored in ways which do not directly involve maturity and liquidity transformation and associated risks from these functions. Assuming liquid markets (an assumption which will be relaxed in Chapter 3), the narrow banking commitment creates a closer match between the nature of the MMHC’s liabilities (instantly redeemable funds) and assets (liquid investments) than is normally the case in bank deposits. This closer match should eliminate the potential for a pure panic run because the mobile money system never faces a liquidity problem.

3.3.1.4 Conclusion

The holding company, trust, and narrow banking commitments are key methods through which the MM firm and the MMHC credibly commit to address the conflict of interest between customers and shareholders. The structure that emerges from these commitments also enables the MM firm to establish and maintain a 1:1 relationship between cash received from customers, stored within the system as highly liquid assets, and e-money. In turn, this enables a mobile money account to provide an

³⁵⁸ This assumption will be relaxed in Chapter 4, which examines the specific risk profile of different trust assets and policy issues involved in addressing them.

³⁵⁹ See discussion of narrow banks in: text to n 274.

equivalent storage function to a bank deposit but without the credit, liquidity, and maturity transformation performed by a bank, and the risks that arise from these activities.

3.3.2 Analysis

This section explores the residual risks to mobile money which emerge once the holding company and trust commitments have been introduced.³⁶⁰ These risks can arise through three components of these commitments, each of which are examined below. The first is the holding company structure. The second is from limitations in trust instruments. The third arises due to the limited ability of unbanked customers to effectively use trust instruments to protect their funds. These two issues can impact upon each other, as explained below.

3.3.2.1 The Holding Company Structure

As discussed above, the holding company structure can protect customers from the risk that the MM firm invests their funds in risky or illiquid business asset. It also means customers are protected from credit risk that might arise through insolvency of the MM firm. However, this structure involves an important limitation, which is that the MM firm might try to control the MMHC to enter into asset-diverting transactions. The discussion in Section 3.3.2.3 of this Chapter, below, explores the ways in which this might occur and the resulting risks to customers' funds and confidence in the service.

³⁶⁰ Chapter 4 examines the commitment of the MMHC to operate as a narrow bank.

3.3.2.2 Limitations of Trust Instruments

The second set of risks emerge through limitations of trusts. Three issues are relevant to the likely effectiveness of trust instruments as a means of addressing the conflict of interest between shareholders and mobile money customers. Two are ex ante and the other is ex post, as follows.

First, civil law jurisdictions do not use trusts. This makes it more difficult to segregate customers' funds from the assets of the MMHC.³⁶¹ As a result, as a condition of launching mobile money operations, MM firms must institute alternative arrangements, which, like trusts, are designed to segregate customers' funds from the estate of the MMHC. For example, in Chad, the Congo, and El Salvador, customers' funds must not be subject to 'attachment' by creditors of the MMHC.³⁶² In other countries, such as Paraguay, customers' funds must be treated as 'autonomous assets' that are not subject to seizure by creditors of the MMHC.³⁶³

There is little information on the actual legal tools used to ensure customers' funds are not subject to attachment and/or are treated as autonomous assets. For this reason, it is unclear whether such tools protect customers' funds from insolvency of the MMHC to the same extent as trusts, if at all. This is part of the broader difficulties civil law faces in achieving the same outcomes as a common law trust.³⁶⁴ Research from Munoz, Solana, Buckley, and Greenacre (2016) suggests that in civil law countries, a combination of fiduciary contracts, mandate contracts, and direct

³⁶¹ In Mali, funds received in exchange for mobile money must be immediately placed in one or more banks or MFIs. These funds must be clearly identified, but there are no specific provisions to ensure that these funds are protected in the event of the mobile money issuer's insolvency: BCEAO Instruction regarding E-Money Issuance (date unclear), art 32.

³⁶² Chad: Regulation on E-Money Issuance 2011, reg 15; Congo: Instruction on E-Money Issuance (date unclear) art 18; El Salvador Ley para Facilitar la Inclusion Financiera (undated), art 10.

³⁶³ Ley No. 921 de Negocios Fiduciarios (undated), art 10, 13.

³⁶⁴ See discussion in Muñoz and others (n 149).

regulation may be required to segregate customers' funds from the assets of the MMHC.³⁶⁵ However, the degree of protection provided by this patchwork of tools is unclear and requires further research.

The second *ex ante* problem relates to the enforceability of trusts in the country under examination. The extent to which trusts are enforced across jurisdictions is an empirical question that the thesis has insufficient space to explore.³⁶⁶ Instead, as outlined in Chapter 1, the thesis assumes that a trust, properly constituted, can be enforced. Further research should examine the extent to which trusts can be enforced across different jurisdictions.

Ex post, even if funds are adequately segregated, there may be a significant delay in returning them to customers. This risk arises because of delays in the operation of applicable insolvency procedures.³⁶⁷ In particular, there may be a very considerable delay while the liquidator or insolvency trustee determines the validity and quantum of each customer's claim over the funds held by the MMHC. Drawing on World Bank data, Awrey and van Zwieten (2016) explain that the average length of an insolvency process in sub-Saharan Africa is approximately three years.³⁶⁸ Such a delay may disrupt the economic activity of the unbanked customer who must wait for her claim to be processed, and impede the ability of the MM firm to provide effective liquidity insurance. It may also cause unbanked customers to lose trust in mobile money, and potentially electronic financial services more generally, which can impair financial inclusion objectives.

³⁶⁵ *ibid* 16-33.

³⁶⁶ However, see a brief discussion on this point in Awrey and van Zwieten (n 221), directly below.

³⁶⁷ Awrey and van Zwieten (n 221) 32.

³⁶⁸ *ibid*.

3.3.2.3 Governance Strategies

A third problem emerges because the trust arrangement itself is a governance strategy. This section examines this problem in two components. The first examines the governance tools that underpin the trust arrangement and explains it is unlikely that customers will make effective use of them. The second explains the resulting operational, credit, and liquidity risks that can arise in relation to customers' funds.

3.3.2.2(a) Strategies and Likely Effectiveness

There are two components to this discussion. One is the governance strategies themselves and the likely inability of unbanked customers to use them. The other, which follows, is the contractual terms between the MM firm and MMHC which make it even more difficult for customers to monitor the actions of these firms.

3.3.2.2(a)(i) Governance Strategies

Customers have two sets of tools to monitor the MM firm and MMHC, each of which emerge from the trust in which customers' funds are stored. The first set of tools emerge through the trust arrangements in the scheme. The terms of the trust deed will outline the rights of the customers, as beneficiaries of the trust, to monitor actions of the MMHC, as trustee. Furthermore, the MMHC will also be under implied trustee duties, which can buttress the safety of customers' funds. For example, depending on the trust-related legislation in any given country, the MMHC must act in the best interests of the customers. More specifically, it is likely the MMHC would need to ensure that customers' funds are stored in a separate account from its own bank account or the account of a third party. The MMHC must also exercise the skill of a 'prudent' person in performing its duties under the trust, and not profit from the office

of trustee.³⁶⁹

The MMHC is likely to be subject to trust-related duties which can facilitate recordkeeping and help customers, as beneficiaries, to monitor what the MMHC does with the funds. For example, the MMHC is likely to be under an implied duty to keep accurate records of the trust account and provide them to customers upon request.³⁷⁰

Finally, trusts provide customers with the means to sanction the MMHC for failing to deliver on these duties, including in relation to customers' funds. This is because customers have the right to enforce the terms of the trust by suing the MMHC for breaches of its terms.³⁷¹

Customers are unlikely to use tools contained in the trust deed to monitor the extent to which the MM firm and MMHC deliver on trust-related obligations. This is primarily because the trust-related tools are governance strategies. Their effectiveness relies upon the ability and incentives of unbanked customers to monitor and sanction actions of MMHC. The likely severe information asymmetries between unbanked customers and the MM firm and its associates, and between each other, means they are likely to make less than fully effective use of governance strategies, including those that are trust related. More specifically, the unbanked have no experience in financial tools and are likely to have little or no formal education. This means they are

³⁶⁹ Graham Moffat, Gerry Bean, John Dewar, *Trusts Law: Text and Materials* (Cambridge: Cambridge University Press, 2005) at 405. Paul Finn, *Fiduciary Obligations* (Law Book Company Ltd, 1977) at 18.

³⁷⁰ Moffat and others, *ibid.*

³⁷¹ See discussion in Jonathan Greenacre and Ross Buckley, 'Trust Law Protections for E-Money Customers' (2013) *Alliance for Financial Inclusion (AFI)*, 13 <http://www.afi-global.org/sites/default/files/publications/piwg_knowledge_product_e-money_trust_and_model_trust_deed.pdf> accessed 11 April 2016.

unlikely to know how to use trust-related tools effectively.³⁷² Furthermore, the coordination problems facing unbanked customers means they are unlikely to assemble and develop their understanding of how to use such tools.³⁷³

3.3.2.2(a)(ii) Contractual Arrangements Between the MM Firm and MMHC

The likely inability of a customer to effectively monitor the actions of the MM firm and MMHC means these firms may be more likely to shirk rather than deliver on the holding company and trust commitments. In particular, the MM firm and MMHC may collude in ways that put customers' funds at risk of loss. The contractual arrangements in mobile money would facilitate this process. This is because, although the MM firm and MMHC are institutionally independent – in that they are separate legal and corporate entities – the MM firm has certain contractual rights which may enable it to access customers' funds which then can facilitate co-mingling.

In M-Pesa, Safaricom gains these contractual rights through the trust deed containing the declaration of trust over customers' funds. This trust deed states that the MPHC enters into a management agreement with Safaricom. This agreement appoints Safaricom to operate as an 'agent' of the MPHC.³⁷⁴ As a result, Safaricom gains the contractual right to operate the commercial bank accounts in which customers' funds are stored.³⁷⁵ Safaricom can also effect payments from the trust fund back to customers who wish to redeem their funds.³⁷⁶ Authorised Safaricom personnel are signatories of the bank account under the name of the MPHC.³⁷⁷

³⁷² Note there is no empirical material on this topic.

³⁷³ See a discussion of the unbanked's coordination and collective action problems in Chapter 1.

³⁷⁴ M-Pesa Amendment Deed, cl 7.1.

³⁷⁵ M-Pesa Amendment Deed, cl 7.1(a).

³⁷⁶ *ibid.*

³⁷⁷ *ibid.*

The terms of the agency agreement do not, in themselves, impair the credibility of the holding company structure in safeguarding customers' funds for the purposes of payments and storage. This is because Safaricom only obtains the contractual authority to process transactions required for payment and storage. It does not gain the contractual authority to directly access and use customers' funds for its own business purposes. Nor can it invest customers' funds in illiquid business assets.

Acting as a 'rogue employee', one of Safaricom's co-signatories of the bank account in the name of the MMHC from Safaricom could steal customers' funds. Theft has occurred in mobile money. For example, in May 2012, employees of MTN Uganda, an MM firm, stole around £2.5 million of customers' funds.³⁷⁸ Inadequate internal controls meant that the employees could extract funds held in the mobile money platform.³⁷⁹ However, to this author's knowledge, this theft is the only realisation of major operational risk.

Another risk, which is the focus of this discussion, is that the MM firm could use its contractual right as agent of the MMHC to divert funds from the commercial bank accounts in which customers' funds are stored into its own account. In turn, this can mean the MMHC – customers' funds – may be co-mingled with those of the MM firm. This could impair the effectiveness of the trust commitment in the following way.

³⁷⁸ The funds were stolen from a 'suspense account', which stores funds from transactions that could not be completed. Jeff Mbanga, 'How MTN Lost Mobile Billions' (*The Observer*, 24 May 2012) <<http://allafrica.com/stories/201205250847.html>> accessed 9 April 2016.

³⁷⁹ *ibid.*

3.3.2.2(b) Consequences for the Trust Arrangement

This section explores the potential consequences of co-mingling on the trust arrangements. The discussion involves examining the legal requirements for establishing a trust, and consequences for customers' funds if these requirements are not met.

3.3.2.2(b)(i) Establishing a Trust

As explained above in Section 3.3.1.2 of this Chapter, the trust structure protects customers against the risk that the MM firm will use their funds, once held on trust, contrary to its commitment. This will be a breach of trust and give customers a proprietary claim against the MM firm if it takes assets out of trust to invest them in any way, including risky or illiquid assets. In addition, the trust is linked with the holding company structure. This is because the trust structure protects customers' against credit risk which might otherwise arise through insolvency of the MMHC.

However, to provide these protections, the trust must be validly established. If the MM firm never establishes the trust, the customers will not enjoy the protection it brings. This raises a legal question: when is a trust established? This requires the 'three certainties': certainty of subject matter (which assets are to be held on trust), certainty of intention (does the settlor really mean to hold the assets separately from her own) and subject to the onerous duties of trusteeship and certainty of objects (for whom are the assets to be held on trust).³⁸⁰

³⁸⁰ See original statement of the three certainties rule in *Knight v Knight* (1840) 49 ER 58. See earlier discussion in *Wright v. Atkyns* (1823) Turn. & R. 143, 157, per Lord Eldon: "...first...the words must be imperative...; secondly...the subject must be certain...; and thirdly...the object must be as certain as the subject". For additional discussion on various components of the three certainties, see intention to create a trust inferred from circumstances (*Re Kayford* [1975] 1 WLR 279).

If the MM firm does not segregate customers' funds from its own assets, there is a risk that the trust arrangement will not meet the three certainties. In this case a court may conclude (regardless of what the MM firm represented to its customers) that it did not evince the necessary intention to hold the funds on trust, and/or, if the funds were mingled, that it is not possible to identify which funds it was supposed to have segregated.³⁸¹

3.3.2.2(b)(ii) Consequences for Customers' Funds

There are two sets of consequences to impairment – or perceived impairment – of the trust. The first are risks that apply directly to customers' funds. In particular, if the trust/holding company structure is never properly established, the MM firm, rather than MMHC, may have title over funds transferred to it by customers. Failure to establish the trust/holding company structure means customers may become mere creditors of the MM firm. This outcome means customers' funds become exposed to credit risk at the MM firm. This is because, in the event of the MM firm's insolvency, customers cannot assert their claim to funds in priority to this firm's general creditors.

Failure to establish the trust/holding company structure also reintroduces the conflict of interest between MM firm shareholders and customers, and resulting credit and liquidity risks to the customers. This is because, absent any other ordering to the contrary, the MM firm will be able to invest funds received for its own business purposes in risky and/or illiquid assets, as outlined above.³⁸² The conflict of interest between shareholders of the MM firm and customers, discussed above, means

³⁸¹ See the case of *Re Goldcorp* [1994] UKPC 3 in which the firm promised to hold assets on trust but failed to do so and the customers received nothing in its insolvency; Roy Goode, *Principles of Corporate Insolvency Law* (4th edn, Sweet & Maxwell, 2011) 213.

³⁸² As explained in the Introduction to this Chapter.

managers may well invest customers' funds in these ways. In turn, this can cause credit or liquidity risks to customers' funds as discussed below.

A second set of risks that arise from co-mingling are *functional* in nature. These apply to the ability of the trust to buttress the credibility of the MM firm's commitment to safeguard customers' funds for the purposes of payments and storage. The customers may have difficulty in determining whether the trust arrangements have been set up in a way that actually works. They may be able to determine that the holding company arrangement is established, because it is conceptually and legally distinct from the trust. For example, a customer could check the register of local companies. Furthermore, any contract for payment will state who is the payee, enabling customers to determine if they are making a payment to the MMHC or the MM firm.

However, determining the validity of the trust arrangement will be more difficult. This difficulty emerges due to the factors discussed in Section 3.3.2.2(a)(i) of this Chapter: customers' lack of sophistication in using trust instruments and the contractual rights of the MM firm to deal with funds in ways that the customers cannot easily observe. If the customers cannot be sure the trust has been established properly and validly in law, they will not be confident that they have the legal protections it seeks to provide. As a result, customers will be unsure whether the trust is established or invalid, in which case they become unsecured creditors of the MM firm. In turn, potential solvency problems at the MM firm may trigger a fundamentals run. This is because, like a depositor and a bank, their uncertainty about the validity of the trust arrangement may mean customers believe they are unsecured creditors of

the MM firm. As a result, assuming the MM firm must pay out funds while it is still solvent, customers face first-mover advantages in running to redeem their funds before they are exhausted satisfying the claims of secured and unsecured creditors of the firm.

A customer run could be triggered by an actual breakdown of the trust structure due to co-mingling. For example, by investing customers' funds in illiquid business projects, the MM firm may be unable to liquidate sufficient assets in time to honour customers' redemption requests.³⁸³ Customers may confuse this liquidity problem for solvency problems at the MM firm and again, fearing they are unsecured creditors of this firm due to co-mingling and a breakdown in the trust arrangement, run to redeem their funds.

Customers may be particularly strongly inclined to engage in a fundamentals or pure panic run in the event of financial distress of the bank in which customers' funds are stored. This is due to the lack of ex post regulatory support for mobile money. In theory, when stored in a bank, customers' funds are protected by deposit guarantee schemes. This is because these funds are in a bank deposit in the name of the MMHC. However, the size of this account normally far exceeds the ceiling of deposit guarantee schemes.

M-Pesa provides a useful example of the way in which customers' funds exceed the ceiling of deposit guarantee schemes. In September 2013, the MPHC held £4.8 billion of customers' funds in a bank deposit with the CBA. Kenya's deposit

³⁸³ This means the firm is unable to pay debts as they fall due: see discussion in text to n 349.

guarantee scheme insures funds up to a maximum of KSh100,000, or about £695.00. This means M-Pesa customers' funds are virtually completely uninsured against bank failure.³⁸⁴ Furthermore, deposit insurance does not exist in many developing countries that use mobile money. These include Congo, Ivory Coast, Ghana, Lesotho, Madagascar, Mali, Malawi, Namibia, Pakistan, Rwanda, Senegal, Somalia, South Africa, and Tunisia.³⁸⁵

The propensity for customers to run exists regardless of whether the trust is set up. It is driven by customers' perception and inability to verify whether the trust arrangement is legally valid. If the trust is in fact set up properly, the consequences of a run will be less severe than if it is not. This is because customers' funds will be stored in liquid assets and can be redeemed for cash. However, mere occurrence of such a run may cause a reduction in confidence in mobile money, which may impair financial inclusion efforts.

3.3.3 Conclusion

Ultimately, the reliance on governance strategies means that private ordering leaves a non-trivial operational risk that the MM firm and/or MMHC will not deliver on the holding company and trust commitments. This risk can create credit and liquidity risks to customers' funds, which in turn may cause a fundamentals or pure panic run. The next step of analysis involves examining the potential role for public ordering in addressing the conflict of interest between shareholders and mobile money customers

³⁸⁴ William Jack and Tavneet Suri, 'The Economics of M-Pesa', (2010) Massachusetts Institute of Technology, Working Paper, August 2010 <<http://www.mit.edu/~tavneet/M-PESA.pdf>> accessed 11 March 2016, 10.

³⁸⁵ Asli Demirgü-Kunt, Edward Kane, and Luc Laeven 'Deposit Insurance Database' (2014) International Monetary Fund Working Paper, Table 1 <<https://ideas.repec.org/p/nbr/nberwo/20278.html>> accessed 11 April 2016.

and buttressing the credibility of the holding company, trust, and narrow banking commitments discussed above.

3.4 Public Ordering

There are two key questions for analysis in this section. What additional public ordering, if any, can address residual agency problems and enable mobile money to provide its storage function more efficiently? What are the policy trade-offs in imposing such regulation, if any? The section below examines these questions in the context of a set of relevant *ex ante* and *ex post* tools. The majority of these tools are designed to buttress the credibility of the MM firms' commitment to safeguard customers' funds for the purposes of providing payment and storage functions only. The final tool, extending bank resolution schemes to mobile money, is designed to minimise risk of delays in the event of insolvency of the MMHC.

3.4.1 Ex Ante

3.4.1.1 Dissuade People from Viewing Mobile Money As Storage

The first regulatory tool involves signalling to the public that mobile money is a payments, *not* a storage service, and so is not protected by banking regulation.³⁸⁶ For this reason a customer would be putting her funds at considerable risk by storing them in the mobile money service. The implication is that a customer should only use the storage function in a limited capacity. This would involve building up small amounts of funds and then transferring them to others rather than using her mobile money

³⁸⁶ This approach is used in other countries. For example, in Afghanistan e-money cannot be considered a deposit, no interest may be earned on the mobile money account, and lending against customers' funds is prohibited: Regulations Issued Under the Law of Da Afghanistan Bank, Article E II, reg 2.5.2.

account as a place for savings. The public and private ordering used to give effect to this objective is outlined above in Section 3.1.2 of this Chapter.

This public and private ordering may reduce the consequences of failure of the storage function to a customer. If a customer stores only a small fraction of her personal wealth with mobile money, failure of the scheme will not destroy her entire asset base. The empirical material outlined in Chapter 1 suggests that public and private ordering does not dissuade customers from viewing mobile money as a place for savings. This is likely to occur for two reasons.

A first potential reason customers are not dissuaded from using the service as a place for savings is because a mobile money account provides the same customer-facing storage functions as a bank deposit, as explained in Chapter 2. In both mobile money and bank accounts, a customer can convert cash for a form of electronic currency and vice versa upon demand. For this reason, a customer may then infer she can treat her mobile money account as a place for savings, much like a depositor and a bank account.

A second potential reason is the lack of explicit ex post support of the type that applies to banks is also unlikely to discourage customers from making use of the storage function of mobile money. A comparison can be made to MMMFs, which often disclose to investors that their funds are not covered by ex post regulatory support.³⁸⁷ Despite this disclosure, there is evidence that investors use their MMMF accounts as a substitute for a bank account.³⁸⁸

³⁸⁷ Macey (n 335) 56.

³⁸⁸ See Banking Daily, 'Most Consumers Unaware' Jan. 14, 1994, cited in Macey (n 335) 55.

Unbanked customers are likely to take a similar approach as investors in MMMFs. Customers, particularly those of large and sophisticated mobile money schemes, may believe there is an implied guarantee of ex post support for mobile money. This is because such schemes may be ‘systemically important’ and so will receive government support in the event of their failure.³⁸⁹

Furthermore, and an alternative to the implied guarantee, the unbanked are unlikely to be aware of the differences in ex post support between a mobile money account and bank account. This, again, is due to the inability of unbanked customers to make use of disclosed material. Finally, even if the unbanked are aware that their funds are not protected by ex post support, they may still use it as a place for savings. This is because electronic storage has a range of advantages over physical methods of safekeeping funds.³⁹⁰

For this reason, policymakers are increasingly coming to accept that customers are likely to continue making use of the storage function of mobile money. This realisation has prompted the development of additional regulation designed specifically to protect customers’ funds, examined below.

³⁸⁹ Note that there have been no studies done on whether mobile money is systemically important. Again, a comparison with investors of MM firms may be useful here. A Securities and Exchange Commission released in November 1993 found that 49% of the public believed that funds held with MMMFs are insured by the Federal Deposit Insurance Corporation (see Press Release, Securities and Exchange Commission, “Chairman Levin Announces Results of SEC’s Mutual Fund Survey,” SEC Press Release 93-55 (Nov. 10, 1993) (Survey prepared by the SEC’s Office of Economic Analysis) cited in Macey (n 335), 54. See alternative studies that find that investors generally believe that MMMFs are equivalent to holding cash in a deposit account: see Robert A. Robertson and Bradley W. Paulson, ‘A Methodology For Mutual Fund Derivative Investments’ (1994) 1 Stanford Journal of Law, Business, and Finance 237 cited in Macey (n 335), 55. These studies have limited direct relevance given their age.

³⁹⁰ See Chapter 1 for a discussion of these advantages.

3.4.1.2 Capital Requirements

The second potential tool of public ordering involves requiring the MM firm to hold capital against its e-money liabilities. These requirements are a form of private insurance. They aim to require the MM firm to use its own capital to meet losses of customers' funds due to actions of the MMHC.³⁹¹

The key policy and regulatory issue is the trade-offs involved in setting different capital levels. Capital requirements for mobile money are imposed in a number of countries and vary between them considerably.³⁹² In a number of countries, such as the Philippines, Colombia, Mali, and Senegal, MM firms are required to provide a set amount of capital. In other countries capital requirements are a proportion of the MMHC's e-money liabilities, usually around 2-3%.³⁹³ In the Congo, capital requirements are set at 100% of the MMHC's e-money liabilities.³⁹⁴ However, this requirement is yet to be enforced and there is no publicly-available information as to why this is the case.³⁹⁵

³⁹¹ In this sense, capital requirements have a similar purpose to when it is imposed on banks and other financial institutions: Capital rules aim to ensure that shareholders' equity funds a minimum proportion of the current value of the bank's assets. This aims to increase the likelihood that a bank can absorb losses on the assets side of its balance sheet without becoming insolvent and triggering a run on its deposits or other short-term funding: Armour and others (n 2) ch 14, 296.

³⁹² NPS Regulations, reg 11 and sch 1.

³⁹³ The Philippines: the initial and on-going capital amounts are equivalent at PHP 100 million (approx. USD 1.53 million). A number of other countries set capital levels against mobile money liabilities. For example, in Colombia, a MM firm is subject to capital requirements of COP 5.846 billion (approx. USD 1.46 million) and on-going levels of 2% of outstanding mobile money liabilities. In Mali initial capital requirements are set XOF 300 million (approx. £355,000) and on-going requirements are the greater of (1) XOF 300 million (approx. £355,000); or (2) 3% of outstanding mobile money liabilities. In Senegal, initial requirements are set at XOF 300 million (approx. £355,000) and on-going requirements are set at the greater of (1) XOF 300 million (approx. £355,000); or (2) 3% of outstanding mobile money liabilities (see material GSMA, 'Safeguarding Mobile Money: How Providers and Regulators Can Ensure that Customer Funds Are Protected' (January 2016) GSMA <http://www.gsma.com/mobilefordevelopment/wp-content/uploads/2016/01/2016_GSMA_Safeguarding-Mobile-Money_How-providers-and-regulators-can-ensure-that-customer-funds-are-protected.pdf> accessed 10 April 2016, 25-26. Note this source was used to access information on mobile money regulation in Bolivia, Chad, Colombia, Congo, Ghana, Lesotho, Paraguay, Peru, the Philippines, Sri Lanka, Uganda, and the West African Monetary and Economic Monetary Union. In Afghanistan, an MM firm must be capitalised in the amount of at least £700,000: Regulations Issued Under the Law of Da Afghanistan Bank, Article E II, reg 2.5.2). A large number of countries such as Ghana, Lesotho, Malawi, Paraguay and Uganda do not appear specify capital amounts (GSMA, *ibid* 25-26).

³⁹⁴ GSMA (n 221) 25.

³⁹⁵ *ibid* 26.

The regulator's dilemma, involving a tension between financial inclusion and consumer protection, applies in relation to capital levels. Higher levels of capital can have customer protection benefits. It builds the credibility of MM firm's commitment to safeguard the funds of the mobile money customers for the purposes of providing payment and storage functions only. This is because higher capital requirements increase the likelihood that the MM firm can fully reimburse customers in the event of failure to deliver on the holding company, trust, and narrow banking commitments and resulting loss of funds.

However, assuming that debt is tax deductible and cheaper than equity, capital requirements increase compliance costs for the MM firm.³⁹⁶ This is because equity capital is the most costly to raise for this firm, as an exception to the Modigliani and Miller theorem. Such costs may prevent the extension of mobile money into unbanked people. For example, in September 2013, Safaricom's e-money liabilities were greater than its market capitalisation.³⁹⁷ A full capital guarantee would have prevented Safaricom from growing its mobile money service and reaching larger numbers of unbanked and other low-income customers.

³⁹⁶ Franco Modigliani and Merton H. Miller, 'The Cost of Capital, Corporation Finance and the Theory of Investment' (1958) 48(3) *The American Economic Review* 261
<<https://assets.aeaweb.org/assets/production/journals/aer/top20/48.3.261-297.pdf>> 30 December 2016; Franco Modigliani and Merton H. Miller, 'Corporate Income Taxes and the Cost of Capital: A Correction' (1963) 53(3) *The American Economic Review*, June 1963, 433
<<https://www2.bc.edu/~chemmanu/phdfincorp/MF891%20papers/MM1963.pdf>> accessed 29 December 2016; Serena Fatica, Thomas Hemmelgarn and Gaëtan Nicodème, 'The Debt-Equity Tax Bias: consequences and solutions' (2012) European Commission Taxation Papers, Working Paper 33
<https://ec.europa.eu/taxation_customs/sites/taxation/files/resources/documents/taxation/gen_info/economic_analysis/tax_papers/taxation_paper_33_en.pdf> accessed 29 December 2016; and James A. Miles and John R. Ezzell, 'The Weighted Average Cost of Capital, Perfect Capital Markets, and Project Life: A Clarification' (1980) 15(3) *The Journal of Financial and Quantitative Analysis*, September 1980, 719
<https://www.jstor.org/stable/2330405?seq=1#page_scan_tab_contents> accessed 29 December 2016.

³⁹⁷ Discussion with mobile money specialist, 8 December 2015.

These greater compliance costs may be passed onto customers in the form of higher fees. This may mean the service becomes unaffordable for customers ‘at the margins’ and so mitigate financial inclusion objectives.

Higher capital requirements may prevent smaller, potentially more innovative phone companies from entering the sector. Barriers to entry of this kind may inhibit competition and innovation in mobile money, which in turn impairs the spread of this service to larger numbers of low-income and unbanked customers. There is evidence that a lack of innovation already exists in many mobile money sectors. A reason often given is that larger, more established players such as Safaricom tend to have an overwhelming market dominance, which limits their incentive to innovate and reach larger numbers of unbanked people.³⁹⁸

It may be useful to set a level of capital that is sufficient to reimburse customers in the event a ‘rogue’ employee of the MM firm or MMHC steals customers’ funds. This provides a degree of protection to customers’ funds from theft. In doing so, this tool can be justified through customer protection. It may also have financial inclusion benefits. This is because it may encourage risk-averse unbanked people to trust that their funds are protected from rogue employees. However, the likely low level of capital requirements mean that financial inclusion is unlikely to be unduly affected.

³⁹⁸ Ignacio Mas, ‘Shifting Branchless Banking Regulation from Enabling to Fostering Competition’ (2014) 30(2) *Banking and Finance Law Review*, 179.

As a result, customers may be more likely to trust that their funds are adequately protected from theft. However, the compliance costs are kept sufficiently low that financial inclusion objectives will not be unduly effective.

Overall, the discussion in Section 3.4.1 of this Chapter has explained that the unbanked are likely to continue to use the storage function of mobile money. Furthermore, the only ex ante method of guaranteeing that the MM firm and its associates will safeguard customers' funds for the purposes of providing payment and storage functions only would require 100% capital requirements on the MM firm, which would impose very considerable costs for financial inclusion. This means there is a need to explore other, potentially lower-cost regulatory tools. The discussion turns to those other options below.

3.4.1.3 Active Approach

The next set of recommendations emerge from the likely limited ability of unbanked people to make effective use of governance strategies, particularly trust-related tools. As explained in Chapter 2, a policymaker should respond to this likely limited ability by taking an 'active approach'. This involves monitoring a greater range of risks and more closely than what might be expected for retail and wholesale investors. The policymaker can do so by replacing the governance arrangements that underpin the trust commitments with regulatory strategies. Such strategies should involve the following four features.

3.4.1.3(a) Independent Directors

The first are methods to ensure the independence of the MMHC and MM firm. This tool aims to remove conflicts of interest ex-ante through requiring the MMHC to be staffed by directors who are independent of the MM firm.³⁹⁹ Conflict of interest tools can better ensure such managers are guided by conscience and reputation when making decisions.⁴⁰⁰ This tool may reduce the likelihood of directors of the MMHC engaging in collusion with the MM firm and shirking from the commitments in the holding company and trust structures.

3.4.1.3(b) Fit and Proper Tests

The second regulatory tool involves requiring the MM firm to follow fit and proper tests when selecting managers of the MMHC. Such tools aim to ensure managers of the MMHC are of ‘good character’. In common law countries, fit and proper rules can be applied to the MMHC in its role as trustee. For example, in Kenya, trustees must be fit and proper persons.⁴⁰¹ Similar to independent directors, such rules can reduce the likelihood that the managers of the MMHC steal customers’ funds or permit employees to do so.

3.4.1.3(c) Back-up Systems

A policymaker should also require the MM firm to establish backup systems to ensure that account information can be recovered in the event of physical destruction and theft.⁴⁰² This tool can be justified in the interests of ensuring continuity of service in

³⁹⁹ Kraakman and others (n 208) ch 2, 8.

⁴⁰⁰ *ibid.*

⁴⁰¹ NPS Regulations, regs 4(2)(i)(iv) and 25(2)(a).

⁴⁰² Pierre-Laurent Chatain, Andrew Zerzan, Wameek Noor, Najah Dannaoui and Louis de Koker ‘Protecting Mobile Money Against Financial Crimes: Global Policy Challenges and Solutions’ (2011) World Bank <<http://www.globalinitiative.net/download/financial-crime/global/World%20Bank%20-%20Protecting%20Mobile%20Money%20against%20Financial%20Crimes.pdf>> accessed 20 April 2016; Klein and Mayer (n 58) 13.

the event of a major operational failure at the MM firm and MMHC. It can also facilitate record-keeping.

3.4.1.3(d) Supervisory Tools

The next component of regulatory strategies should involve granting the policymaker powers to directly monitor the actions of the MMHC and MM firm. In particular, a policymaker should be granted powers to monitor compliance with operating systems as part of a wider toolkit of addressing potential collusion between the MM firm and MMHC. This involves substituting the likely ineffective private monitoring which unbanked customers are likely to perform with public oversight. A policymaker can make use of one or a combination of the following two sets of tools to monitor operational risk on behalf of customers.

First, a policymaker could be given powers to monitor the MMHC and MM firm using existing governance strategies. Greenacre and Buckley (2014) advocate for such an approach in common law countries. They argue that the unbanked, as beneficiaries of the trust, would be unlikely to effectively make use of trust-related protections.⁴⁰³ As a result, the policymaker should take an active approach, involving monitoring the MMHC's compliance with the trust deed much like a beneficiary might ordinarily do. This would mean the policymaker acts as a 'protector', which is, on occasion, used in trust law.⁴⁰⁴

⁴⁰³ Greenacre and Buckley (n 374). See also Greenacre and Buckley (n 149) 12.

⁴⁰⁴ This role involves giving an entity the authority to oversee the actions of the trustee. Protectors are used in offshore jurisdictions where investors are concerned about the trustworthiness of companies that hold funds on their behalf. Matthew Conalgen and Elizabeth Weaver, 'Protectors as Fiduciaries: Theory and Practice' (2012) 18 (1) *Trusts and Trustees* 17, 20; see also Richard Ausness, 'The Role of Trust Protectors in American Trust Law' (2010) 45 *Real Property Trusts and Estate Law Journal* 319; Tsun Tey, 'Trust Protector' (2008) 20 *Singapore Academy of Law Journal* 99; Alexander Bove, 'The Case Against the Trust Protector' (2011) *Probate & Property* 50. See Greenacre and Buckley (n 149) 13.

This approach is consistent with financial inclusion and consumer protection. Knowledge of public monitoring over the trust account may mean the MMHC, as trustee, is more likely to ensure funds are adequately stored and delivered on terms of the trust deed more generally. In turn, this may encourage the MM firm and MMHC to deliver, rather than shirk, commitments undertaken in the course of providing mobile money.

The second, and a related, component of the active approach is to replace governance with regulatory strategies. The aim would be to enable the policymaker to monitor most, if not all, operational risks on behalf of customers. In particular, the policymaker should monitor reconciliation between the accounting systems of the MM firm and MMHC.⁴⁰⁵ It should also monitor the integrity of the system and impose auditing procedures.⁴⁰⁶

This approach is used sporadically in a number of countries. Often when applying to provide mobile money, an MM firm submits documentation explaining how reconciliation will take place between the MM firm's accounting system and the bank deposit in which funds are stored. For example, in Uganda, an MM firm applying to provide mobile money must submit a copy of the agreement between it and the bank to the Bank of Uganda (which is the central bank of Uganda).⁴⁰⁷

This approach is also used in Kenya. An MM firm must implement and

⁴⁰⁵ Mas (n 139) 289.

⁴⁰⁶ Paul Makin 'Regulatory Issues Around Mobile Banking (OECD, Paris 2009) mimeo cited in Klein and Mayer (n 58) 13.

⁴⁰⁷ Mobile Money Guidelines, s 6(b)(i).

deliver on a detailed set of operational rules that are designed to protect customers' funds. For example, when applying to provide mobile money, a MM firm must provide to the CBK a description of governance, risk management and accounting procedures, including those that apply to customers' funds. The MM firm must also deliver on a range of measures to ensure customers' funds are stored safely, particularly through record-keeping and auditing requirements.⁴⁰⁸

Furthermore, often policymakers monitor such reconciliation. For example, in Uganda, an MM firm is required to reconcile funds daily between its accounting system and those of the bank, and provide monthly reports to the Bank of Uganda.⁴⁰⁹ In Sri Lanka, the bank holding the e-float is held responsible for reconciliation, resolving any discrepancies within seven days, and reporting periodically to the Central Bank of Sri Lanka.⁴¹⁰

3.4.1.3(e) Implementation Considerations

The design and implementation of the public ordering proposed in Section 3.4.1 of this Chapter, above, are subject to the market and institutional conditions that exist in countries in which mobile money operates. Two are particularly important. The first is the ability of a policymaker to implement and supervise the public ordering discussed above. This is because, as explained in Chapter 1, the policymaker is likely to face significant resource constraints. The second is the policy trade-offs that can arise in a number of these tools. This section examines both issues.

⁴⁰⁸ NPS Regulations, reg 4(2)(g)(i), 27(2), and 29(1)(a).

⁴⁰⁹ Mobile Money Guidelines, s 7(3) and Appendix.

⁴¹⁰ Mobile Payments Guidelines No. 2 of 2011, s 6.2.c-d.

3.4.1.3(e)(i) Resource Constraints

A policymaker in a developing country should be able to use the regulatory strategies proposed above. This is primarily because the holding company, trust, and narrow banking commitments are relatively simple. The model involves three levels of commitments, each of which are relatively basic and easy to monitor. In M-Pesa, the narrow banking component also involves transparent connections with the formal financial system. This is because funds are received from customers and stored in a bank account. This simple intermediation structure means prudential risk is minimal which in turn imposes limited monitoring costs on the policymaker. It also means that other than simple prudential regulation required on the MMHC, which is examined in Chapter 4 below, public ordering can address the key risks through operational rules, rather than standards.

Furthermore, the holding company commitment is a form of structural separation. This is because the storage and lending is provided by the MMHC, while the MM firm performs the administrative tasks of facilitating deposits, transfers, and withdrawals.⁴¹¹ A conventional perceived benefit of structural separation is that it enables a policymaker to more easily monitor the risks being taken on and how they are being addressed.⁴¹² This is because the policymaker must only monitor risks emerging from one or more relatively simple activities performed within the separated entity. The remaining, more complex activities are performed by another actor.

⁴¹¹ See a discussion of structural separation as a potential regulatory strategy for the 'shadow payment system' in Awrey and van Zwielen (n 221) 42.

⁴¹² High-Level Expert Group on Reforming the Structure of the EU Banking Sector, Final Report (2012) Liikanen Report, 99. <http://ec.europa.eu/internal_market/bank/docs/high-level_expert_group/report_en.pdf> cited in Armour and others (n 2) ch 23, 509.

Resolution strategies can also be simpler than those that might apply to a firm providing a bundle of services.⁴¹³

This same logic, and resulting lower monitoring costs, also applies to mobile money through the holding company structure. In this case, the structural separation means the risk of loss of customers' funds through failed monitoring of the MMHC is distinguished from operational risks that can arise through the other, often more complex administrative components of the service. These include the payments system and cash merchant networks.

3.4.1.3(e)(ii) Regulatory Trade-Offs

The discussion above has explored potential policy trade-offs that can arise in relation to capital and active supervisory tools respectively. This subsection explores an additional potential trade-off that can arise through the active supervisory approach. This is the potential trade-off that exists between financial inclusion and systemic risk. It arises because the policymaker commits to monitor operational risk on behalf of customers. This commitment may lead to free riding in monitoring, in which the customers do not monitor operational risk on the grounds that the policymaker will do it for them. This outcome may cause a tension between financial inclusion and systemic risk, as follows.

The policymakers' commitment to monitor most operational risks may contribute to financial inclusion. This is because extensive public monitoring can help

⁴¹³ Independent Commission on Banking ('ICB'), Final Report: Recommendations (London: ICB, 2011) ('ICB Report'); <[http://webarchive.nationalarchives.gov.uk/20131003105424/https://hmt-sanctions.s3.amazonaws.com/ICB%20final%20report/ICB%2520Final%2520Report\[1\].pdf](http://webarchive.nationalarchives.gov.uk/20131003105424/https://hmt-sanctions.s3.amazonaws.com/ICB%20final%20report/ICB%2520Final%2520Report[1].pdf)> cited in Armour and others (n 2) ch 23, 509.

convince an unbanked customer that her funds are protected against agency problems, which in turn encourages her to begin using the service. Free riding may also increase the stability of the system. This is because the unbanked will not monitor and so are less likely to confuse liquidity with solvency problems and run on the system.⁴¹⁴

However, financial inclusion may also contribute to systemic risk. This is because free riding may reduce overall monitoring of the MM firm and MMHC. As a result, these actors may engage in more risky behaviour than if they were subject to effective private monitoring. Furthermore, the policymaker's commitment to monitor agency problems may encourage depositors to move their funds from banks into the mobile money system. This is because depositors may believe that their funds are more closely protected through ex ante supervision in mobile money than they are in the retail banking sector.

The migration of depositors into mobile money may reduce the amount of funds intermediated through banks and so cause a reduction of credit in the economy. A combination of these processes may mean mobile money grows to a size that it is significantly important and so constitutes a source of systemic risk. And the resulting moral hazard from free riding in monitoring, particularly the lack of private monitoring, may mean the MMHC and MM firm then take excessive risk.

⁴¹⁴ See the point raised in Armour and others (2016): 'So, the position is not, as is sometimes said, that retail depositors do not monitor the bank, but rather that their capacity to monitor is limited and their response to signals is a simple 'stay or run' decision... [in the footnotes] Arguably, this is a case where it is better to have no monitoring than imperfect monitoring. Deposit insurance in effect brings about this situation by removing the incentive to monitor entirely and (if effective) replicating the benefits of running': Armour and others (n 2) ch 15, 320.

3.4.1.4 Conclusion from Public Ordering

The conclusion from this section is that the only ex ante method of completely eliminating residual agency costs through the holding company, trust, and narrow banking commitments would be through 100% capital requirements. This approach will of course significantly impair financial inclusion objectives. Other ex ante tools employed through an active approach can reduce the likelihood of the realisation of operational risks but cannot fully eliminate them.

As a result, the holding company, trust, and narrow banking commitments and ex ante public ordering do not fully guarantee that the MM firm and its associates will safeguard customers' funds for the purposes of providing payment and storage functions only. In turn, this means the scheme is not fully protected against the risk of loss of funds and, as a result, potential fundamentals and pure panic runs. Furthermore, these tools do not enable a rapid resolution of the scheme in the event of insolvency. This can mean insolvency of an MMHC may cause considerable and protracted economic disruption to unbanked people, as explored below.

Given the limitations of the holding company, trust, and narrow banking commitments and ex ante public ordering, ex post tools should be used to enable the MM firm and its associates to more credibly commit to safeguard customers' funds for the purposes of providing payment and storage functions only. The next section examines such tools and trade-offs involved in using them.

3.4.2 Ex Post

This section focuses on two potential ex post tools that can buttress the credibility of commitments made by the MM firm and MMHC to address the conflict of interest between shareholders of the MM firm and customers. In doing so, these regulatory tools can also buttress the creditability of the MM firm to safeguard the funds of the mobile money customers for the purposes of providing payment and storage functions only. These are deposit insurance and special resolution regimes, as follows.

3.4.2.1 Deposit Insurance

As stated above, other than through 100% capital requirements, ex ante tools cannot fully guarantee the ability of customers' funds for the purposes of providing payment and storage functions only. The only method to provide this guarantee is a deposit insurance scheme.⁴¹⁵ This tool is used if the bank is unable to honour depositors' redemption demands. In this case, the state steps in and honours such demands on behalf of the bank.⁴¹⁶ In the case of mobile money, the customers would be notified that should their funds be lost, the state will reimburse them.

Deposit insurance would mean mobile money moves from providing 'liquidity' to the type of 'liquidity insurance' provided by banks. This is because the state provides tools that enable the actors in the mobile money system to continue to provide their functions during time of institutional stress.⁴¹⁷ This may provide customer protection (because funds are fully protected from loss) and financial inclusion benefits because the availability of customers' funds for the purposes of

⁴¹⁵ Deposit insurance can protect depositors against losses from liquidity and solvency problems: Armour and others (n 2) ch 13, 281.

⁴¹⁶ Armour and others (n 2) ch 15, 319.

⁴¹⁷ Awrey and van Zwieten (2016) focus on the capacity of the shadow payment system, including mobile money, to perform its core functions during periods of institutional stress and explore the capacity of regulatory tools to assist it to do so: Awrey and van Zwieten (n 221) 32 and 34.

providing payment and storage functions is guaranteed by the state. However, it is important to note that mobile money only moves towards rather than fully performs liquidity insurance. This is because other ex post tools, such as central bank liquidity, do not tend to apply to mobile money, despite suggestions that they should.⁴¹⁸ Two main issues are relevant to the potential use of deposit insurance: its regulatory consequences and its feasibility, as follows.

3.4.2.1(a) Regulatory Consequences

A major regulatory consequence of extending deposit insurance to mobile money is potential moral hazard and regulatory arbitrage problems.⁴¹⁹ Moral hazard arises because, through obtaining deposit insurance, a portion of the costs of an MM firm's or MMHC's failure would be borne by others (namely all members of the deposit insurance scheme), not just the firms in question. As a result, the MM firm and/or MMHC may take additional actions that put customers' funds at greater risk of loss. This knowledge may also lead to the MM firm and MMHC taking insufficient care to ensure against co-mingling of their assets.

A related problem is regulatory arbitrage. As outlined in Chapter 1, in mobile money the MM firm is subject to a lower ex ante regulatory burden than banks. As a result the MM firm obtains the same deposit insurance protection as banks, yet is subject to less of the ex ante regulatory requirements that constrain risk-taking amongst these firms such as liquidity and capital requirements. Linking back to the

⁴¹⁸ Ignacio Mas and Michael Klein, 'A Note on Macro-financial Implications of Mobile Money Schemes' (Frankfurt School of Finance and Management' (2012) Frankfurt School of Finance and Management, Working Paper 118, March 2012 <<http://www.frankfurt-school.de/clicnetclm/fileDownload.do?goid=000000368515AB4>> accessed 27 December 2016, 8.

⁴¹⁹ See material explaining that the growth of the 'safe safety net' over the 20th century in the United Kingdom and United States was associated with a decline in equity capital, increase in leverage, and increase in risk taking: Andrew G Haldane and Piergiorgio Alessandri, 'Banking on the State', (2009) Bank of England Conference Paper <<http://www.bis.org/review/r091111e.pdf>> accessed 16 December 2016.

discussion above, this may provide MM firms and MMHCs with additional opportunity to undertake risky activities.

Furthermore, the equivalent deposit insurance protection and lower ex ante regulatory requirements may mean that MM firms are able to reduce their fees to a lower level of banks. Ultimately, this means MM firms can provide equivalent storage and payment functions through a lower fee structure than banks. This may cause an influx of depositors into the mobile money systems, which in turn may contribute to systemic risk, as discussed above.

The policymaker could impose several ex ante initiatives to deal with potential moral hazard and regulatory arbitrage problems. As part of its active approach, the policymaker could closely monitor the activities of the MMHC and MM firm, particularly through the business conduct regulatory tools proposed above. This would involve dedicating considerable resources to monitor the accounting practices of the MMHC and MM firm and even physically visiting the premises of both firms.

A second tool involves holding managers of the MM firm or MMHC personally liable for failure of the MMHC. This could involve criminal liability, through introducing provisions similar to those in the UK Financial Services (Banking Reform) Act 2013. Under such legislation it is a criminal offence for a senior manager in a financial institution to make a decision that causes that institution, or any other financial institution which is a member of the same group, to fail.⁴²⁰

⁴²⁰ Financial Services (Banking Reform) Act 2013, s 36.

The enforceability of such a scheme is unclear. A policymaker would need to prove that the MMHC collapsed due to mismanagement, rather than one of many other outside forces that could have caused its failure.⁴²¹ However, this task may be simpler in mobile money than in banking. This is because the prosecutor must only establish that the manager failed to ensure compliance with narrow banking rules, which are relatively straightforward in nature. In turn, this would rest on establishing that through mismanagement funds were co-mingled between the MM firm and the MMHC.

An alternative is to impose civil liability. This approach is used in Kenya; any shortfall in the trust funds is recoverable directly from the managers of the MMHC, as trustees of the scheme.⁴²² These tools may encourage managers of the MMHC and MM firm to ensure the MM firm delivers holding company, trust, and narrow banking commitments, despite the access to ex post regulatory support. There has been no substantive study on such provisions, making it difficult to analyse them in depth.

3.4.2.1(b) Feasibility

Another important issue involved in determining the usefulness of deposit insurance to enable the MM firm and its associates to more credibly commit to safeguard customers' funds for the purposes of providing payment and storage functions only is feasibility. It cannot be assumed that a policymaker could effectively use deposit insurance. This is because developing countries, particularly in Africa, are only

⁴²¹ See discussion amongst industry and law firms in Bob Penn, 'Legal and Regulatory Risks for the Finance Sector' (*Allen and Overy*, (undated)) <<http://www.allenoverly.com/publications/en-gb/lrrfs/uk/Pages/The-Banking-Reform-Act-2013.aspx>> accessed 12 April 2016; Neil O'May, 'Criminal liability for Senior Bankers' (*Norton Rose Fulbright*, October 2014) <<http://www.nortonrosefulbright.com/knowledge/publications/122774/criminal-liability-for-senior-bankers>> accessed 12 April 2016.

⁴²² NPS Regulations, reg 10(9).

beginning to use deposit insurance. Currently only 11 of 54 African countries have deposit insurance.⁴²³ To this author's knowledge, there is no empirical analysis of the ability of policymakers in developing countries to effectively use deposit insurance. Research on this point would provide guidance on the feasibility of using this regulatory tool and its ability to prevent a run in mobile money platforms.

3.4.2.2 Special Resolution Scheme

The second tool assumes that the MMHC and MM firm have delivered on the holding company, trust, and narrow banking commitments. Even if this has taken place, there may be an extensive potential delay in the event of an insolvency at the level of the MMHC. This is because, as explained above, normally mobile money is subject to delays in the operation of applicable insolvency procedures.⁴²⁴

One possible way to ameliorate this problem would be to introduce a form of special insolvency procedure or resolution mechanism for MMHCs. The imposition of such a scheme could be justified in the interests of financial inclusion as follows.

The collapse of a major mobile money scheme and the subsequent extensive delay in paying out customers' funds may severely impair the credibility of mobile money. In turn, this could impair financial inclusion objectives because customers lose trust in mobile money and financial inclusion products more generally. An expedited insolvency regime could assist in addressing this problem, which in turn may cause customers to more readily trust the service.

⁴²³ John M. Chikura (Chair of African Regional Committee (ARC) of IADI and Chief Executive Officer, Deposit Protection Corporation, Zimbabwe), 'Welcome Remarks' (IADI Africa Regional Committee Conference, Zanzibar, 1 September 2016).

⁴²⁴ This is part of the wider problem of the likely average length of an insolvency process in developing countries, as discussed above in Awrey and van Zwieten (n 221) 32.

Such a regime could incorporate a range of possible mechanisms to expedite customers' repayment. One approach could, by analogy with the Investment Bank Special Administration regime in the UK,⁴²⁵ require the insolvency trustee to prioritise the repayment of customers' funds ahead of other objectives. Another mechanism would be to provide for an expedited transfer of assets *and claims* from an insolvent to solvent MMHC. This second mechanism draws inspiration from the US Federal Deposit Insurance Corporation receivership regime. This scheme focuses on waiving property rights to effect a very rapid transfer of complex assets and short-term liabilities to a purchaser, which stands behind these liabilities and thereby ensures stability.⁴²⁶ This could be modified for mobile money. It would essentially involve implementing the type of licence transferral mechanisms used for utility companies. In this case licences are transferred from an insolvent to a solvent MMHC.⁴²⁷

The extent to which such modifications to insolvency regimes are capable of improving outcomes for MM customers is unclear. Such mechanisms require a significant degree of sophistication and skill on the part of insolvency practitioners and courts or regulators tasked with overseeing them. It is unclear whether parties in developing countries regulating mobile money would have sufficient resources to design and implement such schemes. This point is particularly important given the

⁴²⁵ Investment Bank Special Administration Rules 2011, SI 2011/1301.

⁴²⁶ See a discussion of bank resolution schemes in Armour and others, 2009 (n 2) ch 16, 340.

⁴²⁷ See Julian Franks, Colin Mayer, Luis Correia Silva, *Asset Management and Investor Protection: An International Analysis* (OUP 2007), 267. See discussion of the type of issues involved in such an extension: Ann Wardrop, 'Theorising Insolvency Law in the Context of Insolvent Utilities' (2014) 29(3) *Banking and Finance Law Review* 435. See also CMS, 'Does the Oil and Gas Industry Need a Special Insolvency Regime?' (CMS, 12 October 2015) <http://www.cms-lawnow.com/ealerts/2015/10/does-the-oil-and-gas-industry-need-a-special-insolvency-regime?cc_lang=en> accessed 12 April 2016. John Armour, 'Making Bank Resolution Credible' in *Moloney, Ferran and Payne, 2015* (n 191).

extensive time required to process an average insolvency procedure, as discussed above.

Conclusion

Mobile money uses a set of holding company, trusts, and narrow banking commitment to credibly commit to safeguard customers' funds for the purposes of providing payment and storage functions only. These commitments protect customers' funds against a range of credit and liquidity risks. However, there remains a non-trivial operational risk that the MMHC and/or MM firm may not deliver on the trust arrangement. This is because trust related tools are governance strategies. The unbanked are unlikely to make effective use of such strategies.

As a result, public ordering should be used to enhance efficiencies in addressing the conflict of interest between shareholders of the MM firm and customers. In doing so, public ordering can enable the MM firm and its associates to more credibly commit to safeguard customers' funds for the purposes of providing payment and storage functions only. To this end, the policymaker should impose a range of ex ante and ex post tools, although it will face challenging policy considerations in doing so, particularly in relation to the latter. However, the simplicity of the holding company, trust, and narrow banking commitments mean ex ante public ordering can take the form of rules rather than standards and so should be relatively simple to design and supervise.

The simplicity of the holding company, trusts, and narrow banking commitment and public ordering designed to enable the MM firm and its associates to

more credibly commit to safeguard customers' funds for the purposes of providing payment and storage functions only is a key benefit of the service, particularly over banking. It enables mobile money to provide an equivalent storage function of a bank without performing credit, liquidity, and maturity transformation. As a result, mobile money is exposed to less credit and liquidity risks, and so imposes less monitoring costs on customers and policymakers.

Mechanisms then need to be imposed to ensure firms deliver on narrow banking commitments and safeguard customers' funds for the purposes of providing payment and storage functions only. Like in banking, deposit insurance is required in order to guarantee funds are available for storage and, by extension, payment functions. This guarantee will maximise public confidence in mobile money. Deposit insurance creates important regulatory and policy trade-offs which need to be addressed.

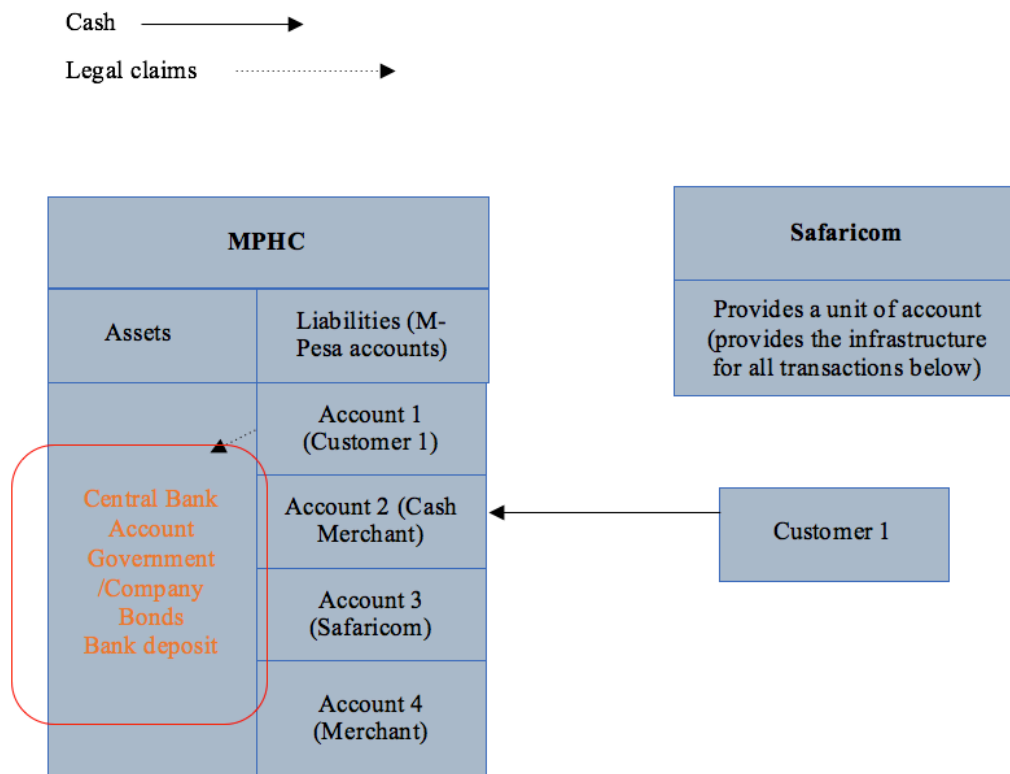
CHAPTER 4: THE BALANCE SHEET OF THE MMHC

Introduction

This chapter assumes that the MM firm and MMHC have implemented and are delivering upon the commitments designed to address the conflict of interest between shareholders of the MM firm and mobile money customers. The MM firm has delegated the storage of customers' funds to the MMHC. Furthermore, the MMHC has stored customers' funds in a valid trust. Pursuant to the requirements in the trust deed, the MMHC is operating as a narrow bank because it has stored the trust assets, which are owned beneficially by customers, in 'safe', highly liquid form.

The chapter focuses on indirect intermediation which arises through these commitments and its effect on the balance sheet of the MMHC. This indirect intermediation emerges because the 'safe' asset in which the MMHC typically 'stores' customers' funds may in some cases take the form of a bank deposit account. This means that the trust asset – to which the MM customers are beneficially entitled – itself comprises a claim against a financial intermediary. In turn, this means the MMHC and, through it, customers' funds are exposed to various forms of credit and liquidity risks. The diagram below highlights the indirect intermediation that takes place in mobile money.

Diagram 4: The Balance Sheet of the MMHC



Usually, private and/or public ordering permits or requires the MMHC to store customers' funds in one or more of a central bank account, government or corporate bonds, or a commercial bank account. This chapter explores policy and regulatory issues involved in choosing different potential trust assets, focusing on their impact on the balance sheet of the MMHC. It does so in four parts.

The part first explores the function performed by the MMHC. It argues that the MMHC commits to perform a storage function because, pursuant to the holding company and trust commitments, this firm takes legal title over customers' funds.

The second explains that the MMHC's storage function creates an agency problem. This part also explains that the chapter assumes that risks from the conflict

of interest between shareholders of the MM firm and mobile money customers have been addressed. As a result, the chapter focuses on the credit and liquidity risks to the MMHC that arise through indirect intermediation.

The third provides a criteria for analysing the benefits and costs of the different potential trust assets. This part involves unpacking financial inclusion, which, as discussed in Chapter 1, means connecting unbanked people to formal payment and storage functions, into a series of objectives. One is *safety*, which is buttressing the credibility of the MM firm's commitment to safeguard customers' funds for the purposes of providing payment and storage functions only. Another is *compliance costs*, which involves minimising compliance costs so that MM firms are better able to reach larger numbers of unbanked people. Yet another is *returns*, which is the ability of an asset to generate interest payments which can then be passed onto customers.

The fourth analyses the regulatory and policy issues that arise in relation to each potential trust asset which is available under current private and/or public ordering. This task involves analysing the marginal benefits and costs that arise when moving from one type of asset to another. This part explains that much industry and regulatory practice has traditionally assumed the M-Pesa model, in which funds are stored in a commercial bank account, is the most appropriate for mobile money. However, the analysis in the chapter demonstrates that storing customers' funds in a central bank account is the most safe because indirect intermediation is removed and it involves the lowest compliance costs. For this reason, this trust asset is most likely to lead to financial inclusion.

The fifth proposes two trust assets or groups of assets that may maximise safety, returns, and compliance objectives. One involves requiring the MMHC to store customers' funds in a similar set of assets to an MMMF. An alternative involves storing customers' funds in a central bank deposit, which can provide interest payments on its accounts.

4.1. Function

4.1.1 Introduction

The previous chapter introduced commitments made by the MM firm and MMHC which are designed to address the conflict of interest between the MM firm's shareholders and mobile money customers. In doing so, these commitments also buttress the credibility of the MM firm's commitment to safeguard customers' funds for the purposes of providing payment and storage functions only. This sub-section briefly reviews these commitments to contextualise the topic matter of this chapter.

The MM firm commits to ensuring all customers' funds are paid directly to the MMHC. This firm takes legal title to such funds. The MMHC then declares it stores customers' funds on trust. Assuming the trust is validly constituted, this means that, while the MM firm has legal title, customers retain beneficial ownership.

This chapter assumes the MM firm and MMHC have delivered on these commitments. It examines the consequences of the final main commitment used to address the conflict of interest between shareholders of the MM firm and mobile

money customers. This commitment, which emerges from the trust deed, relates to the trust assets, which are beneficially owned by customers. The MMHC, as trustee, cannot intermediate trust assets. Instead, the MMHC must maintain the funds for the purposes of payment and storing by storing them in liquid assets.

This commitment appears to enable mobile money to provide an equivalent payment function as a bank but through lower credit and liquidity risks. The prohibition on lending means, unlike depositors, customers are not exposed to credit intermediation and risks from this activity. By storing customers' funds in liquid, rather than long-term assets, customers do not face liquidity and maturity transformation that takes place in banking and resulting potential liquidity and maturity mismatches.

However, a closer analysis of the trust arrangements reveals that, depending on the trust asset, mobile money is indirectly exposed to intermediation. This is because the 'safe' asset in which the MMHC typically 'stores' customers' funds normally consists of a bank deposit account or another financial intermediary. For example, in M-Pesa, the MPHC is required to invest customers' funds in commercial bank accounts and/or Government of Kenya securities.⁴²⁸ In the case of securities, these must be capable of being realised into cash at short notice and without loss of capital.⁴²⁹ In practice, at the request of the CBK, Safaricom has directed the MPHC to store customers' funds in a bank.⁴³⁰ In other countries the MMHC has greater discretion and can store customers' funds across a range of different liquid, low-risk

⁴²⁸ M-Pesa Amendment Deed, cl 6.1.

⁴²⁹ *ibid.*

⁴³⁰ As discussed in Klein and Mayer (n 58) 9-10.

assets.⁴³¹ 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 MMHC and, through it, customers’ funds are exposed to various forms of credit and liquidity risks.

4.1.2 Literature

There has been little research into the operation of indirect intermediation, the risks it creates, and policy implications of using different regulatory responses to them. This may be because, overwhelmingly, industry and donor material on mobile money focus on the payment function of M-Pesa and other schemes.⁴³² Other material, such as GSMA (2016), lists different potential trust assets available to MMHC across different countries.⁴³³ However, this material does not explain the regulatory and policy implications involved in choosing between these options. Instead, the material tends to claim that mobile money is not exposed to intermediation.⁴³⁴ This is a significant limitation because it means research does not examine the risks that arise from indirect intermediation through different trust assets and how they should be addressed through regulation.

As a result of the limitations of this research, MM firms and policymakers have little guidance on the different policy implications of choosing different trust assets. This means customers’ funds may not be adequately protected through private or, where needed, public ordering.

⁴³¹ Chapter 4 examines the policy implications of these different investments choices.

⁴³² See the discussion in Chapter 3 on how policy and industry emphasises the payment function mobile money.

⁴³³ See, for example, GSMA (n 232).

⁴³⁴ Material states that funds not intermediated in ways that put the funds ‘at risk’. Or, it is argued that customers’ funds are not at any greater risk than cash held at a bank: see, for example, Ehrbeck and Tarazi (n 223).

This chapter moves beyond current literature by exploring the operation of indirect intermediation on mobile money based on the different trust assets used in mobile money platforms. It also examines the credit and liquidity risks that arise through these different trust assets and policy and regulatory trade-offs that arise when addressing them.

4.2 Market Failures and Risks

As explained in Chapter 2, the storage function involves an agency problem because the principal delegates the task to the agent. For the purposes of mobile money, customers, as principals, delegate the task of storing their funds to the MM firm (the agent). The MM firm then delegates the task of storing funds, in terms of taking legal title over them, to the MMHC through the holding company commitment discussed above.

This process means ultimately customers are exposed to credit, liquidity, and operational risk at the MMHC which may put their funds at risk. As discussed above, the Chapter focuses on credit and liquidity risks to the balance sheet of the MMHC based on indirect intermediation in mobile money and regulatory tools which can address them.

4.3 Policy Objectives

This section explains the policy considerations that can be used to analyse the benefits and costs of different trust assets. These policy objectives can be considered component parts of ‘financial inclusion’ which, as explained in Chapter 1, focuses on

enabling unbanked people to shift from informal tools to electronic, formal payment and storage functions, which they can access through mobile money platforms. The objectives are not based on a formal criteria drawn from existing literature. Instead, they represent trends and developments in mobile money regulation, each of which are designed to contribute to financial inclusion.

4.3.1 Safety

A first policy consideration that underpins financial inclusion is safety of customers' funds. As discussed in Chapter 1, the CBK's initial set of rules for M-Pesa were contained in a letter of no objection rather than substantive regulation. This letter required Safaricom to store customers' funds 'safely'.⁴³⁵ This led to Safaricom and its associates adopting a range of commitments designed to safeguard customers' funds for the purposes of providing payment and storage functions only, as explored in this thesis.

To give effect to the safety requirement imposed by the CBK, Safaricom committed to, amongst other measures, placing customers' funds in a trust, which was stored in a bank deposit. The CBK and Safaricom believed this approach would mean customers' funds were 'safe'.⁴³⁶ Over time, also in the interests of the safety of customers' funds, policymakers in other countries have used similar trust arrangements but required the MMHC to invest trust funds in a wider range of assets. Presumably this diversification was imposed to reduce idiosyncratic risk to customers' funds from any one asset class. In theory, it means an MM firm can enable

⁴³⁵ AFI (n 113).

⁴³⁶ Klein and Mayer (n 58) 16.

the MM firm and its associates to more credibly commit to safeguard customers' funds for the purposes of providing payment and storage functions only.

This diversification of holding of trust funds operates in a number of ways. Many countries such as Ghana, Kenya, Lesotho, Malawi, Namibia, and Sri Lanka require or authorise the MMHCs to move beyond the original M-Pesa model and store customers' funds in one or more commercial banks.⁴³⁷ Policymakers in other countries have further diverged from this initial model by permitting MMHCs to store funds into a wider range of assets. In some countries, such as the Democratic Republic of Congo, the MMHC must deposit funds in 'liquid' assets that equals the firm's e-money liabilities.⁴³⁸ In other countries such as Chad and Ghana, the central bank has the authority to determine the eligible asset class, without specifying it in regulation.⁴³⁹

Other regulatory regimes are more specific. For example, in El Salvador and Colombia, an MMHC must intermediate customers' funds into a central bank account.⁴⁴⁰ In a very large numbers of countries, such as Bolivia, the Philippines, and the West African Economic and Monetary Union, the MMHC is permitted to invest funds across a range of liquid assets. These include multiple banks, government bonds, and/or corporate bonds.⁴⁴¹

⁴³⁷ Ghana: Money Guidelines, art 16; Kenya: NPS Regulations, reg 25-26; Lesotho: Guidelines on Mobile Money, principle 4, app 10; Malawi: Guidelines for Mobile Payment Systems, art 8; Namibia: Determination on Issuing of Electronic Money in Namibia, art 11.2 and Guidelines for Issuers of Electronic Money and Other Payment Instruments in Namibia, art 7; and Sri Lanka: Mobile Payments Guidelines No. 2 of 2011 for Custodian Account Based Mobile Payment Services.

⁴³⁸ Instruction on E-Money Issuance, art 20.

⁴³⁹ Chad: Regulation on E-Money Issuance, art 14; Ghana: E-Money Guidelines, art 16.

⁴⁴⁰ El Salvador: Ley para Facilitar la Inclusion Financiera, art 10; Colombia: Decreto 1491 de 13 July 2015, art 8.

⁴⁴¹ Bolivia: Circular ASFI/102/2011, s 5 and Recompilation of Regulations for Banks and Financial Institutions, Title I, Chapter 17, art. 12; the Philippines: Circular 649; and West African Economic and Monetary Union: BCEAO Instruction regarding E-Money Issuance, art 33-34; Ivory Coast: BCEAO Instruction regarding E-Money Issuance, art 32.

4.3.2 Compliance Costs

A second key trend within financial inclusion relates to compliance costs. Also as discussed in Chapter 1, the CBK believed M-Pesa was a tool to provide payment services to unbanked Kenyan communities and so achieve financial inclusion.⁴⁴² By reducing compliance costs, Safaricom and later other MM firms were more likely to begin providing mobile money and expand into rural areas where the unbanked live and work. To this end, as discussed above, the CBK's original letter of no objection comprised a series of basic objectives rather than substantive regulation. Safaricom was given regulatory freedom to design private ordering which would give effect to such objectives.

The apparent success of M-Pesa in reaching low-income and unbanked people has encouraged policymakers in other countries to adopt similar regulatory frameworks for mobile money. For example, as discussed in Chapter 1, policymakers in Tanzania and Uganda followed the CBK's lead and issued letters of no objection to MM firms wishing to launch mobile money. Similar to the CBK, these policymakers were motivated by minimising the amount of regulation, particularly prudential regulation, to which the MM firm and MMHC must comply, in the interests of enabling mobile money to reach larger numbers of unbanked customers.⁴⁴³

⁴⁴² The thesis uses the term 'compliance costs' provided by Alfon and Andrews (1999) as 'costs to firms and individuals of those activities required by regulators that would not have been undertaken in the absence of regulation.' See Isaac Alfon and Peter Andrews, 'Cost-Benefit Analysis in Financial Regulation — How to Do it and How it Adds Value' (1999) FSA Occasional Paper Series 3, 16

<<http://citeseerx.ist.psu.edu/viewdoc/download?doi=10.1.1.201.978&rep=rep1&type=pdf>> accessed 20 April 2016. See the importance of minimal compliance costs for mobile money in Evans and Pirchio (2015) who explicitly link together light touch regulation and high levels of growth (Evans and Pirchio (n 125)).

⁴⁴³ See, for example, the discussion in Chapter 6 of how financial inclusion informed the regulatory actions of the Bank of Tanzania (central bank of Tanzania): text to 622.

4.3.3 Interest Payments

A third, and more recent, regulatory development relates to interest payments. As discussed in Chapter 1, under Kenyan law, permitting Safaricom to provide interest payments to customers would mean that an M-Pesa account performed an equivalent function to a bank deposit and so should be subject to banking regulation.⁴⁴⁴ In an effort to minimise compliance costs on Safaricom, as discussed in Chapter 1 above, the CBK required the firm to transfer interest payments to charities rather than use them within the mobile money scheme.⁴⁴⁵

Initially, scholarship and policymakers paid little attention to these returns. This may be because policymakers wanted to continue to classify mobile money as a ‘payments’ service, rather than a savings or investment vehicle so that MM firms would not be subject to banking regulation.⁴⁴⁶ However, policy interest began to develop in 2012 when it emerged that M-Pesa was generating £5.3 million per year in interest payments on customers’ funds stored in MPHC’s bank account with the CBA.⁴⁴⁷

Around this time, the donor and industry community began to advocate for regulatory reform to permit MM firms to pass on interest payments to customers. Doing so means, in addition to payments and storage, mobile money provides an

⁴⁴⁴ The reasoning used by the CBK was that M-Pesa was not providing a banking business on the grounds that: (1) the system is prefunded because a cash merchant deposits a ‘e-float’ of cash upfront in an M-Pesa account, held by a local bank. In theory this means there is no credit risk to either the customer or Safaricom; (2) There was allegedly no intermediation because funds are stored in a bank account; (3) There is no interest paid on customer deposits; see AFI (n 42) 4.

⁴⁴⁵ NPS Regulations, reg s 25(5).

⁴⁴⁶ See the discussion in Chapter 3 on how policy and industry have sought to downplay the storage component of mobile money.

⁴⁴⁷ United Nations Conference on Trade and Development, ‘Mobile Money for Business Development in the East African Community’ (2012) (UNCTAD/DTL/STICT/2012/2, UNCTAD, 2012), 27–28 <http://unctad.org/en/PublicationsLibrary/dtlstict2012d2_en.pdf> accessed 12 April 2016.

investment function.⁴⁴⁸ Over time, a range of countries have begun to respond to this advocacy and permit MM firms to provide interest payments to customers. For example, on 1 October 2015, in response to regulatory reform, Airtel Tanzania announced it would pay interest on customers' mobile money accounts.⁴⁴⁹ This follows a move by rival Tigo Tanzania, which began doing so in February 2014.

Scholars and policymakers have failed to analyse the regulatory consequences of these developments. The next section performs such an analysis. In doing so, the chapter examines the potential credit and liquidity risks to the balance sheet of the MMHC.

4.4 Trust Assets

In the interests of examining the specific credit and liquidity risks of each potential trust asset, this chapter assumes that each potential asset comprises the MMHC's entire portfolio. This means impairment of the asset (such as financial distress of the bank with which funds are stored) can cause a credit or liquidity problem for the MMHC. The analysis below examines the consequences of storing customers' funds in central bank, government bonds, corporate bonds, and commercial bank deposits.

4.4.1 Central Bank

A first potential trust asset is a central bank account. Mobile money holding companies in Columbia and El Salvador can store customers' funds in this trust

⁴⁴⁸ See a definition of 'investment' in Chapter 2: text to 244.

⁴⁴⁹ Simone di Castri, 'Should the Interest on the Trust or Escrow Account Be Paid Out to Mobile Money Customers?' (2014) Groupe Speciale Mobile Association (GSMA), 8 September 2014 <<http://www.gsma.com/mobilefordevelopment/programme/mobile-money/should-the-interest-accrued-on-the-trust-or-escrow-account-be-paid-out-to-mobile-money-customers>> accessed 29 September 2015.

asset.⁴⁵⁰ By doing so, the MMHC stores customers' funds in the equivalent of an electronic safe box.

Customers' funds continue to be exposed to inflation, foreign exchange risk, and appropriation by the state. However, indirect intermediation is removed entirely from mobile money. This is because the central bank does not intermediate funds. In turn, this means mobile money is entirely institutionally insulated from the formal financial system.⁴⁵¹ There are no interlinkages between the mobile money and formal financial systems, making mobile money entirely 'shadow' in nature. This means mobile money is not directly exposed to many of the risks that arise when customers' funds are stored in other assets, such as bonds and commercial bank deposits, as discussed below. In turn, this safety enables the MM firm and its associates to more credibly commit to safeguard customers' funds for the purposes of providing payment and storage functions only.

This trust asset also minimises compliance costs. Without exposure to direct or indirect intermediation there are no credit or liquidity risks and so prudential regulation is not required.⁴⁵² The only risks that remain are operational in nature, namely that funds do not reach the central bank. Such risks can be addressed relatively simply through business conduct rules.

This trust asset may also be particularly inexpensive to provide. This is because the central bank subsidises the cost of storing customers' funds. The limitation of this trust asset is that funds are not invested into the economy, which in

⁴⁵⁰ See legislative terms for Colombia and El Salvador above.

⁴⁵¹ Klein and Mayer (2011) discuss this as a key potential benefit of mobile money (n 58) 28.

⁴⁵² *ibid.*

turn means interest payments may not be possible. The availability of interest payments in this trust asset will depend on the legislative authority of the central bank in question.⁴⁵³ Some central banks, such as the Bank of England and the European Central Bank, have the authority to pay interest on reserves.⁴⁵⁴ The Federal Reserve in the United States also has this authority.⁴⁵⁵ However, other central banks do not have the legislative authority to pay interest on reserves or choose not to do so, such as the Reserve Bank of Malawi.⁴⁵⁶

For the sake of analysis, and to enable a comparison with later trust assets, this section assumes that the central bank does not have the legislative mandate to provide interest payments on funds received from the MMHC.⁴⁵⁷ As a result, this trust asset has safety and compliance costs benefits at the cost of interest payments.

4.4.2 Government Bonds

Another trust asset is government bonds. This asset is available to MMHCs 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.⁴⁵⁸ In this situation, the MMHC *substitutes* the banking system. It generates an investment portfolio that is similar to an MMMF with a more

⁴⁵³ See Edward J Green, 'The Role of a Central Bank in Payment Systems', in Haldane, Millard and Saporta (n 23) 1183.

⁴⁵⁴ David Bowman, Etienne Gagnon and Mike Leahy, 'Interest on Excess Reserves as a Monetary Policy Instrument: The Experience of Foreign Central Banks' (2010) Board of Governors of the Federal Reserve System International Finance Discussion Papers Number 996, March 2010 <<https://www.federalreserve.gov/pubs/ifdp/2010/996/ifdp996.pdf>> accessed 16 December 2016.

⁴⁵⁵ Federal Reserve Bank of San Francisco (author unspecified), 'Why did the Federal Reserve start paying interest on reserve balances held on deposit at the Fed? Does the Fed pay interest on required reserves, excess reserves, or both? What interest rate does the Fed pay?' (2013) Education, Dr Econ, March 2013 <http://www.frbsf.org/education/publications/doctor-econ/2013/march/federal-reserve-interest-balances-reserves/#_ftn2> accessed 16 December 2016.

⁴⁵⁶ Communication with staff of Reserve Bank of Malawi, 26 December, 2016.

⁴⁵⁷ This distinction enables a comparison between safety and interest payments considerations, as outlined below in this Chapter.

⁴⁵⁸ BCEAO Instruction regarding E-Money Issuance, Art. 33-34 and Circular 649.

restricted asset base. In particular, the MMHC then resembles an MMMF which invests in government and treasury bills.⁴⁵⁹ In doing so, the mobile money system moves from being shadow in nature to becoming interconnected with the financial system through financial markets.

The marginal benefits and costs of storing funds in government bonds rather than a central bank are as follows. A key benefit is interest payments which are usually available in government bonds.⁴⁶⁰ As discussed above, interest payments on mobile money enable the service to provide an investment function. The cost of this increased functionality is that customers' funds become exposed to the credit and liquidity risks that inhere in investments in the financial system. These risks may impair safety objectives. For example, customers' funds become exposed to a credit risk. This is because customers' funds are now exposed to the risk that the bond issuer may default. The credit risk of any one set of investments will depend upon, amongst other issues, the creditworthiness of the actual company in which funds are stored, interest rate risk, and inflation levels.

Liquidity risks increase beyond those that arise when customers' funds are simply stored in a central bank (that is, converted into a claim against the central bank). This is because there is a potential mismatch between the instant redeemability provided through a mobile money account and bond market liquidity. Similar to credit

⁴⁵⁹ See an industry discussion of such MMMFs in Fidelity Investments, 'Government Money Market Mutual Funds: An Attractive Option for Investors Seeking Capital Preservation and Liquidity' (2015), Leadership Series, Investment Insights, March 2015 <https://www.fidelity.com/bin-public/060_www_fidelity_com/documents/fidelity/govt-money-market-funds.pdf> accessed 29 December 2016.

⁴⁶⁰ Australian Government, 'Treasury Bonds' (*Australian Government*, undated) <<http://australiangovernmentbonds.gov.au/etbs/treasury-bonds/>> accessed 16 December 2016.

risk, the scale of this mismatch will depend on the liquidity of individual bond markets.

In the interests of the safety of customers' funds, a policymaker needs to respond to the introduction of credit and liquidity risk by introducing a greater component of prudential regulation of the type imposed on financial intermediaries. For example, a policymaker may need to impose capital requirements to address the credit risk that can arise through using this trust asset. In doing so this trust asset increases compliance costs on an MMHC beyond those that applied when the central bank account was the trust asset. In turn, this may ultimately cause the MM firm to raise the fees in the mobile money which may make the service unaffordable to customers at the margins.

This potential trade-off between returns and safety is part of the broader tension between financial inclusion and consumer protection. The returns may make the service more attractive to customers, however, the regulatory costs required to protect funds from loss may make it unaffordable to unbanked people. A policymaker needs to determine the extent to which, if at all, storing funds in corporate bonds is more desirable than a central bank. This involves determining whether the benefits of interest payments offsets the resulting impairment to the safety of funds and the increase in compliance costs. There is insufficient empirical material available to make this determination.

Intuitively, storing funds in a central bank may be of most benefit to unbanked people due to its safety, despite its lack of interest payments. This is because the

customer obtains access to a risk-free asset which provides her with a range of economic benefits that are available through electronic payment and storage functions.⁴⁶¹ This is consistent with one of the fundamental tenants behind narrow banking; depositors may be willing to accept the low or non-existent rate of remuneration of their deposits in exchange for the safety of their assets.⁴⁶² Unbanked customers may have the same view about the safety of their funds in mobile money accounts.

However, it is likely that interest payments and the widening functionality of mobile money to provide an investment, as well as payment and storage functions, is likely to significantly benefit unbanked people. These benefits may contribute to financial inclusion objectives by making mobile money more attractive to unbanked customers. By widening the functionality beyond payments and storage to include investment, a customer obtains greater overall potential benefit from using mobile money services. In particular with interest payments, a customer's funds are better protected from inflation while stored within mobile money platforms. This functionality may be particularly important in Africa where inflation is often 10% or higher.⁴⁶³ In turn, this enables her to build up capital which means she has more funds available to use in the event of an economic shock.

Market developments tend to support the contention that interest payments increase the usefulness and attractiveness of mobile money to unbanked communities. Studies of mobile money tend to find that lack of interest payments is a barrier to

⁴⁶¹ See Chapter 1 for a description of these benefits.

⁴⁶² Phillips and Roselli (n 274).

⁴⁶³ For example, at the time of the study in Dupas and others (2016) study inflation was 14% in Malawi and 10.7% in Uganda (Dupas and others (n 57) 5). See also Manroth and Solo (n 33).

uptake and usage.⁴⁶⁴ Conversely, provision of interest payments is correlated with increased uptake. For example, Tigo Tanzania noted an 11% increase in new customers after introducing interest payments on its mobile money account.⁴⁶⁵ However, this finding is limited due to questions of causality, and has not been replicated across studies. Furthermore, there are no studies into the increased prudential regulation imposed on Tigo Tanzania due to the introduction of interest payments, whether fees increased due to compliance costs, and whether such fees mitigated against potential customers at the margins.

The discussion above in relation to the investment function relates to a cost-benefit analysis. The risks unbanked people incur in using other informal assets, particularly cash, as discussed above in Chapter 1, means they may prefer a credit and liquidity risk-free asset in the form of funds in their mobile money account. A customer must determine whether the likely benefits of accessing an investment function outweighs the increased risks involved in storing funds in bonds rather than a central bank.

4.4.3 Corporate Bonds

A third potential trust asset is corporate bonds. Mobile money holding companies can store customers' funds in this form in the WAEMU.⁴⁶⁶ When compared to the central

⁴⁶⁴ C Pulver, 'The Performance and Impact of M-PESA: Preliminary Evidence from a Household Survey' (2008) Financial Sector Deepening Kenya (no other publication material available). See also Mia Thom, Jeremy Gray, Christine Hougaard, Barry Cooper, Shirley Mburu, David Saunders, Mia Slabber and Zani Muller, 'Swaziland: Demand, Supply, Policy and Regulation' (2014) Centre for Financial Regulation and Inclusion (CENFRI) Synthesis Report <http://www.finmark.org.za/wp-content/uploads/2016/01/MAP-Swaziland-Synthesis_Final3.pdf> accessed 16 December 2016.

⁴⁶⁵ GSMA (n 17) 57.

⁴⁶⁶ In the WAEMU, an MMHC 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.

bank account, corporate bonds provide a similar set of benefits and costs to government bonds. The degree of similarity is an empirical question that depends upon, amongst other factors, differences in credit risk, market liquidity, the absence of a sovereign restructuring mechanism versus the possible ineffectiveness of domestic corporate insolvency regimes, and enforcement problems that may be associated with the issuance of sovereign debt under domestic law.

4.4.4 Commercial Bank

The final trust asset to be considered is a commercial bank deposit. This trust asset was mandated in the original M-Pesa model, as discussed above in Chapter 1. Mobile money intermediaries in Ghana, Kenya, Lesotho, Malawi, Namibia, and Sri Lanka can store customers' funds in this asset.⁴⁶⁷

By using this trust asset, mobile money *complements* the banking system. This is because the service gathers funds and stores them in a bank where they can be intermediated into the economy.⁴⁶⁸ In doing so, mobile money becomes connected to the banking and financial system as a shadow intermediation chain.⁴⁶⁹ This describes instances in which when liquidity, maturity, and credit transformation are performed using funds that originated outside the traditional commercial banking system.⁴⁷⁰

⁴⁶⁷ Ghana: Mobile Money Guidelines, art 16; Kenya: NPS Regulations 2014, reg 25-26; Lesotho: Guidelines on Mobile Money, principle 4, app 10; Malawi: Guidelines for Mobile Payment Systems, art. 8; Namibia: Determination on Issuing of Electronic Money in Namibia, art 11.2 and Guidelines for Issuers of Electronic Money & Other Payment Instruments in Namibia, art 7; and Sri Lanka Mobile Payments Guidelines No. 2 of 2011 for Custodian Account Based Mobile Payment Services s 1.3.

⁴⁶⁸ See how Klein and Mayer (2011) explain that M-Pesa is primarily a 'conduit for deposits' (Klein and Mayer (n 58) 16.

⁴⁶⁹ Zoltan Pozsar, Tobias Adrian, Adam Ashcraft and Hayley Boesky, 'Shadow Banking' (2012) Federal Reserve Bank of New York Staff Report 458, February 2012
<https://www.newyorkfed.org/medialibrary/media/research/staff_reports/sr458.pdf> accessed 28 December 2016.]

⁴⁷⁰ Charles R. Hulten, Marshall B. Reinsdorf, 'Measuring Wealth and Financial Intermediation and Their Links to the Real Economy' (2013) (National Bureau of Economic Research in Income and Wealth
<<https://www.bea.gov/papers/pdf/Introduction%20to%20CRIW%20conference%20volume%20on%20Measuring%20Wealth%20and%20Financial%20Intermediation.pdf>> accessed 20 April 2016, 1. See also Tobias Adrian and

Mobile money fits this description because the MMHC gathers funds from mobile money customers, not bank depositors. The MMHC then stores those funds in a bank, which in turn subjects them to maturity, credit, and liquidity transformation.

This section has two main parts. The first explains how, by storing funds in a commercial bank, customers become exposed to liquidity, credit, and maturity transformation. The second explores regulatory tools that can address liquidity, credit, and maturity transformation and, in doing so, enable the MM firm and its associates to more credibly commit to safeguard customers' funds for the purposes of providing payment and storage functions.

4.4.4.1 The Introduction of Credit, Liquidity, and Maturity Transformation

As discussed above, in M-Pesa customers' funds were stored in a bank deposit. The justification given was that funds were 'safe' because they were stored in a bank.⁴⁷¹ However, this trust asset is less safe than the alternatives, which are a central bank account or government or corporate bonds. This is because, by becoming part of a shadow intermediation chain, the MMHC becomes *exposed* to liquidity, maturity, and credit transformation.

Assuming that mobile money customers know this information and are operating in a rational manner, storing funds in a bank account introduces a form of the confidence trick that lies at the heart of depositor runs. The customer knows that the MMHC will have sufficient value of liquid assets to honour her redemption

Adam B. Ashcraft, 'Shadow Banking Regulation' (2012) Federal Reserve Bank of New York Staff Report No. 559 April 2012 1 and 7 <http://www.newyorkfed.org/research/staff_reports/sr559.pdf> accessed 29 September 2015.

⁴⁷¹ As discussed in Chapter 1.

requests so long as the MM firm and MMHC deliver on the narrow banking commitment, in this case storing funds in a central bank (as well as the holding company and trust-related commitments, which is assumed in this chapter). The customer *also* knows that this liquidity relies on the capacity of the MMHC to redeem the pooled deposit at the bank. For this reason, if the customer hears adverse news about the solvency of the bank, or even other banks, she may engage in a fundamentals run. She would aim redeem her share of the pooled deposit at the bank before other regular, non-bank depositors get there first and cause the bank to run out of money. For similar reasons, this structure could cause a pure panic run. The bank may only have a liquidity problem but customers may mistake it for a solvency problem and run to the MMHC to redeem their funds.

Like depositors, insurmountable coordination costs prevent unbanked customers from meeting and determining an efficient response to news of solvency or liquidity problems at the bank. As discussed above, this collective action problem is particularly likely for unbanked customers because they live in highly dispersed communities.

Customers' incentive to run to the MMHC in the event of credit or liquidity problems – or perceived problems – at the bank may be even stronger than that of a non-mobile money depositor of the bank. This is because, as discussed in Chapter 3, usually only a small fraction, if any, of a mobile money customers' funds are

protected through deposit guarantee schemes, unlike regular depositors.⁴⁷²

The exposure to liquidity, maturity, and credit transformation means a policymaker must impose additional regulation in order to enable the MM firm and its associates to credibly commit to safeguard customers' funds for the purposes of providing payment and storage functions. This regulation will impose greater compliance costs on the MMHC than when the firm stores customers' funds in a central bank, or government or corporate bonds. These increased costs can make mobile money unaffordable for customers at the margins, which can mitigate against financial inclusion objectives. The next section examines three main tools that can be used to address the potential credit risk caused by failure of the bank.

4.4.4.2 Public Ordering

A first tool, which has become increasingly used in recent years, involves permitting the MMHC to diversify its holding by storing funds across multiple banks. This option is available in Kenya and Namibia.⁴⁷³ The aim is to minimise losses to customers' funds through diversification.

However, it is uncertain how this regulatory tool would operate in practice. In particular, it is unclear how losses would be shared amongst mobile money customers in the event that one of the banks fails. Funds in the failed bank may be specifically associated with particular customers. Alternatively, losses may be shared

⁴⁷² Jack and Suri (n 243) 10.

⁴⁷³ Determination on E-Money, s 11.2.1.

proportionally among mobile money customers.

More generally, the usefulness of this tool is unclear. Unless the MMHC stores funds across a very large number of banks, a significant portion of customers' funds is exposed to loss in the event one of the banks fail. Again, assuming that customers know this information, they will still want to run in the event one of the banks faces financial distress. This is because they fear that they will only receive a fraction of their funds. Furthermore, financial distress in the banking system may be correlated across multiple banks, and so diversification is unlikely to protect customers' funds from loss.

A second potential tool involves requiring the MM firm to hold sufficient capital to guarantee the MMHC against the credit risks that can arise through this trust asset. As explained in Chapter 3, extra capital requirements may increase the safety of funds. Furthermore, when set at 100% of e-money liabilities, capital can completely insure customers from loss of funds due to failure of the bank. This would have considerable consumer protection benefits. However, such capital requirements would increase compliance costs considerably, which would significantly impair financial inclusion efforts.

A third potential tool is deposit insurance.⁴⁷⁴ Given it is assumed mobile money customers behave the same way as depositors in relation to runs on the system,

⁴⁷⁴ This discussion focuses on extending deposit insurance through unorthodox means, as follows.

deposit insurance is required to prevent a run in the event of the occurrence or perceived occurrence of bank failure. Policymakers are increasingly adopting this approach and imposing pass-through deposit insurance for mobile money. In this situation, the deposit insurance provider acknowledges that the MMHC's bank account can be characterised as a number of smaller accounts for the purposes of deposit insurance protection.⁴⁷⁵ In effect this means each mobile money account receives the full protection of the country's deposit insurance scheme.

On 18 January 2016, the Nigeria Deposit Insurance Corporation announced that pass-through deposit insurance would be extended to mobile money, making Nigeria the first, and currently only country to do so.⁴⁷⁶ The system insures each individual mobile money account up to \$US3,255 (around £2,482).⁴⁷⁷ As of November 2016, the following countries are also designing pass-through deposit insurance for mobile money: Tanzania, Kenya, Uganda, and Zimbabwe.⁴⁷⁸

The effectiveness of pass-through deposit insurance for mobile money is unclear, for two main reasons. Unbanked people may not be aware of deposit insurance, which in turn means this instrument does not prevent them from running in

⁴⁷⁵ GSMA (n 584) 25-26.

⁴⁷⁶ See announcement in Babajide Komolafe, 'NDIC Issues Deposit Insurance Guidelines for Mobile Money' (*Vanguard*, 18 January 2016) <<http://www.vanguardngr.com/2016/01/ndic-issues-deposit-insurance-guidelines-for-mobile-money/>> accessed 12 April 2016.

⁴⁷⁷ Kingsley O. Nwaigwe (Deputy Director, Research Policy and International Relations Department, Nigeria), 'Deposit Insurance and Mobile Money in Africa' (IADI Africa Regional Committee Conference, Zanzibar, 1 September 2016).

⁴⁷⁸ Malisa (n 243); Khalid Salum Moh'd, 'Opening Speech' (IADI Africa Regional Committee Conference, Zanzibar, 1 September 2016); Charles R. Owiny Okello (Director Non-Bank Financial Institutions, Bank of Uganda), 'Presentation 3. Uganda', (IADI Africa Regional Committee Conference, Zanzibar, 1 September 2016); and Gift Chirozva (Director Business Operations), 'Presentation 1. Zimbabwe', (IADI Africa Regional Committee Conference, Zanzibar, 1 September 2016).

the event of perceived failure of the bank.⁴⁷⁹ Empirical materials suggest that due to their lack of experience with formal financial tools, unbanked people have little knowledge of the existence of banking regulation.⁴⁸⁰

A related problem is the potential credibility of pass-through deposit insurance, particularly in the context of the likely severe institutional constraints of policymakers.⁴⁸¹ This problem is similar to that which arises when a policymaker seeks to use deposit insurance generally, which is discussed in Chapter 3. There has been no empirical analysis of the extent to which policymakers in developing countries can credibly commit to providing pass-through deposit insurance. Additional research on this point would provide guidance on the extent to which pass-through deposit insurance is likely to prevent a run in mobile money.

4.4.4 Conclusion

This section has explained that, in contrast to much literature and regulatory practice, storing customers' funds in a bank account may be the least safe of available trust assets open to MMHCs. A wider set of prudential tools are required to deal with the increased credit and liquidity risks than those of any other trust asset, which increases compliance costs and in turn may mitigate against financial inclusion objectives by making the service unaffordable for customers at the margins. The next section examines two additional proposals that may enable mobile money to deliver on safety, compliance costs, and interest payments objectives.

⁴⁷⁹ See discussion of a lack of public awareness of deposit insurance in members generally, David Walker (Senior Advisor to IADI Secretary General), 'Presentation 1. IADI Initiatives for Protecting Mobile Money Deposits', (IADI Africa Regional Committee Conference, Zanzibar, 1 September 2016); See also Nwaigwe (n 480) below.

⁴⁸⁰ See, for example, concern from the Nigerian Deposit Insurance Corporation (NDIC), which is responsible for deposit insurance in the country, about a lack of public awareness of this regulatory tool: see Nwaigwe (n 480).

⁴⁸¹ See Nwaigwe (n 480); See also International Association of Deposit Insurers (IADI), 'Presentation 2. Ghana Representative', (IADI Africa Regional Committee Conference, Zanzibar, 1 September 2016).

4.5 Additional Proposals

The previous section has analysed the benefits and costs of existing types of potential trust assets. This section makes two proposals which aim to move beyond these options and enable mobile money to simultaneously deliver on the safety, returns, and compliance costs objectives. It examines the marginal benefits and costs involved in moving from the trust assets discussed in Section 4.4 of this Chapter to those examined in this section. Each proposed trust asset provides a series of benefits but is faced with several challenges of implementation.

4.5.1 MMMF

A first option involves requiring the MMHC to store customers' funds across a wider range of asset classes, such as cash, government securities, and high-grade commercial paper. In doing so, the MMHC would develop a portfolio that even more closely resembles that of a money market mutual fund (MMMF, as explained above), particularly a Government and Treasury money fund.⁴⁸²

4.5.1.1 Benefits

The primary benefit of the requiring the MMHC to store customers' funds in a similar portfolio to an MMMF is increased safety. Like storing funds in a central bank, government or corporate bonds, customers' funds would not be exposed to liquidity, credit, and maturity transformation. There is an additional benefit in storing customers' funds across a portfolio of assets. This approach means customers' funds would be made safer from idiosyncratic risk that arises when they are stored in any

⁴⁸² See a discussion of such funds above: text to 462.

one asset (other than the central bank, assuming this institution does not impose any credit or liquidity risk). This diversification would mean the MMHC would take the form of a narrow bank providing a payment function with an asset base which, occasionally, has been advocated for in the literature, comprising cash, government securities, and high-grade commercial paper.⁴⁸³

The diversification in this approach may also increase the stability of the mobile money sector. By prioritising or mandating any of the trust assets in Section 4.4 of this Chapter, a policymaker encourages homogeneity across the portfolios of different MMHCs. This may make the sector more correlated to shock from failure of the mandated asset class.⁴⁸⁴ In contrast, the MMMF approach enables diversification across asset classes. The precise correlation between these asset classes will vary depending on the financial system of the country in question. In addition, like an MMMF, the MMHC's portfolio would generate interest payments which could be passed onto customers.

4.5.1.2 Costs

There are several main costs and challenges with requiring the MMHC to develop the portfolio of an MMMF. This type of portfolio imposes a *compliance cost* on the MMHC. This is because the MMHC will need to design internal processes in order to develop the portfolio required under regulation. The MM firm, which is responsible for providing the service, may increase fees in response to the greater compliance costs, which may impair financial inclusion objectives. In addition, the portfolio may

⁴⁸³ Phillips and Roselli (n 314) 11-12.

⁴⁸⁴ The herding of investments in the securitisation sector demonstrates the dangers of correlated investment strategies: Armour and others (n 2) 7.

not be *feasible*. To operate effectively, the MMHC must be able to store customers' funds in government securities, commercial paper, and other financial markets. Some of these markets may not operate in developing countries, which reduces the usefulness of this approach.⁴⁸⁵

4.5.2 Central Bank Plus Interest

An alternative option would involve storing customers' funds in a central bank account, as currently permitted in Columbia and El Salvador, as discussed above in Section 4.4. In addition, the central bank would be permitted to pay interest on funds received from the MMHC, which could be passed on to the customer.

4.5.2.1 Benefits

This trust asset maximises safety and compliance costs objectives for the reasons outlined in the Section 4.4.1 of this Chapter. In particular, indirect intermediation is removed entirely from mobile money because the central bank does not intermediate funds. Furthermore, assuming the central bank is solvent, this trust asset has no credit or liquidity risks, and so there is no need for prudential regulation.⁴⁸⁶ This means that mobile money creates operational risk only.

The additional benefit is interest payments. It means mobile money can provide an investment function. This is likely to have financial inclusion benefits, for the reasons discussed in Section 4.4.2, above.

⁴⁸⁵ Alternatively, they may be underdeveloped in an important respects such as low levels of liquidity: Bruce Hearn, Jenifer Piesse and Roger Strange, 'Market Liquidity and Stock Size Premia in Emerging Financial Markets: The Implications for Foreign Investment' (2006) *International Business Review* Vol. 19:Iss 5 <<http://australiangovernmentbonds.gov.au/etbs/treasury-bonds/>> accessed 16 December 2016.

⁴⁸⁶ See, again, Klein and Mayer (2011) listing the benefits of this approach: Klein and Mayer (n 58).

4.5.2.2 Challenges

Two main potential challenges arise in relation to this model. The first relates to the regulatory classification of mobile money as a payments provider should interest payments be available on accounts. The second applies to the legal authority of the central bank to provide such payments. Both are examined below.

4.5.2.2(a) Regulatory Classification

This section discusses a potential tension that may arise when central bank interest payments are available on mobile money accounts. As discussed in Chapter 2 and other parts of the thesis, one of the CBK's three key justifications for regulating M-Pesa through a 'special' rather than a banking licence was that, unlike a bank deposit, a mobile money account does not provide interest payments. This is because interest payments are one of the defining features of a deposit under Kenya's Banking Act 1995. As discussed in Chapter 1, in 2014 the CBK amended its approach to mobile money so now M-Pesa is regulated through the National Payment Systems Regulation 2014, not a special licence.

Introducing interest payments, as proposed in this section, will cause mobile money to more closely resemble a bank deposit, which may lead to pressure for the service to be regulated under the Banking Act. As discussed in Chapter 1, such a classification, and the resulting increase of prudential regulation on mobile money, could raise compliance costs and defeat financial inclusion objectives.

The CBK, and policymakers in other countries wanting to supervise mobile money through a special licence or a legal instrument that is similar to the NPS

Regulations, may need to respond to this legal tension. To this end, a policymaker could rely on an additional ground upon which the CBK justified its decision to regulate M-Pesa through a special, rather than a banking, licence: unlike banking, customers' funds are not intermediated by a cash merchant or the MM firm.

4.5.2.2(b) Authority of the Central Bank

This discussion focuses on the legal authority of the central bank to provide interest payments on reserves, including those amounts stored through mobile money platforms. As discussed above, the central bank may not such authority. Such authority could be justified on three grounds.

A first, and most conventional, justification would be that the central bank has a wider role in providing an electronic account to the non-banking public, which could be used for storage and payments. In turn, this would be justified on the grounds that a payments system is a *public good*.⁴⁸⁷

A second justification would be *financial inclusion*. It has been argued that central banks must 'reinvent' themselves for financial inclusion, although the features of this approach have not been articulated.⁴⁸⁸ As argued in this thesis, such a reinvention involves a policymaker taking a much more 'active' regulatory approach than normally envisaged in traditional regulation and supervision. In particular, this approach should include monitoring private ordering available to the unbanked on the grounds that these communities are unlikely to do so effectively. By providing an

⁴⁸⁷ This involves viewing a payments system as a utility or public infrastructure such as a power grid. See critique of this view in Scott 2014 (n 31) 20.

⁴⁸⁸ See Elisabeth Rhyne, 'Expert Opinion: Basel III Impact On Inclusion' (2016) MasterCard Centre for Inclusive Growth <<http://inclusionhub.mastercardcenter.org/features/6034/op-ed-davos-should-consider-basel-iii-impact-on-inclusion/>> accessed 14 April 2016.

account to MMHCs which pays interest, the central bank would be performing a storage function that is consistent with the active approach.

There is some policy and scholarly interest in the type of approach proposed in this section. For example, and as outlined above in Section 4.4.1, above, in El Salvador and Columbia an MMHC can already store funds in a central bank. Furthermore, literature is beginning to emerge that central banks should provide electronic accounts to customers.⁴⁸⁹

This trust asset model may lead to regulatory arbitrage problems. This is because the MMHC would provide an investment product free from credit and liquidity risk. Investors and depositors may herd into the mobile money sector to take advantage of this favourable regulatory structure. Depending on the scale of such herding, this process may reduce the amount of funds intermediated into the economy. It may also cause mobile money to grow rapidly to the point that it becomes systemically important and a source of systemic risk.

A policymaker can prevent herding into mobile money by setting interest payments on mobile money schemes at a point slightly lower than the risk-free rate of return achieved in the financial system in question. Doing so involves establishing a new asset class that would be attractive to unbanked and low-income communities. This is because such communities would gain access to a financial instrument that is safer than cash. In particular, funds could not be stolen through physical means, as

⁴⁸⁹ Ben Dyson and Graham Hodgson, 'Digital Cash: Why Central Banks Should Start Issuing Electronic Money' (January 2016) Positive Money <http://positivemoney.org/wp-content/uploads/2016/01/Digital_Cash_WebPrintReady_20160113.pdf> accessed 14 April 2016.

outlined in Chapter 1. Furthermore, unlike cash, she could obtain interest payments on her funds which can be used to combat the potential for inflation to reduce the value of her stored funds, which in turn is a means of accelerating her wealth creation. However, the trust asset is unlikely to trigger herding from depositors and investors into mobile money. This is because the interest payments are lower than the risk-free rate of return.

As with other proposals in this thesis, the effectiveness of the two proposals in this section in contributing to financial inclusion are difficult to forecast due to a lack of research into the risk profile of unbanked customers. Answers to a range of research questions would contribute to assessing the usefulness of such products. For example, what are the risk profiles of unbanked customers? As a related question, to what extent do unbanked customers value safety in financial instruments over interest payments? Chapter 7 further explores arising issues of research that relate to unbanked people.

Conclusion

Chapter 3 has explained that commitments in mobile money, particularly its holding company, trust, and narrow banking structures, can protect customers from a range of credit, liquidity, and operational risks. This chapter has focussed on the narrow banking requirements by examining the potential credit and liquidity risks to the MMHC based on its use of customers' funds.

There is an assumption that storing funds in a commercial bank is the most effective method of safeguarding customers' funds for the purposes of providing

payment and storage functions only. However, this Chapter has explained that customers' funds are better protected from credit and liquidity risks when stored in a central bank account. Assuming the central bank is solvent and liquid, using this trust asset enables mobile money to provide a storage function that causes operational risk only. This is the risk that customers' funds do not actually reach the central bank. A policymaker can use many of the tools introduced in Chapter 3, particularly independent directors, fit and proper tests, back-up operational systems, and direct supervision, in order to address this operational risk.

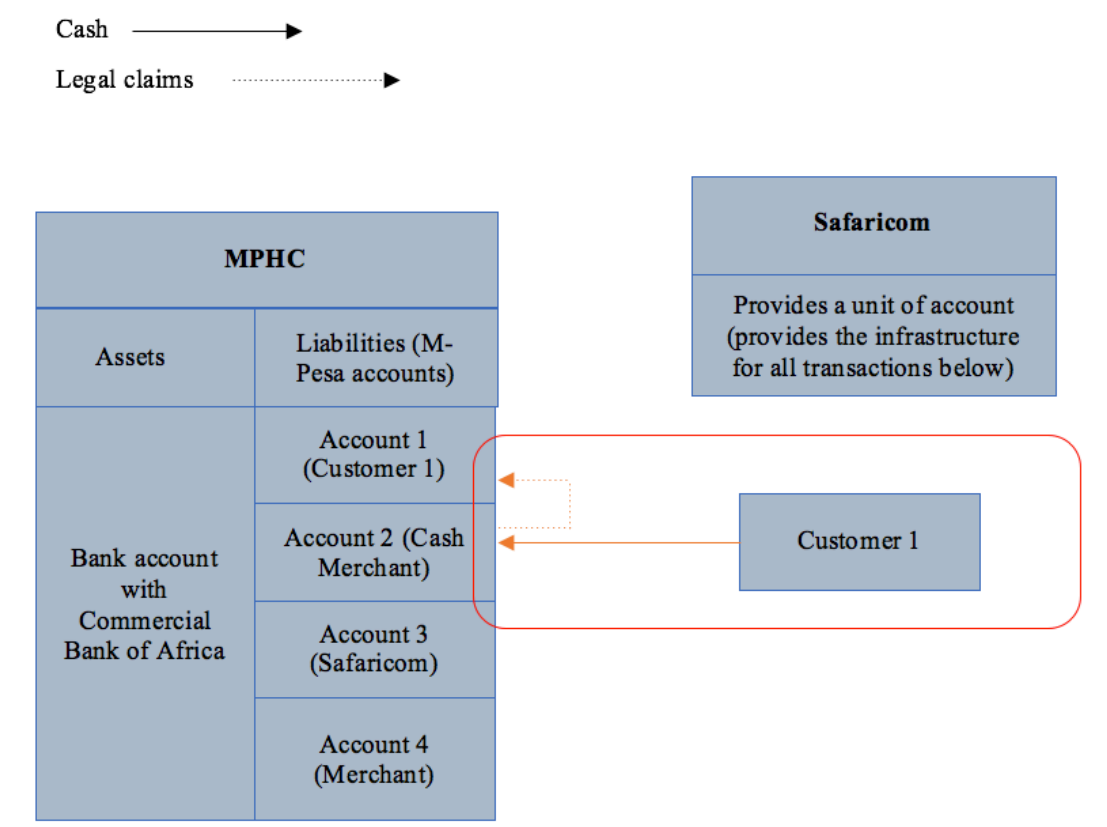
There are additional benefits from the safety of this approach. The lower regulatory requirement means compliance costs are lower, which can enable MM firms to reach a larger number of unbanked customers. This trust asset is particularly useful when the central bank can provide interest payments on accounts. It means mobile money can provide a broader product offering, involving payment, storage, and investment functions. In turn, this can enable unbanked customers to meet a wider range of her economic and liquidity needs.

CHAPTER 5: FUNDS CONVERSION

Introduction

This chapter examines the regulatory and policy issues in the funds conversion component of mobile money. This involves a customer converting cash for e-money and vice versa. The MM firm contracts with cash merchants, which are retail outlets such as corner stores and petrol stations, to perform the funds conversion service on its behalf. The diagram below outlines the component of M-Pesa that relates to funds conversion.

Diagram 5: The Funds Conversion Service of Mobile Money



This chapter assumes for the purposes of analysis that private and public ordering discussed in Chapters 3 and 4 address risks that arise through the conflict of interest

between shareholders of the MM firm and customers, and the balance sheet of the MMHC, respectively. Chapter 5 asks what additional policy and regulatory issues, if any, are raised by the funds conversion service.

This chapter argues that the cash merchants create primarily operational, rather than credit and liquidity, risk. Furthermore, mass operational failure could cause a pure panic run on the system. Private ordering is unlikely to address these risks, creating the opportunity for public ordering to buttress the credibility of the MM firm's commitments to safeguard customers' funds. The chapter explores this argument in four parts.

The first explains that cash merchants perform a storage function in order to provide the funds conversion service. This is because the cash merchant must be 'liquid' in order to enable customers to convert cash for e-money and vice versa. This means she must store sufficient amounts of e-money in her mobile money account and cash on her premises in order to perform cash-in and cash-out transactions, respectively.

The second argues that the funds conversion component of mobile money creates an agency problem between the MM firm (the principal), which delegates the responsibility of storing sufficient amounts of e-money and cash to the cash merchant (a sub-agent of the MM firm). The MM firm may be unable to determine the extent to which the cash merchant is delivering on its commitment to store enough e-money and cash to remain 'liquid' and effectively perform funds conversion transactions. Uncorrelated instances of illiquid cash merchants impose costs on a customer. She

must either wait until the cash merchant rebuilds its reserves of e-money or cash as required or travel to find a liquid cash merchant. Correlated instances of illiquid cash merchants – namely across a significant portion of the network – may cause a pure panic run. This is because, like depositors and a bank facing liquidity problems, customers view the mass liquidity shortage in the cash merchant system as signalling a solvency problem at the MM firm.

The third part examines the extent to which private ordering addresses the potential for uncorrelated and correlated liquidity problems at cash merchants. Central to private ordering are commitments cash merchants make when agreeing to join mobile money platforms. The cash merchant commits to use her own e-money and cash for funds conversion transactions, rather than those of the MMHC or MM firm. This means a cash merchant does not intermediate funds. As a result, the cash merchant is a ‘liquidity island’; any failure on her part to maintain sufficient amounts of e-money or cash will have no direct impact on the liquidity of other cash merchants in the scheme. Furthermore, the insolvency of a cash merchant does not trigger any credit risk to other agents in the mobile money service, particularly other cash merchants, the MMHC or MM firm, or the customer.

The cash merchant also commits to maintain a 1:1 relationship between e-money in her account and cash physically stored on her premises. This commitment means the cash merchant should never become illiquid and cause a liquidity problem to customers; she will always have sufficient e-money or cash to process fund conversion requests.

While these commitments address credit and liquidity risk which could arise through intermediation, a non-trivial operational risk remains that the cash merchant will not deliver on its commitments, particularly to maintain a 1:1 relationship between e-money in her account and cash physically stored on her premises. This could arise through the cash merchant's lack of expertise or intentional shirking of this commitment. Furthermore, collapse of the cash merchant operating system could also impair the 1:1 relationship.

Private ordering is also unlikely to effectively address the operational risk of an impairment to the 1:1 relationship. Significant information asymmetries and coordination problems mean unbanked customers are unlikely to make effective use of governance strategies designed to monitor the liquidity problems of individual cash merchants. Institutional arrangements used by some MM firms for monitoring purposes, which involve the introduction of wholesale cash merchants and master cash merchants, may facilitate monitoring of individual cash merchants, but are themselves the source of operational risk. Furthermore, failure of these additional types of cash merchants could themselves cause correlated liquidity problems across the cash merchant network and a pure panic run.

The fourth part explains how, given the limitations of private ordering, public ordering can buttress the efficiency of mobile money platforms in addressing risks in the funds conversion component of mobile money. Ex ante, a policymaker should aim to prevent correlated liquidity problems from emerging in cash merchant networks. To this end, a policymaker should require the MM firm to implement operating standards to prevent the likelihood of mass operational failure and back-up systems

which can be used in the event it occurs. Ex post, a policymaker should implement systems which reassure customers that correlated cash merchant liquidity problems do not, in themselves, signal solvency problems at the MMHC. A policymaker can provide such reassurance through a public notification scheme that can be used in the event of correlated liquidity problems in the cash merchant system.

5.1 Function

This part has four components. The first outlines the basic operational procedures behind the funds conversion service. The second outlines the storage function that underpins this service. The third explores the policy emphasis on growing cash merchant networks. The fourth reviews the literature that applies to the funds conversion transaction.

5.1.1 Operation of the Service

The discussion below briefly outlines the funds conversion service in mobile money provided by cash merchants, originally introduced in Chapter 1. It focuses on M-Pesa. A cash merchant establishes an ‘e-float’. This involves providing cash to the MMPHC and receiving an equivalent value of e-money in return. The cash merchant uses this e-float and her own cash for transactions with customers, as follows.

The customer signs up for M-Pesa by visiting the premises of the cash merchant. The customer obtains a Safaricom SIM card, completes the M-Pesa

Registration Form, and provides appropriate identification.⁴⁹⁰ The cash merchant creates an M-Pesa account for the customer.

Next, the parties perform a ‘cash-in’ transaction, which means the customer loads e-money onto her M-Pesa account. She hands cash to the cash merchant. In return, the cash merchant transfers an equivalent value of e-money from her own account to the account of the customer.⁴⁹¹ This means, for both parties, there is an equivalent, simultaneous offset of cash for e-money.⁴⁹²

The ‘cash out’ element of the funds conversion service operates in the reverse of a deposit. A customer visits the premises of the cash merchant. By following prompts on her M-Pesa screen, she transfers an amount of her e-float to the cash merchant’s account.⁴⁹³ She receives an equivalent amount of cash in return.⁴⁹⁴

As can be seen from the transactions above, on one level a cash merchant is simply another mobile money customer. This is because in the course of establishing her ‘e-float’, like a customer, she puts cash into the system in exchange for e-money.⁴⁹⁵ She then uses her own balances of e-money and cash to facilitate cash in and cash out transactions with customers. She has additional contractual obligations, such as signing up customers to the mobile money service, as discussed above, and

⁴⁹⁰ M-Pesa Terms and Conditions, cls 2.3 and 3.1.2.

⁴⁹¹ A customer must pass security validation and verification checks, provide cash to the cash merchant and sign the cash merchant’s log book. The Terms and Conditions describe this process as ‘loading’ e-money: see M-Pesa Terms and Conditions, cls 5.1.1, 7.2 and 7.3.

⁴⁹² M-Pesa Amendment Deed, cl B3-4; and M-Pesa Terms and Conditions, cls 5.1.1, 7.2 and 7.3.

⁴⁹³ So this follows the same model as a transfer, in which Safaricom notifies the MPHIC to take action, in this case debit funds: M-Pesa Trust Deed cl 2(ii) and M-Pesa Amendment Deed, cl 3.1.

⁴⁹⁴ The customer signs the log book which is ‘conclusive evidence’ that the withdrawal has occurred successfully. M-Pesa Terms and Conditions, cl 10.1.

⁴⁹⁵ Ignacio Mas and Dan Radcliffe, ‘Scaling Mobile Money’ (2010) Bill and Melinda Gates Foundation, September 2010 <<http://www.gsma.com/mobilefordevelopment/wp-content/uploads/2010/02/Scaling-mobile-money.pdf>> accessed 14 April 2016, 2.

additional commitments which will be explored below. For present purposes, it is sufficient to note that by establishing an e-float a cash merchant obtains the same basic legal rights to her funds as a customer. So, as discussed in Chapter 2, absent any ordering to the contrary, by providing cash to the MMHC she would be an unsecured creditor of this firm. However, due to private ordering in mobile money, particularly the holding company and trust commitments discussed in Chapter 3, like regular customers, she is a beneficiary of the trust in which her funds are held. Also like customers, the quantum of the cash merchant's beneficial interest is the amount of funds in her mobile money account. This point has critical regulatory consequences, which will be explored below in this Chapter.

5.1.2 Function

The discussion in Section 5.1.2, above, explains that cash merchants perform an administrative role in signing up customers. This chapter focuses on the protection of funds in cash merchant networks rather than regulatory issues that arise in the administrative component of the funds conversion service. This approach is consistent with the broader focuses of the thesis which is regulatory issues that arise in the protection of customers' funds within mobile money systems.

The description of the cash-in and cash-out transactions, discussed in Chapter 2, reveals that cash merchants perform a storage function in order to provide the funds conversion service. This is because the cash merchant must be 'liquid' in order to enable customers to convert cash for e-money and vice versa. To become and maintain her liquidity, she must store sufficient amounts of e-money in her mobile money account and cash on her premises.

5.1.3 Policy Emphasis on Growth

The CBK and many policymakers in other countries tend to take a pro-growth approach to cash merchants. This approach tends to involve exploring methods of providing MM firms with maximum regulatory freedom to design and grow cash merchant networks.⁴⁹⁶ The intuition is that by minimising compliance costs on MM firms, cash merchant networks are more likely to expand into rural areas where unbanked people tend to live and work.

More generally, cash merchants are considered a key factor to the profitability and sustainability of mobile money. Studies suggest there is a very high level of correlation between the density of cash merchant networks and the success of the mobile money scheme in question.⁴⁹⁷

Cash merchants are important because they reduce the fixed cost an MM firm might otherwise face in providing mobile money in unbanked people.⁴⁹⁸ The funds conversion service could be performed ‘in house’ at a branch of the MM firm. By contracting with retail outlets, an MM firm does not need to build branches in remote areas where the unbanked tend to live and work. Cost savings are particularly significant when an MM firm can contract with airtime sellers which already sell phone credit on its behalf. This is because airtime sellers can add mobile money services to their existing product offering at low cost.⁴⁹⁹

⁴⁹⁶ Industry advocates for minimal regulation of cash merchants. For example the GSMA emphasises that MM firm liability should be the cornerstone of regulation of cash merchants, with minimal additional regulation: di Castri 2013 (n 84).

⁴⁹⁷ Evans and Pirchio (n 125) 1.

⁴⁹⁸ Mas and Radcliffe (n 12) 2.

⁴⁹⁹ *ibid* 2.

In addition, a larger cash merchant network facilitates the liquidity component of mobile money by making it easier for a customer to convert cash for e-money and vice versa, as desired. In turn, this increases the attractiveness of the scheme.

At this point it is useful to draw an analogy between cash merchants and bank infrastructure, particularly branches and automated teller machines. Both sets of infrastructure provide cash in and cash out (apart from automated teller machines which provide cash out alone). The wider the reach of bank infrastructure, the easier it is for depositors to engage in these transactions, which in turn increases the attractiveness of the bank in question. The same point applies to mobile money.

5.1.4 Literature

Despite the importance of the funds conversion service to mobile money, there has been limited research into its regulation. Generally, materials dealing with this topic comprise consulting reports that are written for MM firms and other actors that are seeking to develop cash merchant ecosystems. They tend to focus on developing appropriate business procedures for cash merchants rather than examining regulatory issues in depth.⁵⁰⁰

There are two notable exceptions. Gibson, Lupo-Pasini, and Buckley (2015) have explored whether vicarious liability of the MM firm is a more efficient

⁵⁰⁰ Yasmina McCarty and Gerald Rasugu, 'Designing & Delivering Agent Training for Mobile Money Deployments' (*GSM*A, (undated)) <http://www.gsma.com/mobilefordevelopment/wp-content/uploads/2012/10/MMU_Agent-Training.pdf> accessed 14 April 2016; Mark Flaming, Claudia McKay and Mark Pickens, 'Agent Management Toolkit' (*GSM*A, 2012) <<http://www.gsma.com/connectedwomen/wp-content/uploads/2012/03/agentmanagementtg22.pdf>> accessed 14 April 2016.

regulatory approach than personal liability of the cash merchant.⁵⁰¹ However, Gibson, Lupo-Pasini, and Buckley (2015) is of limited direct relevance to this Chapter because their paper explores cash merchants of mobile money schemes *and* banks, known as ‘agent banking’, without distinguishing between these two types of services. This Chapter argues that cash merchants in mobile money schemes need to be analysed independently of agent banking. This is because, as will be explained, regulatory issues in mobile money are informed by the holding company, trust, and narrow banking commitments that underpin the scheme. These commitments do not apply in agent banking.

The second is Klein and Mayer (2011). These authors explain that the funds conversion service does not raise financial risks.⁵⁰² This is correct on the grounds that the cash merchants are performing a spot transaction only. While this is a useful addition, Klein and Mayer (2011) provide a limited contribution to regulatory issues in the funds conversion service because the paper applies to M-Pesa only. This means these scholars do not address the range of cash merchant ecosystems that have emerged since M-Pesa was launched, and the regulatory issues they create.

This chapter aims to develop the analysis of Klein and Mayer (2011) by moving beyond the M-Pesa model to examine the different forms of cash merchant ecosystems that now exist in the market. The chapter begins this analysis by exploring the fundamental market failure that emerges through the funds conversion service.

⁵⁰¹ Evan Gibson, Federico Lupo-Pasini and Ross Buckley, ‘Regulating Digital Financial Services Agents in Developing Countries to Promote Financial Inclusion’ (*CLMR*, 16 August 2015) <http://www.clmr.unsw.edu.au/sites/default/files/attached_files/ross_buckley_090815_e_-_aug_16_version_resubmitted_to_sjls.pdf> accessed 14 August 2015.

⁵⁰² Klein and Mayer (n 58) 11.

5.2 Market Failures and Risks

This section has two parts. The first explains the cause and operation of the agency problem that inheres in this service. The second outlines the main consequences of the agency problem.

5.2.1 The Agency Problem

The funds conversion component of mobile money creates an agency problem between the MM firm (the principal) and the cash merchant (the sub-agent). This is because the MM firm delegates to the cash merchant the responsibility of performing the funds conversion transaction and storing sufficient amounts of e-money and cash. This point emerges from the discussion in Section 5.1 above; the MM firm does not perform the funds conversion service. This means it does not need to store sufficient amounts of e-money and cash. Instead, the MM firm relies upon the cash merchant to perform the funds conversion service.

This agency problem means the MM firm may be unable to determine the extent to which the cash merchant performs the funds conversion transaction and retains its liquidity. This is due to the institutional arrangements in cash merchants. These arrangements and their consequences can be explained by distinguishing the incentives and monitoring that apply to employees of the MM firm and cash merchants. An employee may also shirk rather than deliver upon the contractual terms under which she has been hired. However, this agency problem is normally limited because usually management will use a range of corporate law structures, buttressed

by business conduct rules, to monitor her activity and sanction her for non-compliance.⁵⁰³

In contrast, the institutional separation between the MM firm and cash merchants may involve greater information asymmetries than those that arise between management and employees. An MM firm is less able to directly monitor cash merchants than its own staff. This is because usually cash merchants are physically distant from the MM firm, often located in rural areas where the unbanked and other low-income people live and work. Furthermore, cash merchants usually use their own accounting systems for both mobile money and their regular non-mobile money related business, which the MM firm may be unable to directly monitor.

The agency problem between the MM firm and cash merchants can manifest itself in two main types of risks. One is the extent to which the cash merchant performs the actual funds conversion transaction as required in the contract with the MM firm. The other revolves around the extent to which the cash merchant retains its liquidity as part of performing its storage function. The subsections below examine both points.

5.2.1.1 Performing the Funds Conversion Transaction As Required

The cash merchant may not perform the funds conversion transaction as required under the contract. For example, the cash merchant may *steal* a customer's funds in the course of performing the funds conversion service.⁵⁰⁴ However, the institutional

⁵⁰³ Many of these issues arise through the separation between management and control: see Jensen and Meckling (n 256).

⁵⁰⁴ USAid (n 138) 23.

structure of mobile money cash merchants means this risk is unlikely. Theft could operate in several ways. The cash merchant may steal from the customer. For example, the cash merchant receives a certain amount of cash from the customer. The cash merchant only loads a lesser portion of value onto the customer's mobile money account and transfers the difference of e-money to her own ledger.

Procedures built into the operation of mobile money mean such theft is practically impossible. This is a spot transaction and the cash merchant and customer receive an instant text message after the funds conversion takes place.⁵⁰⁵ The customer can immediately determine if the cash merchant has loaded an amount of e-float in her account that differs from the amount of cash she gave to the cash merchant. For this reason theft of the customer in the funds conversion service has yet to be reported.

A second type is theft from the *cash merchant*.⁵⁰⁶ In this case a person steals cash reserves that the cash merchant uses to perform the funds conversion service. This point is examined below in Section 5.3.1.2 because it is addressed by one of the main commitments made by the cash merchant.

A third type of theft could emerge from fraud.⁵⁰⁷ In this case, a person pretends to be the customer and withdraws cash from her account at a cash merchant. Such fraud is unlikely due to the number of procedural steps required to cash out funds. Most obviously, the fraudster would need to access her account, which

⁵⁰⁵ Safaricom, 'Withdraw Cash' <<http://www.safaricom.co.ke/personal/m-pesa/get-started-with-m-pesa/withdraw-cash>> accessed 28 December 2016.

⁵⁰⁶ USAid (n 138) 24.

⁵⁰⁷ USAid (n 138) 24.

involves stealing the customer's PIN. Additional procedural steps then apply. For example, in M-Pesa, to cash out funds a customer must select this option on her phone, which involves using a PIN, presenting valid identification to the cash merchant, and signing a log book at the cash merchant's premises.⁵⁰⁸ Furthermore, even if fraud takes place, funds can be traced through the mobile money system, which facilitates detection. Isolated incidents of fraudsters gaining access to customers' mobile money accounts have been reported, particularly in Uganda.⁵⁰⁹ However, it does not appear to be a significant problem to the point of dissuading customers from using the service.

5.2.1.2 Illiquidity

The institutional arrangements designed to address theft and fraud, and the apparent very low incidence of these outcomes, leaves a second, and potentially more serious, risk that the cash merchant will not retain its liquidity, namely sufficient amounts of e-money and cash to perform fund conversion transactions. This is important because the delegation of storage, discussed above in this Chapter, means a cash merchant faces a non-trivial liquidity management problem which can impair her ability to perform the cash in or cash out service.⁵¹⁰ The cash merchant must predict the amounts of e-float and cash she will need for future cash-in and cash-out transactions,

⁵⁰⁸ In addition, see the customers' contractual right to redeem funds from in M-Pesa Terms and Conditions, cls 5.1.3 and 5.1.4 and Amendment Deed, cls (b)(5) and (C)(5). Note she must complete this transaction at a cash merchant's premises: see Terms and Conditions, cl 10.1. See additional administrative steps outlined in Safaricom (n 509).

⁵⁰⁹ Jonathan Adengo and Eronie Kamukama, 'Uganda has highest mobile money fraud cases' (2016) Daily Monitor Report, 9 September 2016 <<http://www.monitor.co.ug/Business/Uganda-has-highest-mobile-money-fraud-cases--report/688322-3374002-format-xhtml-r767dy/index.html>> accessed 17 December 2016.

⁵¹⁰ Jack and Suri (n 387) 8; Pascaline Dupas, Sarah Green, Anthony Keats and Jonathan Robinson, 'Challenges in Banking the Rural Poor: Evidence from Kenya's Western Province' (2012) National Bureau of Economic Research Working Paper 17851, February 2012 <<http://www.nber.org/papers/w17851>> accessed 28 December 2016.

respectively.⁵¹¹ Failure to do so could cause her to become illiquid; she will not have sufficient amounts of e-money or cash to process the customer's cash-in or cash-out transactions, respectively. Illiquidity amongst cash merchants is a commonly-reported problem. It has occurred in Bangladesh, India, Indonesia, Kenya, Nigeria, Pakistan, Tanzania, and Uganda.⁵¹²

5.2.2 Consequence of the Agency Problem

The chapter focuses on two potential consequences of illiquidity at a cash merchant. Each have important regulatory consequences.

5.2.2.1 Uncorrelated Illiquidity

A first set are uncorrelated instances of illiquid cash merchants. In this situation, one, or a small number, of cash merchants fail to manage their liquidity. Such occurrences are localised, imposing costs on individual customers seeking to access fund conversion transactions at the cash merchant. For an individual customer, an illiquid cash merchant is analogous to the local bank branch being closed or an ATM which is 'out-of-order'. This is an appropriate analogy given a cash merchant performs the same role as a bank branch and, in relation to the cash-out transaction, an ATM. Like a branch closure or an out-of-order ATM, the cash merchant is essentially closed for business. As a result, a customer cannot deposit cash for e-money at the cash merchant, nor can she convert e-money for cash.

Similar to a branch closure, an illiquid cash merchant can cause a liquidity problem for a customer. This is because she experiences a delay in converting one

⁵¹¹ Jack and Suri (n 387) 8; Annabel Lee, 'Emerging Trends for Digital Finance Agent Networks' (The Helix Institute of Digital Finance, 27 May 2014) <<http://www.helix-institute.com/sites/default/files/Presentation%20Downloads/Emerging%20Trends%20for%20Mobile%20Money%20Agent%20Networks.pdf>> accessed 28 December 2016.

⁵¹² See discussion in Greenacre, Malady and Buckley (n 32).

asset (e-money) for another (cash), or vice versa.⁵¹³ The liquidity problem can impose a range of costs. A customer may need to wait while the cash merchant rebuilds its reserves of e-money or cash as required and becomes liquid.

Depending on the amount of time it will take for a cash merchant to rebuild its liquidity and how pressing her liquidity needs are, the customer may need to travel to find a liquid cash merchant. This imposes switching costs on the customer who needs to find another cash merchant through whom she can perform the funds conversion transaction. The scale of the switching cost depends on the number of cash merchants in her community. If there are many, she can find a liquid cash merchant at a low cost. If there is only one cash merchant in her community an illiquid cash merchant may impose prohibitively high switching costs to the point that she cannot access mobile money more generally. This is because the costs a customer must incur to reach a liquid cash merchant, particularly travel-related expenses, may outweigh the benefits from doing so and so she stops using the service.

In theory there is a potential risk of contagion in the case of an illiquid cash merchant. This is because if large numbers of customers from an illiquid cash merchant (A) move to another, liquid cash merchant (B), this may cause a shock to that cash merchant's (B's) liquidity. This is because cash merchant's liquidity might be exhausted satisfying the liquidity demands of the customers who have moved from the illiquid cash merchant (A).

There is insufficient empirical material to examine the likelihood and

⁵¹³ This delay impedes liquidity when defined in the manner outlined above: text to n 228.

operation of this form of contagion. Such an analysis would require information on, amongst other topics, the speed with which customers could move from the illiquid cash merchant (A) to the liquid cash merchant (B). In turn, this would require data on the geographical dispersion of customers relative to merchants and the transport options available to customers seeking to move to liquid cash merchant (B). An analysis of this form of contagion would also require information into the remedial actions the MM firm could take to ensure that customers' movement from one illiquid cash merchant to another does not cause a liquidity problem for that liquid cash merchant.

The lack of publicly-available information on these issues means the thesis does not specifically focus on the potential for the type of contagion introduced through liquidity of an individual cash merchant. Instead, the thesis assumes each cash merchant, can, through its own liquidity management and/or remedial actions imposed by the MM firm, meet the liquidity demands created by failure of an individual neighbouring cash merchant. In this case, contagion could emerge through correlated liquidity problems, as discussed directly below.

5.2.2.2 Correlated Illiquidity

A potentially more serious problem is correlated illiquidity. This involves instances in which a significant portion of cash merchants are illiquid. Actual or perceived illiquidity across a significant portion of the cash merchant network may cause a pure panic run. This is because, like depositors of a bank facing liquidity problems, customers view the mass liquidity shortage in the cash merchant system as signalling a solvency problem at the MM firm or MMHC.

The potential for a run emerges because cash merchants are the customer-facing actors in mobile money schemes. Customers contract with the MM firm, but actually perform funds conversion transactions with cash merchants. As a result, customers may make *inferences* on the MMHC's solvency based on various signals at the level of cash merchants.

The Chapter is not focused on a 'fundamentals run', in which case the cash merchant cannot obtain liquidity because the MM firm or MMHC actually *do* have insolvency problems.⁵¹⁴ This is because, as discussed above, this chapter assumes that the MM firm and MMHC are delivering on the holding company and trust commitments discussed in chapters 3 and 4. By delivering on these commitments, the MMHC remains solvent and so the worst the customers can be exposed to is illiquidity: a delay while funds held by the MMHC are distributed to them.⁵¹⁵

Instead, the chapter examines the potential for a pure panic run due to the customer's failure to distinguish liquidity problems at the cash merchant network from a solvency problem at the MM firm. Again, a comparison to banking may be useful at this point, and appropriate because cash merchants provide an equivalent role to bank branches and ATMs, and both types of runs arise through correlation. Such a comparison helps explain how a pure panic run might arise, which in turn enables a deeper analysis of the differences in the financial structure between banking and mobile money.

⁵¹⁴ See Armour and others (n 2) ch 15, 321. See an additional discussion of depositor runs in Chapter 2.

⁵¹⁵ Text to n 370.

Three steps can help explain the potential for a pure panic run based on liquidity problems amongst cash merchants. First, unlike a bank, a pure panic run in mobile money is unlikely to arise through the *financial structure* of the service. In banking, a pure panic run can emerge through the liquidity and maturity transformation that underpins a bank's business model. By investing funds in illiquid, long-term, illiquid assets, a bank is vulnerable to liquidity problems. This is because it may not be able to liquidate these assets in time to honour correlated redemption requests from depositors. As discussed in Chapter 3, the holding company, trust, and narrow banking commitments made by the MM firm and MMHC mean, assuming these firms deliver on these commitments, mobile money avoids maturity and liquidity transformation and so should not experience liquidity problems. The insulation from liquidity problems also depends on the choice of trust assets and resulting indirect intermediation, as discussed in Chapter 4.

The second point is that a pure panic run *can*, however, arise due to the actual or apparent failure of the *legal*, rather than financial, structure in mobile money. As discussed in Chapter 3, the holding company and trust commitments which underpin mobile money protect customers' funds from credit risk that might otherwise arise through insolvency of the MM firm or MMHC. These commitments protect against a fundamentals or pure panic run because, so long as the MM firm and MMHC deliver on these commitments, customers' funds will *always* be available, even if there is a delay in returning them due to limitations of trust instruments.

However, should the MM firm and MMHC not deliver on these commitments, customers' funds become exposed to credit risk due to insolvency of the MM firm.⁵¹⁶ This is because customers become unsecured creditors of the MM firm in such a situation. The crucial addition in this chapter is that cash merchants, who, as discussed earlier in this Chapter, obtain similar legal rights to customers by establishing a float, *also* become unsecured creditors of the MM firm should this firm and the MMHC not deliver on holding company and/or trust related commitments.

Combining these two steps creates the initial potential for a pure panic run. This is because cash merchant illiquidity may signal to the customer that the MM firm and/or MMHC have not delivered on the holding company and trust related commitments. As a result, the MM firm may not have properly segregated customers' funds from its own assets. Furthermore, the cash merchant is unable to perform the funds conversion transaction because, as an unsecured creditor, her (the cash merchant's) funds have been used to repay third parties of the MM firm. In this case, the customer is also an unsecured creditor and so she needs to run to redeem her funds because they are exhausted servicing other creditors.

A customer could make this inference due to a failure of the cash in service. The customer visits the premises of the cash merchant. She provides cash to the cash merchant. However, the cash merchant is unable to transfer an equivalent value of e-money to her. In the eyes of the customer, the resulting *liquidity* problem may be due to a *solvency* problem at the MM firm and exposure of funds to this problem. The

⁵¹⁶ As discussed in Chapter 3, MM firms and MMHCs could fail to deliver on these commitments in a number of ways. For example, the MM firm and MMHC may have colluded so that customers' funds become assets of the MM firm. In this case the trust in which funds are stored will become void and customers will become unsecured creditors of this firm.

cash merchant's inability to transfer e-money to the customer signifies that such funds are no longer available because the MM firm has become insolvent and the firm has not delivered on holding company and/or trust commitments. As a result, this firm's insolvency means funds of the cash merchant, which is an unsecured creditor, have been used to repay debts owing to third parties. Assuming the MM firm is required to return funds on a 'first come, first served' basis, the customer may seek to obtain her full share of funds before the firm's assets are exhausted repaying other creditors, including other mobile money customers.

A third step in the process towards a pure panic run is *correlation* in illiquidity. In an uncorrelated illiquidity situation, a customer is likely to believe that the cash merchant's illiquidity is due to her (the cash merchant's) own errors or some sort of localised operational failure. This is similar to a depositor and a closed local bank branch or an out-of-order ATM. In this case, absent any other news, a depositor is likely to believe that this situation represents a localised operational error or set of errors.

However, like a pure panic run amongst depositors, customers may make inferences about solvency problems at the MM firm should illiquidity be correlated across the cash merchant network. This correlation is required in order to create the 'feedback' loop that underpins depositor runs in a bank. Customers who do not believe that cash merchant liquidity problems signal solvency problems at the MM firm will want to run if they believe a sufficient number of other customers will do so.⁵¹⁷ This is because, 'just in case', the cash merchant should redeem her funds

⁵¹⁷ This is a similar incentive to that which applies to depositors: Armour and others (n 2) ch 15, 320.

before the MM firm's assets are exhausted. Furthermore, and like depositors, the likely significant coordination problems of unbanked customers means, faced with mass operational failure, they are unlikely to assemble and determine that this outcome does not, in fact, signal solvency problems at the MM firm.

Correlation can lead to a spike in liquidity demands elsewhere in the network, even amongst cash merchants who are not affected by the operational failure and are still liquid. When a significant majority of customers run on the system, illiquidity problems move from affecting a portion to affecting all, or substantially all, cash merchants in the system. This is because even cash merchants not directly affected by the operational failure – which are still 'liquid' – become illiquid by exhausting their cash reserves in the course of transacting with the customers who have run on the system. This is different to the scenario discussed in Section 5.2.2.1 in which illiquidity of an individual cash merchant can cause customers to move to a neighbouring liquid cash merchant, causing her (the liquid cash merchant) to also become illiquid. This is because, in correlated liquidity problems, the liquid cash merchant faces redemption requests from a larger number of customers, not just those from her neighbouring illiquid cash merchant. This process can cause the liquid cash merchant to become illiquid.

Overall, this can create a spiral because news emerges that illiquidity has moved from facing a significant portion to all cash merchants. This worsening liquidity problem provides additional 'evidence' to customers of solvency problems at the MM firm or MMHC, which can further encourage customers who are yet to run to do so.

5.3 Private Ordering

As discussed in Chapter 2, private ordering is a means by which the MM firm and its associates credibly commit to safeguard customers' funds for the purposes of providing payment and storage functions only. For the purposes of this chapter, the analysis involves determining the extent to which private ordering addresses the potential for uncorrelated and correlated liquidity problems at cash merchants.

As discussed above in Chapter 2, the MM firm commits to store customers' funds within the mobile money system and redeem them upon demand. For example, Safaricom specifically commits to enable a customer to access her funds 'at any time'.⁵¹⁸ The MM firm also commits to give effect this instant redeemability by enabling customers to perform funds conversion transactions at cash merchants. For example, Safaricom specifically makes this commitment.⁵¹⁹

Private ordering then explores commitments and governance strategies which enables the MM firm to credibly commit to maintain the type of liquid, reliable cash merchant network that can provide instant redeemability to customers. One potential option may be for the MM firm to commit itself to be liable for actions of cash merchants, including their illiquidity. This means the MM firm agrees to exchange cash for e-money and vice versa, should a customer be unable to do so at a cash merchant. Such liability may make the MM firm more likely to monitor the liquidity of cash merchants and discipline them for illiquidity by removing their licence to

⁵¹⁸ M-Pesa Terms and Conditions, cl 2.11.

⁵¹⁹ M-Pesa Terms and Conditions, cls 8.2 and 10.2.

provide mobile money services. This approach might demonstrate the MM firm's commitment to ensure the cash merchant always has a sufficient amount of e-money or cash as required to process customers' funds conversion requests.

Usually private ordering does not take this step. For example, in M-Pesa, Safaricom is not contractually liable for any actions of its cash merchants. The customer is required to agree to the following contractual provision:

You acknowledge that M-Pesa Cash Merchants are independent contractors and Safaricom shall not be liable for the acts or omissions of M-Pesa Cash Merchants.⁵²⁰

Under this original arrangement, Safaricom may be liable for the action of its cash merchants under tort or vicarious liability regimes, however, the author is not aware of material on this point.⁵²¹ Instead, in order to deliver on its commitment to enable customers to perform funds conversion transactions and ultimately obtain instant – or at least reliable – redeemability, Safaricom relies upon commitments made by *cash merchants*. These actors make these commitments when joining the mobile money service. These commitments are designed to ensure that each cash merchant remains liquid, and are explored below.

In turn, this enables the MM firm to deliver on its commitment to enable customers to convert cash for e-money upon demand. In doing so, they comprise part

⁵²⁰ M-Pesa Terms and Conditions, cl 18.11.

⁵²¹ Literature suggests that in the event of a legal dispute, despite this disclaimer, Safaricom would be deemed liable through contract under common law principles of vicarious liability: Michael Tarazi and Paul Breloff, 'Regulating Banking Agents' (2011) Consultative Group to Assist the Poor (CGAP), Focus Note, March 2011 <<https://www.cgap.org/sites/default/files/CGAP-Focus-Note-Regulating-Banking-Agents-Mar-2011.pdf>> accessed 14 April 2016.

of the avenues through which the MM firm and its associates credibly commit to safeguard customers' funds for the purposes of providing payment and storage functions only. In this case, the relevant 'associates' are cash merchants. These actors are sub-agents of the MM firm, as discussed above in Section 2.2.3.2(c) of Chapter 2. The sections below examine these commitments and then the governance arrangements imposed to monitor the extent to which cash merchants deliver upon them.

5.3.1 Commitments

Cash merchants use two commitments when joining mobile money platforms. As discussed in Chapter 1, the author has been unable to obtain copies of the contracts between Safaricom and cash merchants. For this reason, information on these commitments is drawn from secondary literature. The subsections below examine the commitments and then risks that remain once they have been introduced.

5.3.1.1 Commitments

First, the cash merchant commits to use her own e-money and cash when providing mobile money services, rather than those of the MMHC or MM firm. The cash merchant makes this commitment when she establishes an 'e-float' which involves providing cash to the MMHC and receiving an equivalent value of e-money in return.

This commitment means a cash merchant does not intermediate funds; it uses its own funds for fund conversion transactions. As a result, the cash merchant is a 'liquidity island'; any failure on her part to maintain sufficient amounts of e-money or cash will have no direct impact on the liquidity of other cash merchants in the scheme. Furthermore, the insolvency of a cash merchant does not trigger any credit

risk to other agents in the mobile money service, particularly other cash merchants, the MMHC or MM firm, or the customer.

In addition, by using her own reserves of cash and e-money, theft of customers' cash is impossible. As discussed above, the customer hands over cash in exchange for an equivalent amount of e-money. In the case of a bank branch, an employee may steal this cash, involving not placing it with other funds received from depositors. A cash merchant cannot steal cash in this way. She may redirect such funds into her non-mobile money-related businesses, such as extending her shop or buying non-mobile money inventory. However, because she has established a float using her own money, this redirection is only a source of potential illiquidity. This is because it means she then may not have enough cash available should the customers, or another customer, return to her premises to convert e-money for cash.

The second commitment responds to this problem discussed in the paragraph above; the cash merchant commits to maintain a 1:1 relationship between e-money in her account and cash physically stored on her premises. This is the fifth of five main commitments explored in the thesis. This commitment provides the *details* of the delegation of the storage function from the MM firm and cash merchant. So not only must the cash merchant use its own funds for processing cash in and cash-out transactions, to which it commits by establishing a 'e-float', she must also maintain a 1:1 relationship. By committing to the 1:1 relationship the cash merchant should never become illiquid and cause a liquidity problem to customers; she will always have sufficient e-money or cash to process fund conversion requests.

5.3.1.2 Residual Risks

The commitment addresses credit and liquidity risk which could arise if the cash merchants intermediated customers' funds. What remains is a non-trivial operational risk that the cash merchant will not deliver on its commitments, particularly to maintain a 1:1 relationship between e-money in her account and cash physically stored on her premises. This operational risk could emerge through a number of ways. The cash merchant may be unable to maintain her liquidity due to inadequate training on operational procedures and mechanisms required to maintain the 1:1 relationship, which involves predicting spikes in demand for e-money or cash and planning accordingly. Inadequate training and resulting illiquidity is a commonly-reported problem, including in Malawi.⁵²²

The cash merchant may also intentionally fail to deliver on its commitment to maintain a 1:1 relationship. The cash merchant may believe that cash stored for the purposes of future fund conversion transactions could be more effectively used in the cash merchant's non-mobile money-related business. The author has learned that in most contracts this type of redirection of funds is a grounds for the MM firm to terminate the agreement with the cash merchant.⁵²³ This sanctioning tool will only compel the cash merchant to deliver on its commitment to maintain a 1:1 relationship if she believes her capital will be more effectively used in mobile money rather than non-mobile money businesses.⁵²⁴

Another potential source of impairment to the 1:1 relationship is theft of cash from the cash merchant. In this case a person steals cash reserves that the cash

⁵²² Greenacre, Malady and Buckley (n 32).

⁵²³ Discussion with mobile money specialist, 8 December 2015.

⁵²⁴ Aron (n 82), 52.

merchant uses to perform the funds conversion transaction. Theft from cash merchants has occurred in Malawi and Uganda.⁵²⁵ Theft of cash from the cash merchant simply imposes costs on this actor, not the customer or the MM firm or MMHC. This is because, as discussed above, the cash merchant commits to using its own reserves of cash and e-money in order to maintain the 1:1 relationship. Knowledge that her own cash is being used – rather than that of the MM firm or MMHC – may encourage the cash merchant to store funds safely. The MM firm also often develops methods of protecting a cash merchants’ cash reserves, discussed below.

A final potential impairment to the 1:1 relationship and the ability of the cash merchant to perform the funds conversion transaction is operational failure. Namely, the operating system developed by the MM firm to process the cash merchant’s transactions may fail in relation to her specific account. This could mean the cash merchant is unable to obtain sufficient e-money or cash from the MMHC as required to maintain the 1:1 relationship. For example, she may aim to increase her e-float by depositing funds in a branch of the bank in which her and customers’ funds are stored. As introduced above in Chapter 1, in M-Pesa this bank is the CBA. An operational failure may mean Safaricom is unable to transfer an equivalent amount of e-money into her account.

A key point is that the first four potential causes of cash merchant illiquidity – inadequate training, theft, liquidity problems caused by customers switching between

⁵²⁵ Face of Malawi (author unclear) ‘Airtel Malawi’s Sales-Men Stage Robbery, Arrested’ (*Face of Malawi*, 19 April 2013) <<http://www.faceofmalawi.com/2013/04/airtel-malawis-sales-men-stage-robbery-arrested/>> accessed 14 April 2016; Bernard Busuulwa, ‘Mobile money fraud, crime rate increase in Uganda’ (*The East African*, 13 October 2016) <<http://www.theeastafrican.co.ke/business/Mobile-money-fraud-and-crime-rate-increase-in-Uganda-/2560-3415786-quaydf/index.html>> accessed 17 December 2016.

cash merchants, and operational failure in relation to her specific account – is likely to create uncorrelated liquidity problems. This is because the commitments discussed above in Section 5.3.1.1 (namely the cash merchant’s use of her own funds and the 1:1 relationship between e-money and cash) mean realisation of these risks and a resulting liquidity problem for one cash merchant will have no direct knock-on effects on others. In particular, as ‘liquidity islands’, cash merchants are not contractually reliant on each other for liquidity. This means illiquidity at one cash merchant will not directly cause illiquidity to another.

Instead, once cash merchants introduce their two commitments, the main potential cause of correlated liquidity problems and a pure panic run is mass operational failure. This would involve the collapse of the operating system across a significant portion or all of the cash merchant network. In such an instance, all or a significant proportion of cash merchants would be unable to process customers’ liquidity requests. This may create a mass liquidity problem because now a significant portion of customers are faced with the conditions of a bank holiday. As discussed above, this creates a feedback loop whereby they mistakenly infer this liquidity problem for solvency problems at the MMHC and rush to redeem their funds.

The next component of the chapter involves determining governance arrangements available through private ordering that can be used to prevent cash merchant illiquidity. Such arrangements could also address the risk of mass operational failure, discussed directly above. As discussed earlier in this Chapter, the contracts that operate between Safaricom and different types of cash merchants are not publicly-available. For this reason, the analysis can only use publicly available

information, which includes the contracts, trust deeds, and pricing structures outlined in the M-Pesa website, and the very limited alternative secondary materials available.⁵²⁶

5.3.2 Governance Arrangements

The section below examines two sets of governance arrangements available to monitor the liquidity of cash merchants. The first are those available to customers. The second comprise institutions used by the MM firm to monitor cash merchant liquidity. These are wholesale and master cash merchants. Like the type of cash merchants discussed in thus far in the chapter (namely the type that convert cash for e-money and vice versa with customers), these actors are also be sub-agents of the MM firm. This is because the MM firm delegates various tasks to them, as discussed below in Section 5.3.2.2.

5.3.2.1 Governance Strategies for Customers

The only governance tool available in public resources are dispute resolution schemes. In M-Pesa, the customer is granted access to a dispute resolution scheme and arbitration scheme as outlined in the following contractual provision:

You may contact Safaricom Customer Care (line 234) for any disputes, claims or to report Account discrepancies. Safaricom Customer Care shall handle the report in accordance with Safaricom's standard complaint handling procedures.⁵²⁷

...

In certain circumstances Safaricom in conjunction with participating merchants may provide for dispute resolution mechanisms. You agree to abide by such mechanisms as may be advised by Safaricom or the participating merchants/businesses from time to time.⁵²⁸

⁵²⁶ M-Pesa Rates (n 75).

⁵²⁷ M-Pesa Terms and Conditions, cl 15.1.

⁵²⁸ M-Pesa Terms and Conditions, cls 15.2-15.3 (dispute resolution) and 15.4-15.5 (arbitration).

The customer can also make use of dispute resolution schemes and arbitration arising in relation to complaints. In theory, customers can use these dispute resolution and arbitration schemes to report on liquidity problems at individual cash merchants. In turn, this enables Safaricom to monitor liquidity problems at cash merchants, both for uncorrelated and correlated circumstances.

The author has not obtained empirical material on the effectiveness of the M-Pesa dispute resolution scheme in detecting and ultimately preventing idiosyncratic liquidity problems in cash merchant networks. However, it is likely that the lack of education and experience with formal financial products means they are unlikely to effectively use this dispute resolution scheme. This is because the complaints line is a governance, rather than regulatory, strategy. As explained in Chapter 2, the unbanked's limited education and experience with formal financial services and firms in general mean it is likely they will not make effective use of governance strategies to monitor the liquidity of individual cash merchants and the operating system more generally.

Furthermore, and like depositors, their limited stake in the system means they face limited incentives to monitor the operation of the system as a whole. For governance strategies to operate in this way, customers would need to determine how to continually monitor the operating system in place and prevent its collapse. Ex ante, coordination costs between unbanked customers and resulting collective action problems make it unlikely they will do this. Ex post, and like depositors, the likely significant coordination problems of unbanked customers means, faced with mass

operational failure, they are unlikely to assemble and determine that this outcome does not, in fact, signal solvency problems at the MMHC.

5.3.2.2 Institutional Arrangements

This subsection explores institutional arrangements, established through private ordering, which are designed to address potential liquidity problems amongst cash merchants. In the original M-Pesa model, cash merchant networks were ‘bundled’. The cash merchant and Safaricom were responsible for all components of the funds conversion service. The cash merchants signed up customers and enabled them to convert cash for e-money and vice versa. The MM firm then assisted cash merchants to manage their liquidity. Many MM firms also monitored e-money accounts of cash merchants, which also seeks to enable them to manage their liquidity demands.⁵²⁹

More recently, MM firms have begun to move from bundled – of the type described above – to unbundled cash merchant networks. This involves introducing additional actors, particularly wholesale cash merchants and master cash merchants, to monitor the liquidity of individual cash merchants. This means that the MM firm delegates tasks to wholesale cash merchants and master cash merchants, making these actors sub-agents of the firm.

The key claim discussed below is that while introducing such actors brings benefits, they are *also* the source of costs. Wholesale cash merchants and master cash merchants may enable large numbers of cash merchants to better manage their

⁵²⁹ Jacqueline Jumah, ‘The “I Don’t Have Enough Float” Quandary!’ (2015) Helix Institute of Digital Finance, 4 February 2015 <<http://www.helix-institute.com/blog/%E2%80%9Ci-don%E2%80%99t-have-enough-float%E2%80%9D-quandary>> accessed 14 April 2016; Mike McCaffrey and Isaac Holy Ogwal, ‘The Ebbs & Flows of Liquidity Management’ (2014) Helix Institute of Digital Finance, 2 December 2014 <<http://www.helix-institute.com/blog/ebbs-flows-liquidity-management-0>> accessed 14 April 2016.

liquidity. However, these firms are themselves the source of operational risk. Their failure could cause correlated liquidity problems across the cash merchant network which then causes a pure panic run on the system. Pursuant with the functional approach used in the thesis, the section below explores this claim by examining the functions performed by wholesale customers and master cash merchants and their potential risks.

5.3.2.2(a) Function

Like the cash merchants discussed above in this Chapter, wholesale and master cash merchants are institutionally-independent of Safaricom and each other. Independence in this context means each actor is a separate corporate entity.

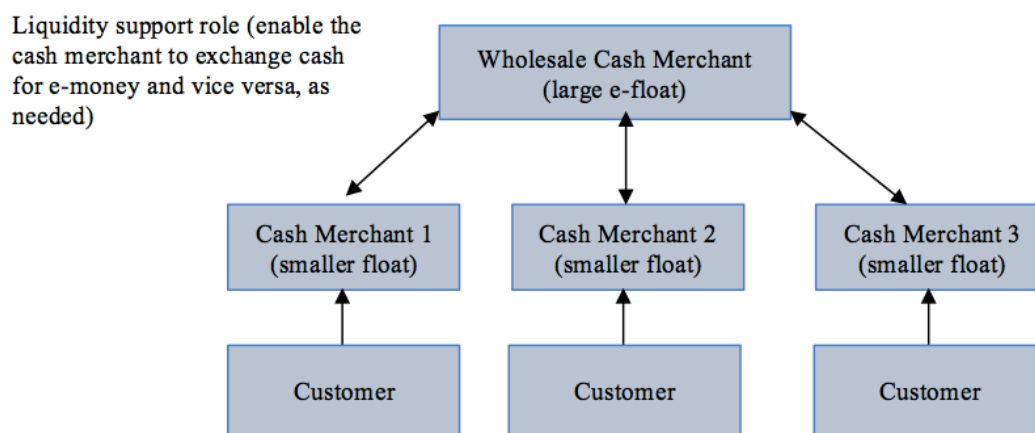
Wholesale cash merchants establish significantly larger e-floats than regular cash merchants. This means they purchase large amounts of e-money from the MMHC. Like regular cash merchants, wholesale cash merchants commit to maintain an equivalent amount of e-money and cash. A wholesale cash merchant is designed to reduce the costs a cash merchant would otherwise face in managing its liquidity. In this case, the costs involved are the transport and other resources incurred in obtaining additional amounts of e-money or cash as required in order to maintain the 1:1 relationship, as follows.

Generally, in order to deposit cash and obtain additional e-float, a cash merchant must go to a branch of the bank in which customers' funds are stored. This is because the cash merchant must deposit cash in exchange for additional e-

money.⁵³⁰ Reaching such branches can impose considerable cost on cash merchants, particularly those located in remote areas where the unbanked tend to live and work.

By holding large amounts of e-money and cash, a wholesale cash merchant can substitute for branches of the bank. Instead of having to travel to a bank branch, a cash merchant can deposit or withdraw funds with a wholesale cash merchant.⁵³¹

Diagram 6: The Operation of Wholesale Cash Merchants



The closer geographical proximity enables cash merchants to transact with wholesalers, often daily, depositing or withdrawing cash depending on the liquidity needs of their customers.⁵³² In turn, this can better enable cash merchants to maintain the 1:1 relationship. Wholesale cash merchants are used in a number of countries, including Bangladesh, Indonesia, and Uganda.⁵³³

⁵³⁰ Jennifer Barassa, 'Agent Network Managers Have Fuelled M-Pesa's Success' (2011) Consultative Group to Assist the Poor (CGAP), 17 February 2011 <<http://www.cgap.org/blog/how-agent-network-managers-have-fueled-m-pesa%E2%80%99s-success>> accessed 14 April 2016.

⁵³¹ Frederik Eijkman, Jake Kendall and Ignacio Mas, 'Bridges to Cash: the Retail End of M-PESA Focus on Agent Networks' (2009) International Finance Corporation, 1 May 2009 <<http://www.ifc.org/wps/wcm/connect/3595bd0049585f1b9ec2bf19583b6d16/Tool+10.7.+GSMA+Example+-+M-PESA+Liquidity+Management.pdf?MOD=AJPERES>> accessed 14 April 2016, 52-53.

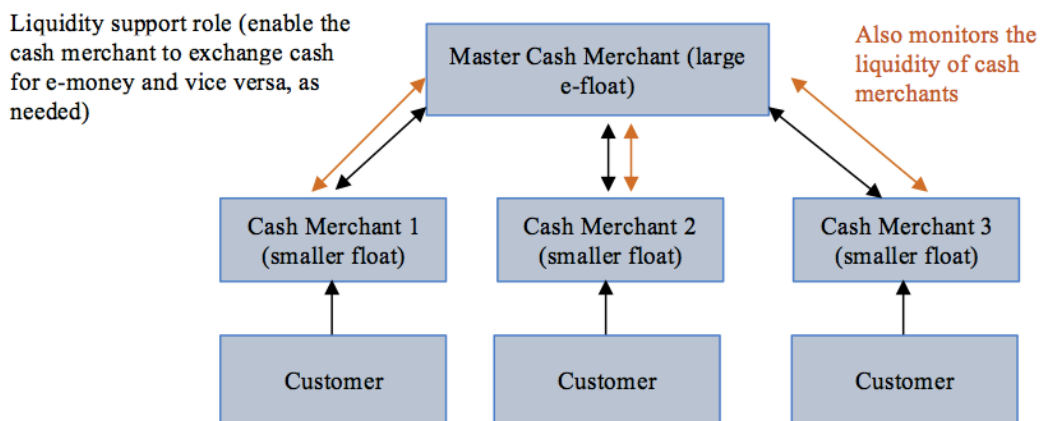
⁵³² MTN, 'MTN Mobile Money Consumer Terms' (MTN, 2015) <<http://www.mtn.co.ug/Help/Legal/MTN-Mobile-Money-Consumer-Term.aspx>> accessed 14 April 2016.

⁵³³ *ibid.* See also McCaffrey and Ogwal 2014 (n 837); Jumah 2015 (n 837).

Master cash merchants, which are usually large institutions such as supermarkets and marketing stores, contract directly with a significant number of cash merchants. Like wholesale cash merchants, master cash merchants purchase large e-floats and maintain a 1:1 relationship between e-money and cash. In doing so, cash merchants also reduce the costs a cash merchant might otherwise face in maintaining its liquidity.

In addition, master cash merchants are contractually-responsible for maintaining the liquidity of cash merchants in their network.⁵³⁴ To this end, master cash merchants monitor the liquidity of their cash merchants. Master cash merchants can also physically deliver cash to cash merchants when necessary, as outlined in the diagram below.⁵³⁵

Diagram 7: The Operation of Master Cash Merchants



Master cash merchants have comparative advantages in monitoring cash merchants compared to the MM firm which has expertise in mobile money and mobile phone

⁵³⁴ Discussion with mobile money expert, 30 March 2016.

⁵³⁵ Eijkman, Kendall and Mas, 2009 (n 536), 52-54.

services. Many master cash merchants specialise in developing technology that is specifically designed to monitor the liquidity of individual cash merchants. For example, the master cash manager for MTN Uganda, an MM firm, has developed Android handsets that replace the inefficient paper checklist previously used by MTN Uganda.⁵³⁶ The master cash merchant reports on the liquidity of individual cash merchants and highlights issues that require attention. Through increased efficiencies it is estimated this technology pays for itself in seven months.⁵³⁷

5.3.2.2(b) Costs

Wholesale and master cash merchants do not create credit risk in cash merchant systems. This is because, by establishing their own float, like regular cash merchants, they do not intermediate funds. Furthermore, these actors commit to maintain a 1:1 relationship between their e-floats and cash and so their failure should not cause liquidity problems for other actors.

However, wholesale and master cash merchants are themselves a source of operational risk. This is because by delegating the responsibilities of providing easier access to liquidity (wholesale cash merchants and master cash merchants) and monitoring cash merchant liquidity (master cash merchants), the MM firm (as principal) faces an agency problem with these sub-agents. This is because these firms may not deliver on their commitment to maintain a 1:1 relationship. Furthermore, and more fundamentally, these actors are themselves a source of additional operational

⁵³⁶ Neil Davidson, 'Innovation in Mobile Money Distribution: Real-time Electronic Reporting on Agent Performance' (2011) Groupe Speciale Mobile Association (GSMA), 21 September 2011 <<http://www.gsma.com/mobilefordevelopment/programme/mobile-money/innovation-in-mobile-money-distribution-real-time-electronic-reporting-on-agent-performance>> accessed 14 August 2015.

⁵³⁷ *ibid.*

risk in two ways.

First, unbundled cash merchant networks require larger and more complex *operational* procedures than bundled networks. This is because contractual and operational arrangements must be extended between the *different* cash merchants in the scheme. Pre-existing coordination problems amongst customers, discussed above in Chapter 1, are likely to become even stronger in the face of such operational networks. This is because customers need to invest greater resources in attempting to understand the procedures that underpin this more complex operational system. In turn, this makes it less likely customers will make use of governance tools, such as the dispute and arbitration system discussed above, to monitor such operational failures.

Second, and perhaps more fundamentally, failure of a wholesale or master cash merchant can have direct, significant knock-on effects for a significant portion of cash merchants. The consequence of such a failure depends on the number of cash merchants with which this firm contracted. In some cases wholesale and master cash merchants contract with such a major portion of a network that their failure and the resulting knock-on effects could cause correlated liquidity problems across the network and create the type of pure panic runs discussed in Section 5.2.2.2, above. For example, Top Image, an outsourcing company, manages 80% of Safaricom's M-Pesa cash merchant network, which equates to around 30,000 cash merchants.⁵³⁸ Failure of this firm would disrupt a very considerable majority of the cash merchant network, which could cause correlated liquidity problems.

⁵³⁸ Barassa (n 535).

The failure of wholesale or master cash merchants could have a number of types of knock-on effects, each of which could cause correlated liquidity problems. For example, failure of the wholesale cash merchant may mean sudden liquidity problems for large numbers of cash merchants which relied upon this actor for their own liquidity needs. These cash merchants may have developed practices of maintaining their 1:1 relationship by using the services of this firm.

Collapse of a master cash merchant could cause liquidity problems for its cash merchants. This is because, aside from loss of geographically convenient liquidity as with a wholesale cash merchant, cash merchants would lose access to the expertise of the master cash merchant in assisting them to manage their own liquidity. They may be unable to effectively manage their liquidity without the assistance of the wholesale cash merchants.

Perhaps the most direct knock-on effect would arise through operational failure at the level of master or wholesale cash merchants. This could cause a resulting operational failure to a significant portion of cash merchants. In turn these cash merchants then face their own liquidity problem which, to the extent it is correlated across the network, could cause a pure panic run on the system.

The consequence of failure of wholesale cash merchants or master cash merchants depends on the number of cash merchants with which these actors dealt. There may also be additional private ordering used to address to these risks.

5.3.2.2(c) Conclusion

The author is not aware of any particular additional private ordering that applies in unbundled cash merchant networks. Overall then, this section has explained that wholesale and master cash merchants may better enable individual cash merchants to manage their liquidity. However, they are also a source of risk because their failure could impair the liquidity of cash merchants with whom they transact. The next section explores the potential for public ordering to increase the efficiency of mobile money in addressing risks in cash merchant activity.

5.4 Public Ordering

This final component of the chapter involves determining the extent to which, if at all, public ordering can increase efficiency in addressing agency problems in cash merchant networks beyond private ordering. This involves analysing potential public ordering in the context of the issues outlined in Chapter 1, which include the feasibility of different regulatory strategies based on the significant resource constraints on policymakers and potential policy trade-offs between consumer protection, financial stability, and financial inclusion.

Similar to other proposals made in this thesis, public ordering should aim to enable the MM firm and its associates to more credibly commit to safeguard customers' funds for the purposes of providing payment and storage functions only. In this case, the commitment focuses on ensuring that cash merchants maintain their 1:1 relationship so they remain liquid, which in turn enables the MM firm to deliver on its commitment to enable customers to convert cash for e-money upon demand.

Ex ante, a policymaker should aim to prevent correlated liquidity problems from emerging in cash merchant network by addressing the operational risk discussed above. Ex post, if correlated problems do arise, the policymaker should reassure customers that correlated cash merchant liquidity problems do not, in themselves, signal solvency problems at the MMHC.

A key point that underpins this discussion is that prudential regulation is not required. This is because cash merchants, whether the type that performs the fund conversion transaction, wholesale cash merchants, or master cash merchants, do not intermediate funds. The aim is to explore public ordering that can address the operational risks from the scheme. Three ex ante tools may be able to achieve this purpose, as follows.

5.4.1 Ex Ante

5.4.1.1 MM Firm Liability and an Active Approach

The first potential tool of public ordering is to make the MM firm liable for cash merchant activity. This approach is used in a very large number of countries, including Afghanistan, Brazil, Cambodia, Kenya, Tanzania, and Uganda.⁵³⁹ The National Payment System Regulations 2014, introduced by the CBK in 2014, makes the MM firm liable for cash merchant activity.⁵⁴⁰ As a result, Safaricom is liable for actions of its cash merchants in regulation, even though it would not be under contract. This would extend to cash merchant liquidity and should be feasible. This is because, so long as the MM firm and MMHC deliver on the commitments discussed

⁵³⁹ See for example, NPS Regulations, reg 14 (4). See Aron (n 82).

⁵⁴⁰ *ibid.*

in Chapter 3, there should be sufficient assets available to satisfy customers' redemption requests, regardless of cash merchant activity. This is because cash merchants use their own funds, as discussed above.

Simple liability alone is unlikely to guide the MM firm's behaviour unless the firm is sanctioned for operating failures at cash merchants. This means a key regulatory question involves determining a model of supervision that can ensure cash merchants are effectively monitored and the MM firm is sanctioned for realisation of operational risk.

As discussed above, one method involves private ordering. This model involves governance strategies, in which the customers, as principals, monitor cash merchant activity and notify the MM firm in the event of operational risks. As discussed above in Chapter 1, the likely strong information asymmetries between unbanked customers and MM firms and other actors in the mobile money system, as well as coordination problems amongst unbanked people, means they are unlikely to effectively use governance strategies. This means they are unlikely to perform monitoring effectively. For this reason, in order to be effective, MM firm liability must be buttressed through the 'active' approach advocated in this thesis. In this instance, MM firm liability should be implemented through a regulatory strategy, in which the policymaker monitors operational problems in the cash merchant network on behalf of customers.

In Kenya, the CBK has the power to take this 'active' approach in relation to supervising cash merchants. The MM firm must assemble information on the contact

details of each of its cash merchants.⁵⁴¹ The CBK can obtain this information from the MM firm at any time in order to directly monitor such activity.⁵⁴² Furthermore, the CBK maintains the power to perform spot checks of cash merchant activity.⁵⁴³

The credibility of this potential oversight and MM firm liability hinges on the likely effectiveness of the policymaker in implementing it. In order to do so effectively the policymaker needs to gather a significant amount of information on the operating system used in cash merchant network. Public ordering often authorises the policymaker to gather this information. For example, in Kenya, an MM firm must notify the CBK of the procedure for selecting cash merchants and provide a copy of the contract which operates between it (the MM firm) and each cash merchant. The MM firm must also explain to the CBK how the mobile money service will provide the funds conversion service to customers.⁵⁴⁴

The policymaker also needs to monitor the operating system. This obligation is also in place in Kenya. When seeking to use cash merchants, an MM firm must provide to the CBK, amongst other materials, a description of the technology to be used by these actors. The MM firm must also provide a risk assessment report to the CBK outlining control measures that can mitigate the risks from individual cash merchants.⁵⁴⁵

⁵⁴¹ NPS Regulations, reg 19.

⁵⁴² NPS Regulations, reg 19 (2).

⁵⁴³ NPS Regulations, reg 33(1)(a).

⁵⁴⁴ This must include details of procedures by which the cash merchant will comply with the Proceeds of Crime and Anti-Money Laundering Act 2009 and the Prevention of Terrorism Act 2012, outline the technology the cash merchant will use, risk assessment procedures on how a cash merchant will mitigate risks, and proposed security measures for cash merchant: NPS Regulations, reg 16.

⁵⁴⁵ NPS Regulations, reg 16 (d)(e).

The likely resource constraints suggest that the policymaker may be unable to effectively process such information, monitor the liquidity of the system, and take action accordingly. Resource constraints are likely to be particularly pronounced in relation to larger, unbundled cash merchant networks. This is because the system is likely to contain a more complex operating system.

However, and as discussed in relation to other components of mobile money, the cash merchant system does not involve intermediation. As a result, public monitoring need only focus on administrative and operational procedures. This reduces the burden of monitoring below what might be incurred in relation to a bank branch network. As a result, a policymaker may be able to effectively implement and supervise such procedures.

5.4.1.2 Screening, Training, and Monitoring, Procedures

The second potential tool of public ordering involves imposing *screening, training, and monitoring procedures* that an MM firm must follow when using cash merchants. In some countries public ordering imposes such procedures. For example, in Kenya a cash merchant must be financially sound and have sufficient expertise to perform its cash merchant function.⁵⁴⁶ The MM firm must exercise due diligence when selecting such actors.⁵⁴⁷ The MM firm must also provide adequate training and support to cash merchants, maintain effective oversight of their activity, and generate records of their activity.⁵⁴⁸

⁵⁴⁶ NPS Regulations, reg 17.

⁵⁴⁷ NPS Regulations, reg 20.

⁵⁴⁸ NPS Regulations, reg 19(3).

Like other proposals, there are two potential countervailing forces at work with this type of public ordering. Such rules may have consumer protection benefits by helping protect against the risk of *uncorrelated* liquidity mismanagement due to errors of the cash merchant. This is because these rules may increase the likelihood that the MM firm chooses cash merchants that are capable of balancing appropriate amounts of e-money and cash and more generally performing the funds conversion service.

However, this increased public ordering imposes greater compliance costs on MM firms and so may impair financial inclusion efforts. This is because an MM firm must follow specific rules in relation to selecting individual cash merchants. Such costs may discourage MM firms from building cash merchant networks in rural areas where unbanked people live and work.

Furthermore, this ordering does not address the potential for correlated liquidity problems due to the collapse of the wholesale or master cash merchant. In this case regular cash merchants may be liquid, but then face liquidity problems due to the collapse of these actors.

5.4.1.3 Capital Requirements

The third potential set of ex ante tools applies directly to wholesale and master cash merchants. To this author's knowledge, there is no specific public ordering for actors in unbundled cash merchant networks such as wholesale cash merchants and master cash merchants. For example, in Kenya, public ordering simply permits MM firms to

use wholesale and master cash merchants but does not provide any additional substantive rules.⁵⁴⁹

One potential regulatory tool that could be applied is capital requirements. The MM firm could be required to hold capital or otherwise insure the wholesale or master cash merchants against failure.

Capital requirements could have consumer protection and financial inclusion benefits, depending on the amount of capital involved. A 100% capital requirement would mean the MM firm provided complete insurance over failure of wholesale and master cash merchants. However, doing so will increase compliance costs which in turn discourages MM firms from using such actors. In turn, this means the mobile money service cannot make use of efficiencies available through such actors. In turn, this may reduce the ability of the cash merchant network to grow and reach larger numbers of unbanked people.

Furthermore, capital requirements are not the most useful tool. As discussed, a key institutional feature of cash merchants systems is there is no intermediation. This means the systems do not create the type of capital and liquidity risks which then justify capital requirements.

5.4.1.4 Conclusion

Ex ante tools, particularly MM firm liability and the imposition of selection, training, and monitoring obligations may ensure operational risks within the system are addressed. The former requires public, rather than private, oversight in order to be

⁵⁴⁹ NPS Regulations, regs 17 and 18.

effective. Ex post public ordering may further increase the efficiency of existing ordering in addressing risk from cash merchant activity.

5.4.2 Ex Post

This section explores two types of potential ex post tools. Each can buttress the credibility of the funds conversion service.

5.4.2.1 Back-Up Systems

First, a policymaker should impose operational requirements that address the cash merchant network as a whole. Such rules are designed to prevent correlated liquidity problems from occurring in the cash merchant network. The key operating requirement should be back-up plans. The MM firm should be required to implement multiple levels of contingency plans in case there is a failure of the operating system on which the cash merchant network relies.⁵⁵⁰

The consumer protection benefits of back-up plans are likely to outweigh the increased compliance costs and potential impairment to financial inclusion. This is because, depending on the amount of information required, an MM firm should be able to implement a back-up plan at relatively low cost. This is because, as discussed in Chapter 1, mobile money business models already maintain records of transactions. Back-up plans would simply involve an extension of this system.

⁵⁵⁰ This can also be justified in the interests of protecting against theft. Back-up systems are needed to ensure that account information can be recovered in case of physical destruction or theft. This point is discussed in Chapter 6 below: text to n 606.

5.4.2.2 Public Notification Systems

As discussed above, this chapter assumes that the MM firm and MMHC are delivering on holding company, trust, and narrow banking commitments. This means, as discussed in Chapter 3, customers' funds are protected from credit and liquidity risks. This means, in the event a run begins, regulatory tools must focus on *correcting* customers' incorrect inferences that a correlated liquidity problem in the cash merchant network signals the insolvency of the MMHC. To this end, the policymaker should implement a public notification scheme, which could be used in the event of the failure of the operating system in the cash merchant network. This notification scheme could be used in the interim, if any, between failure of the operating system and the launch of the back-up system.

This notification system could reassure customers that a collapse of the merchant network does not signal solvency problems at the MMHC. This could involve sending a text message directly to the mobile phones of each mobile money customer. This approach should be tailored to ensure credibility. The customers are unlikely to believe the credibility of a notification issued by the MMHC or MM firm. This is because, like depositors, the customers know that the managers of these firms have limited incentive to reveal 'bad' news about the insolvency of the institution.⁵⁵¹ For this reason, the managers of the MMHC may misrepresent solvency problems facing the firm.

Instead, the central bank should issue such a notification, with an accompanying statement that this institution would provide ex post support to the

⁵⁵¹ Armour and others (n 2) ch 15, 320.

MMHC, in the event that this was required. Literature has occasionally called for this sort of direct reassurance mechanism.⁵⁵²

Such a notification scheme will increase the stability of the service. This is because it will reduce the likelihood of a run. However, the notification tool will not substantially increase *compliance costs* on MM firms. This is because the central bank would subsidise its cost much like a government agency does when announcing the extension of deposit insurance schemes over deposits in times of banking crises.⁵⁵³

Conclusion

Cash merchants perform a vital funds conversion service. They enable funds to enter the system where they can be stored, transferred to others, and later cashed in upon demand. Like many other components of mobile money, funds conversion directly creates operational, rather than credit or liquidity, risks. This is because cash merchants hold their own balance of e-float and cash in order to process cash in and cash out functions, respectively. These actors do not ever intermediate funds and so do not put the money of the MMHC at risk. As a result, cash merchant networks can grow to become extremely large without creating prudential risks.

A key regulatory issue involves the potential for mass operational failure. Such an event may cause simultaneous, correlated liquidity problems across the cash merchant network. Doing so could cause a pure panic run, whereby customers

⁵⁵² Mas and Klein, 2012 (n 421) 8.

⁵⁵³ Federal Deposit Insurance Corporation (FDIC), 'FDIC Announces Plan to Free Up Bank Liquidity: Creates New Program to Guarantee Bank Debt and Fully Insure Non-Interest Bearing Deposit Transaction Accounts' (2008) Press Release, 14 October 2008 <<https://www.fdic.gov/news/news/press/2008/pr08100.html>> accessed 29 December 2016.

mistake the mass liquidity problem for solvency problems at the MMHC and run to redeem their funds.

The chapter has proposed public ordering that can increase the efficiency of the network in addressing such risks. Ex ante tools include MM firm liability, selection, training, and monitoring obligations on the MM firm, and potential capital requirements. Ex post tools include back-up systems and a public notification system that can inform customers that realisation of operational risk does not, in itself, signal solvency problems at the MM firm.

This combination of limited risk and a low-cost regulatory model has considerable potential for financial inclusion. In just the 9 years of mobile money's history, cash merchant networks have grown enormously. M-Pesa now uses 37,000 cash merchants situated throughout Kenya servicing 20 million customers.⁵⁵⁴ Worldwide, there are now 2.3 million cash merchants of mobile money schemes. They outnumber bank branches in 59 countries.⁵⁵⁵

Such networks could continue to grow into the future. Corner stores and other retail outlets exist across developed countries, each of which could become a cash merchant of a mobile money scheme. This could enable mobile money to reach very large numbers of unbanked customers. The commitments that underpin cash merchant activity, namely requiring the cash merchant to commit to using her own reserves of cash and e-money for transactions and to maintain a 1:1 relationship between these types of assets means this expansion can occur through a very limited risk profile.

⁵⁵⁴ Safaricom (n 5).

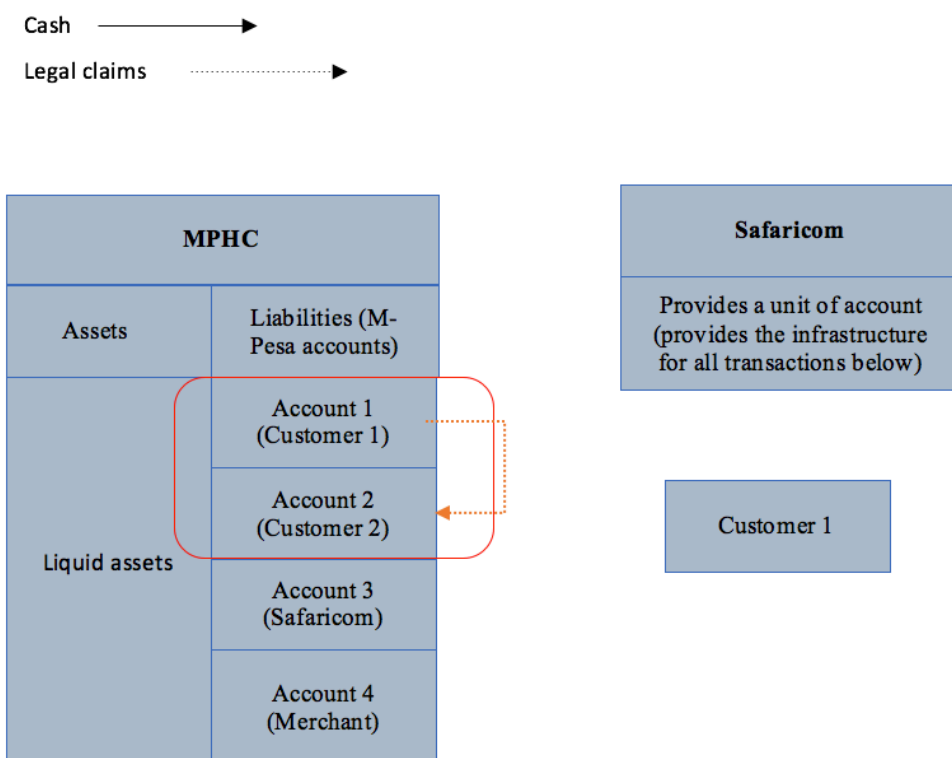
⁵⁵⁵ GSMA (n 17).

CHAPTER 6: PAYMENT

Introduction

This chapter examines the payment function of mobile money. In this function, customers can send units of e-money to each other. This involves debiting e-money in the payors' account and crediting the payor's account. The diagram below highlights the component of the M-Pesa model that is particularly relevant to the payment function.

Diagram 8: The Payment Function of Mobile Money



For the purpose of focusing analysis, this chapter assumes that the MM firm and MMHC have delivered on private and public ordering discussed in previous chapters. As a result, risks from the conflict of interest between shareholders of the MM firm

and customers (Chapter 3), the balance sheet of the MMHC (Chapter 4), and the funds conversion component of the service (Chapter 5) have been addressed.

The chapter examines three main questions. What, if any, additional risks beyond storage are created when mobile money provides a payment function? What are the policy and regulatory trade-offs involved in addressing these risks? And what are the marginal benefits and costs when mobile money moves from non-interoperable to interoperable payment systems? In the former payments can only be made between customers of the one MM firm. In the latter payments can be made between customers of multiple MM firms.

The chapter argues that, like other payment services provided by banks and money transfer operators, the payment function in mobile money creates an agency problem. This agency problem operates between the customers, who are the principals, and the MM firm, which is the agent processing the payments. This problem can create a range of credit, liquidity, and operational risks to the availability of funds for the purposes of payments.

In a non-interoperable system, storage-related private and public ordering proposed in chapters 3 and 4 address credit and liquidity risks. The main additional risk is that the entire operating system may collapse, causing loss to customers who rely upon it for their economic activities. Coordination and information problems amongst unbanked people mean they are unlikely to use governance tools to monitor the operating system and address operational risk. As a result, a policymaker should monitor operational risk on their behalf.

An interoperable system creates additional operational risk compared to a non-interoperable system. This is because an interoperable system requires the creation of an operating system, comprising a series of pre-funded accounts held by different MMHCs, to process payments between different mobile money services. In addition, interconnections between different MMHCs, which are facilitated through interoperability, mean credit or liquidity problems at one can have flow-on effects to others. Unbanked customers are unlikely to use governance tools designed to monitor risks in such a system. This is mainly because the pre-existing coordination problems facing unbanked people become stronger in interoperable systems, which involve larger numbers of customers than non-interoperable.

However, little additional regulation is required beyond storage-related ordering discussed in chapters 3 and 4 and that which applies to non-interoperable systems. In both interoperable and non-interoperable systems, public ordering should respond to the information asymmetries and coordination problems facing customers by monitoring operational risks on their behalf. In interoperability, a policymaker should also impose a special resolution regime which minimises the potential for credit or liquidity problems at one MM firm to cause knock-on effects for others.

The findings in this chapter buttress one of the central themes of this thesis: the *storage* function is of fundamental importance to the regulation of mobile money. By ensuring an MM firm can credibly perform storage, a relatively simple set of additional operating procedures and ordering enables payments to be added to the product offering.

The chapter has four parts. The first describes the operation of and state of existing research into the payment function of mobile money. The second outlines the agency problem that underpins this function in interoperability. The third explores the policy and regulatory issues in non-interoperable systems. The fourth explains the marginal benefits and cost of moving from non-interoperable to interoperable systems.

6.1 Function

6.1.1 Introduction

Mobile money provides a payment function. This is because, pursuant to the meaning of payment used in this thesis, the service enables transfers of value between agents.⁵⁵⁶ In the case of M-Pesa, a customer can use e-money in her account to buy Safaricom prepaid airtime and transfer funds to other M-Pesa customers.⁵⁵⁷ Like a bank deposit, she can also use funds in her account to pay utility bills and goods purchased from participating merchants.⁵⁵⁸

As explained in Chapter 2, mobile money provides a retail payment function. This is because, like other retail payment systems, mobile money meets the payment needs of individuals and businesses for ordinary transactions in the economy.

⁵⁵⁶ A payment is a transfer of value between agents: see Lester, Millard and Willison (n 230) A payment system is ‘the set of rules, institutions, and technical mechanisms for the transfer of money’: Summers (ed) (n 50) 112. See a similar definition in Geva (n 230).

⁵⁵⁷ M-Pesa Terms and Conditions, cl 8.3.

⁵⁵⁸ See outline of payments options in terms and conditions: M-Pesa Terms and Conditions, cls 5.1.5 (airtime), 5.1.6 (utility bills), and 5.1.7 (goods purchased from participant merchants).

Furthermore, mobile money transactions fit the description of those in a retail payment system: large in volume and small in value.⁵⁵⁹

The precise operation of the payment depends on whether the system is non-interoperable or interoperable. The next section outlines the basic institutional arrangements in both models.

6.1.2.1 Non-interoperable

M-Pesa is a non-interoperable system. This means transfers of e-money can only be made between customers of the one MM firm.⁵⁶⁰ Many mobile money sectors operated this way due to first-mover advantages. Retail payment systems such as mobile money operate through network effects: each additional participant increases the value of the network to existing users.⁵⁶¹ This can lead to monopolies in payment systems.⁵⁶² For this reason, MM firms that can move early can create large mobile money systems which then reduces the appeal of smaller networks created by newer MM firms.

M-Pesa is a suitable example. Safaricom had strong first-mover advantages in Kenya, such as a large pre-existing customer base and airtime seller outlet network, which enabled it to quickly expand across the country.⁵⁶³ Despite the entry of other

⁵⁵⁹ See a discussion in European Central Bank 'Revised Oversight Framework for Retail Payment Systems' (2016) European Central Bank, 20 February 2016

<https://www.ecb.europa.eu/pub/pdf/other/Revised_oversight_framework_for_retail_payment_systems.pdf?983906a191ce946301c0803fa2e6d422> accessed 19 April 2016.

⁵⁶⁰ Technically, customers can send money to a non-Safaricom customer, but the recipient does not receive that into the competitor's wallet. Instead she must withdraw cash from Safaricom agent: Carol Coye Benson and Scott Loftness, 'Interoperability in Electronic Payments; Lessons and Opportunities' (2012) Consultative Group to Assist the Poor (CGAP), 31-34

<https://www.cgap.org/sites/default/files/Interoperability_in_Electronic_Payments.pdf> accessed 14 April 2016.

⁵⁶¹ Bolt and Humphrey (n 99). See also Armour and others (n 2) ch 18, 406.

⁵⁶² See Stephen Millard and Victoria Saporta, 'Central Banks and Payment Systems: Past, Present and Future', in Haldane, Millard and Saporta (n 23) 668.

⁵⁶³ See discussion in Chapter 1.

MM firms, Safaricom still commands 80% of Kenya's mobile money sector.⁵⁶⁴ The system remains non-interoperable, in part due to Safaricom's lobbying against interoperability.⁵⁶⁵ This means newer, smaller firms such as Airtel and Tigo are struggling to develop the type of economic networks that can attract consumers and merchants to their services.

6.1.2.2 Interoperable

Many countries have viewed the competition problems that have emerged in Kenya and sought to develop 'interoperable' systems. In an interoperable system, transfers can be made between customers of multiple MM firms.⁵⁶⁶

Interoperability is increasingly feasible because multiple MM firms now provide mobile money in a large number of countries. A 2015 survey found that in the 93 countries in which mobile money operates, 60 have 2 or more live services, and 35 have 3 or more live services.⁵⁶⁷

Industry and donor communities tend to be in favour of interoperability. For example, in April 2013, the GSMA launched the Mobile Money Interoperability program. This program is designed to accelerate the spread of mobile money

⁵⁶⁴ Rival MM firms are becoming increasingly aggressive in challenging Safaricom's market dominance, including through action in courts. For example, in response to intense lobbying, on 22 August 2014, the Communication Authority of Kenya (the public agency charged with licencing and supervising actors in the communications sector) ordered Safaricom to allow rival MM firms to use cash merchants that were previously only permitted to provide M-Pesa services: Hilary Heuler, 'How Kenya's Mobile Money is Opening Up Now Middlemen Have Been Set Free' (*ZD Net*, 22 August 2014) <<http://www.zdnet.com/article/how-kenyas-mobile-money-is-opening-up-now-middlemen-have-been-set-free/>> accessed 14 April 2016.

⁵⁶⁵ *ibid.*

⁵⁶⁶ See an early definition in AFI (n 42) 7.

⁵⁶⁷ GSMA (n 7) 15.

interoperability across developing countries, particularly in Africa.⁵⁶⁸ Its industry representatives account for 582 million mobile connections across 48 countries in Africa and the Middle East.

Domestic policymakers are also pushing for greater interoperability in mobile money systems. For example, the Bangko Sentral Ng Pilipinas (BSP), which is the Philippines' central bank, is currently working with industry around developing an interoperable framework.⁵⁶⁹ The Reserve Bank of Malawi plans to establish a national switch which will enable payments between banks, remittance firms, and MM firms providing mobile money.⁵⁷⁰

And a growing number of countries have become interoperable. These include Bangladesh, Indonesia, Pakistan, Sri Lanka, and most recently, Tanzania.⁵⁷¹ Increasingly, interoperability is international in nature. For example, on 22 April 2015, MM firms MTN Group and Vodafone Group entered a partnership to interconnect their mobile money services. This interconnection enables international mobile payments between M-Pesa customers in Kenya, Tanzania, the Democratic Republic of Congo, and Mozambique, and MTN Mobile Money customers in Uganda, Rwanda, and Zambia.⁵⁷²

⁵⁶⁸ The Mobile Money Interoperability program facilitates this process by identifying and sharing best practices, guidelines and processes and providing regulatory support in a number of leading markets: see GSMA (n 17) 5.

⁵⁶⁹ Bangko Sentral Ng Pilipinas, 'Financial Inclusion 2014' (BSP, 2014) <http://www.bsp.gov.ph/downloads/Publications/2014/microfinance_2014.pdf> accessed 15 April 2016.

⁵⁷⁰ Chikondi Chiyemekeza, 'Malawi National Switch Centre Live in 2014' (*MWNation*, 2 September 2013) <<http://mw-nation.com/malawi-national-switch-centre-live-2014/>> accessed 15 April 2016.

⁵⁷¹ Omoneka Musa, Charles Niehaus, and Martin Warioba, 'How Tanzania Established Mobile Money Interoperability' (2015) Consultative Group to Assist the Poor (CGAP) <<http://www.cgap.org/blog/how-tanzania-established-mobile-money-interoperability>> accessed 15 April 2016, 4.

⁵⁷² Samantha Moodley, 'MTN Mobile Money and Vodafone M-Pesa agree to interconnect Mobile Money Services' (2015) MTN Group Corporate Affairs 21 April 2015 <<http://beta.mtn.co.ug/About-MTN/News-Room/2015/April/MTN-Mobile-Money-and-Vodafone.aspx>> accessed 4 August 2015.

6.1.2 Limited Literature on Risks

The ability of mobile money to provide a retail payment service means much regulation usually classifies the service in such terms. For example, and as explained above, in Kenya mobile money is classified as a retail transfer service.⁵⁷³ This classification enables mobile money to avoid the more onerous prudential regulation that would apply if the service was classified as a banking product. As a result, MM firms face lower regulatory costs than banks and so may be better able to reach unbanked people and so serve financial inclusion purposes.

Despite the industry and donor enthusiasm for payments in mobile money, particularly through interoperability, there remains limited research on the policy and regulatory implications of this function. The most useful study on interoperable systems is USAid (2010), which provides an extensive list of risks from the payment function.⁵⁷⁴ Klein and Mayer (2011) emphasise that prudential regulation is not required to address risks in the mobile money payment function. Measures are required to address the risk of hacking and to confirm that the payor's instructions have been carried out.⁵⁷⁵

More recently, a range of materials have emerged that focus on interoperability in mobile money, particularly Clark and Camner (2014) and Gammer (2014).⁵⁷⁶ The former outlines how to achieve interoperability. The latter explains

⁵⁷³ NPS Regulations, reg 2.

⁵⁷⁴ USAid (n 138) 42.

⁵⁷⁵ Klein and Mayer (n 58) 14-15.

⁵⁷⁶ Dick Clark and Gunnar Camner, 'A2A Interoperability: Making Mobile Money Schemes Interoperate' (2014) Groupe Speciale Mobile Association (GSMA) Mobile Money for the Unbanked (MMU), February 2014 <http://www.gsma.com/mobilefordevelopment/wp-content/uploads/2014/03/A2A-interoperability_Online.pdf> accessed 15 April 2016; Gunnar Camner, 'Snapshot: Implementing mobile money interoperability in Indonesia' (2014) Groupe Speciale Mobile Association (GSMA) Mobile Money for the Unbanked (MMU) <<http://www.gsma.com/mobilefordevelopment/wp-content/uploads/2013/10/Implementing-mobile-money->

how interoperability was achieved in Tanzania. However, this material is industry sponsored, so it tends to outline the business case for interoperability, rather than its regulatory issues. Furthermore, the actual rules in interoperable systems tend to comprise private agreements between MM firms and are not available to the public.

The lack of research means policymakers have a limited conceptual toolkit to analyse the regulatory issues in the payment function of mobile money. Furthermore, policymakers cannot easily incorporate insights from inter-bank and retail payments literature to mobile money transfers. This is because, amongst other reasons, there is disagreement over the extent that regulation is required in retail payment systems. A strand of research argues there are no market failures within retail payment systems other than the competitive distortions discussed above. Other research suggests there are externalities that require public intervention.⁵⁷⁷

Furthermore, *institutional differences* between an inter-bank and mobile money system mean regulatory toolkits from the former cannot be easily used in the latter. This is particularly relevant to international payment standards, including those issued by the Bank for International Settlements. As explained in Chapter 1, these standards tend to be ‘bank centric’; they assume a bank is the account holder into which funds are stored and later transferred.⁵⁷⁸

interoperability-in-Indonesia.pdf> accessed 17 December 2016; Note Klein and Mayer (2011) also examine how interoperability might be achieved (Klein and Mayer (n 58) 24). However, again, these scholars do not emphasise the regulatory issues when it is implemented.

⁵⁷⁷ However, the extent of such intervention depends on how large the systemic risk might be. In turn, this requires understanding the ways in which different credit, liquidity, and operational risks might interact under different designs of payment systems: see Haldane, Millard, and Saporta, ‘General Introduction: The Future of Payment Systems’ in Haldane, Millard, and Saporta (ed) (n 51) 302.

⁵⁷⁸ See citations in Chapter 1 (n 64).

This material is of limited use to mobile money because this service operates on a different institutional structure to banks. In particular, and as discussed primarily in chapters 3 and 4, the holding company, trust, and narrow banking commitments in the service mean it creates a different risk profile to banking.⁵⁷⁹ In turn this means a policymaker or scholar cannot copy and paste international payment standards for mobile money.

Moving forward, this Chapter focuses on the payment function in mobile money. It also examines the extent to which the commitments made by the MM firm and its associates can address the risks from this function.

6.2 Market Failure and Risks

As discussed above in relation to non-interoperable mobile money platforms, retail payments systems involve potential monopolies and inefficient competition. This problem has been identified in relation to mobile money, particularly in Kenya. This thesis has insufficient space to focus on competition problems but notes their importance for mobile money. In Chapter 7, the thesis proposes that additional research should be conducted on this topic.

The chapter focuses on another key market failure in payments which is an agency problem. This problem arises because the payor customer (the principal) delegates the task of performing the payment to the payment provider (the agent). In the case of mobile money, the customer delegates the task of performing the payment function to the MM firm, which commits to perform this function on her behalf. This

⁵⁷⁹ See also a discussion in Section 2.3.2.3 of Chapter 2.

means, in the time between the payor customer making her transfer request and it reaching the payee customer, she is exposed to solvency, liquidity, or operational problems at the MM firm.⁵⁸⁰

The chapter assumes the MM firm and MMHC have delivered on the private and public ordering proposed in the previous chapters. This means, for the purposes of this chapter, credit and liquidity risks from the storage function of mobile money have been addressed. As a result of this assumption, the chapter focuses on analysing the credit, liquidity, and operational risks that are not addressed through private or public ordering imposed in relation to the storage function. The analysis begins with a discussion of non-interoperable systems.

6.3 Non-Interoperable

This section consists of four parts, which follow the framework proposed and used in this thesis. The first outlines the payment function in M-Pesa and how it operates. The second explores the main market failure and risks that arise in this function. The third outlines the extent to which private ordering can address risks in a payments function. The fourth explains the potential for public ordering to address residual risks that are not addressed through private ordering.

6.3.1 The Payment Function

M-Pesa is an appropriate case study for a non-interoperable system. This is because M-Pesa is non-interoperable and is the key case study in this thesis. In M-Pesa a customer performs a payment by selecting the payment option on her phone and

⁵⁸⁰ Chapter 2 discusses these risks.

inserting the relevant information.⁵⁸¹ In doing so the payor customer provides instructions to Safaricom to debit an amount in her M-Pesa account and credit the payee's account. Safaricom nets this payment and transmits the instructions to the MPHC which then updates the accounts it holds on behalf of each customer.⁵⁸²

By paying or transferring funds, 'title' passes to the recipient.⁵⁸³ This means transferring an amount of the customer's beneficial interest in the trust fund to the recipient.⁵⁸⁴

6.3.2 Market Failures and Risks

An interoperable payment contains the agency problem and resulting risks discussed in Section 6.2, above. Customers may not effectively monitor actions taken by the managers of the MM firms involved in a non-interoperable system. This creates a number of risks, however, many are addressed within the mobile money platform. For example, a fraudster may obtain access to a person's funds and transfer them to a recipient. This risk is addressed in a number of ways in mobile money, as discussed in Chapter 1. For example, a customer must enter a PIN for any transfer she wishes to undertake.⁵⁸⁵ This feature protects against fraudsters because a thief would need access to the customer's PIN. Furthermore, a mobile money platform keeps a paper trail of all payments made through the system. This feature enables customers, MM firms and/or policymakers to track stolen funds by determining how her funds have been transferred and to whom. Like other electronic payment systems, mobile money systems can be hacked and customers' funds stolen while in transit between the payor

⁵⁸¹ M-Pesa Terms and Conditions, Clause 8.3.

⁵⁸² M-Pesa Terms and Conditions, cl 8.6; M-Pesa Trust Deed, cls 2(ii) and 3.

⁵⁸³ M-Pesa Terms and Conditions, cl 8.9.

⁵⁸⁴ M-Pesa Amendment Deed, cl 4.2.1; M-Pesa Terms and Conditions, cls 8.9, 8.10 and 9.1.

⁵⁸⁵ Mbiti and Weil (n 32) 1.

and the payee.⁵⁸⁶ However, customers' funds are only exposed to such risk for a very brief period. This is because mobile money payments are instantaneous.

This chapter focuses on the main risk in a non-interoperable service, which is the collapse of the operating system used to make payments. This is the most important risk discussed in this chapter. Theft of a customers' funds, discussed in the paragraph above, causes loss to that person alone. In contrast, collapse of the operating system can disrupt mobile money payments for all customers which could impose significant costs on unbanked people. This is because, amongst other important reasons, as discussed in Chapter 1, unbanked people may be unable to access any other type of formal payment system. As a result, which is also discussed in Chapter 1, unbanked people must resort to informal tools, such as cash, which have a range of functional disadvantages compared to mobile money. Chapter 7 makes tentative claims about the potential scale of costs which may arise through a collapse of mobile money.⁵⁸⁷ The next section examines the extent to which private ordering addresses the risk of collapse of mobile money payment systems.

6.3.3 Private Ordering

As discussed in Chapter 2, private ordering comprises commitments made by MM firm and its associates, and governance strategies available to mobile money customers. This section examines both components of private ordering, as follows.

⁵⁸⁶ As a result, regulatory issues arise in relation to the reliability and integrity of the transportation mechanism for the funds: Klein and Mayer (n 58) 13-15.

⁵⁸⁷ See particularly, Section 7.3.7 of Chapter 7.

6.3.3.1 Commitments

Unlike other chapters, in this chapter, the relevant commitment comes from the MM firm alone, rather than associates. This is because the MM firm commits to provide and process payments. For example, in M-Pesa, Safaricom commits to provide a payment function, as demonstrated through the following contractual terms to which the customer agrees by using the service:

Safaricom operates the M-Pesa mobile money transfer service that allows you to send and receive money through your registered mobile phone.⁵⁸⁸

...
You may send E-Money to any Participant on the M-Pesa system.⁵⁸⁹

Safaricom also commits to process payments. This involves actually transferring the title over that component of the trust fund assets which is required to make a payment. This commitment is demonstrated in the following two contractual terms:

Upon the successful completion of your Transaction to another M-Pesa Participant, Safaricom will immediately cause the transfer of the E-Money to the other Participant's M-Pesa Account. You and the recipient will both be notified by SMS as to the completed status of your transaction.⁵⁹⁰

...
Upon the successful transmission of E-Money from your Account to registered recipient's M-Pesa account, title to the E-Money will pass to the recipient.⁵⁹¹

The author has not been able to obtain copies of operating rules Safaricom uses to process M-Pesa payments. Publicly-available material, such as the terms and conditions between Safaricom and customers, do not outline the operating rules. As a result, the analysis cannot examine the commitments Safaricom makes in the course

⁵⁸⁸ M-Pesa Terms and Conditions, cl 2.1.

⁵⁸⁹ M-Pesa Terms and Conditions, cl 8.3.

⁵⁹⁰ M-Pesa Terms and Conditions, cl 8.6.

⁵⁹¹ M-Pesa Terms and Conditions, cl 8.9.

of committing to process payments. However, it is reasonable to assume that Safaricom commits to provide an operating system that is designed to process payments. Such a system is required for Safaricom to deliver on the commitments discussed above.

6.3.3.2 Governance Strategies

This component of analysis involves determining governance strategies that customers, as principals, can use to monitor the extent to which the MM firm is delivering on its commitment to provide and upkeep the operating system required to process payments. The terms and conditions that operate between the MM firm and customers are silent on the customers' ability to monitor the operating system used to process payments. As a result, for the purposes of analysis, this chapter assumes that M-Pesa customers have no direct method of monitoring Safaricom's operating system and sanctioning the firm if it does not operate effectively.

However, customers obtain a less direct private monitoring tool in the form of complaints, resolution, and arbitration schemes. These enable a customer to report to the MM firm on failed payments. In M-Pesa, and as discussed in Chapter 4, a customer can do this by calling the Safaricom Customer Care line.⁵⁹² The customer can also make use of dispute-resolution and arbitration schemes in relation to those complaints.⁵⁹³

There is no empirical material on the effectiveness of the M-Pesa complaints, resolution, and arbitration schemes in facilitating customers' monitoring of the

⁵⁹² M-Pesa Terms and Conditions, cl 15.1.

⁵⁹³ M-Pesa Terms and Conditions, cls 15.2-15.3 (dispute resolution) and 15.4-15.5 (arbitration).

operational system. There is also no empirical material on the extent to which, if at all, customers' ability to access these schemes discourages the MM firm, if at all, to design, implement, and monitor effective operating systems. However, the thesis can comment on the likely incentives of customers to make use of the complaints, resolution and arbitration schemes which in turn enables tentative predictions. The thesis can also use insights from that discussion to propose the likely effectiveness of these schemes in addressing operational risks, as follows.

The customer care, dispute-resolution, and arbitration mechanisms are unlikely to be effective in addressing the risk that the entire operating system collapses. This is because it is a governance strategy. As discussed above, the information asymmetries and coordination problems that inhere in unbanked people mean they are unlikely to make effective use of governance strategies to address risks to the system as a whole. These same transaction costs inhibit the ability of customers to use private complaints, resolution, and arbitration schemes in ways that address operational risk, as follows.

Effective customer monitoring would require customers to continually monitor the extent to which the MM firm had developed and was monitoring such an operating system. While each customer would benefit from such monitoring, the costs of doing so – namely continually contacting the MM firm and obtaining information on the operation of the entire operating system – means no one person will do it.

This is because each customer may use private complaints, resolution, and arbitration schemes to report back on failed operating systems when her funds have

been lost in the system. These events can include the event that her funds are stolen through fraud, failed payments, or an operating system error causes a failure in a payment. This is because she has a direct stake in the outcome – namely ensuring her funds are ultimately successfully transferred to the recipient.

However, she has little or no incentive in ensuring that all other customers can make payments and thus to protect every component of the operating system. Furthermore, coordination problems, which as discussed above, are severe amongst unbanked populations, mean she won't negotiate with other customers to develop an effective strategy to perform this monitoring. Ultimately, this creates a collective action problem; each customer relies upon others to perform monitoring which means it does not occur at all. This applies to other payment systems.⁵⁹⁴ However, this free riding problem is likely to be particularly severe for mobile money due to the significant information asymmetries and coordination problems facing unbanked people. In turn, this means that private ordering, particularly governance strategies, does not address operational risks from mobile money payments. This then creates the potential role for public ordering in increasing the efficiency of the system, as outlined in the section below.

6.3.4 Public Ordering

Pursuant to the economic approach to regulation used in the thesis, this section aims to determine the extent to which, if at all, public intervention will result in greater efficiency than the level achieved through private ordering alone, as examined above. Like other ordering proposed in this thesis, the aim is to enable the MM firm and its

⁵⁹⁴ See Millard and Saporta in *The Future of Payment Systems* page 26.

associates to more credibly commit to safeguard customers' funds for the purposes of providing payment and storage functions only.

Three sets of ordering can increase efficiencies in addressing operational risks. Each involves different combinations of private and public ordering. The section below examines each option in the context of the likely resource constraints of the policymaker and potential policy trade-offs in public ordering, particularly between consumer protection, financial stability, and financial inclusion.

6.3.4.1 Reduce Monetary Cost in Existing Private Ordering

A first tool involves lowering the monetary cost of the complaints, dispute resolution, and arbitration schemes. Doing so will reduce the amount of total resources an unbanked customer must incur in order to use such services. In turn, this may mean unbanked customers are more likely to monitor operational failure and take action against Safaricom for failing to prevent such occurrences. Public ordering in Kenya achieves this end. For example, an MM firm is required to ensure that its complaint handling process is free.⁵⁹⁵

Reducing the monetary costs of the complaints, dispute resolution, and arbitration schemes may better protect customers. This is because customers must incur less monetary cost in reporting on operating failures, fraud, and other occurrences related to loss of funds. In turn, this may increase customers' monitoring and reporting of breakdowns to the MM firm, which in turn may mean the entire operating system operates more effectively. However, decreasing the monetary costs of using these schemes will not be sufficient for customers to perfectly monitor the

⁵⁹⁵ NPS Regulation 39(7).

operating system. This is because, as discussed above, they will still face coordination costs, particularly in the context of dispersed, unbanked people, which are likely to prevent them from doing so.

However, reducing the monetary cost of the complaints, dispute resolution, and arbitration schemes increases compliance costs which may then impair financial inclusion objectives. This is because the MM firm may increase fees on other components of the service, such as payments or withdrawals, to offset the costs involved in subsidising the complaints, dispute resolution, and arbitration schemes. This increase in fees may make the service unaffordable for customers at the margins.

6.3.4.2 Regulatory Strategies

A second tool, one that is consistent with the active approach, involves buttressing customer monitoring with public sanction. Customers could make complaints on operational failure directly to the policymaker. The policymaker would sanction the MM firm for the occurrence of such failures.

Again, public ordering in Kenya takes this approach. A customer who is not satisfied with the decisions of the MM firm regarding a complaint can appeal directly to the CBK.⁵⁹⁶ The CBK can then take a range of disciplinary actions in relation to the MM firm on the occurrence of a number of events, which could include mass operational failure. The grounds upon which the CBK can take disciplinary action are examined further in Section 3.2.3 below.

⁵⁹⁶ NPS Regulations, reg 40(5).

The effectiveness of this strategy depends on a number of factors. Overall, for this tool to be more effective than the private monitoring that currently inheres in mobile money scheme, a customer must incur lower costs reporting to the policymaker than using pre-existing complaints, dispute resolution, and arbitration schemes. Public ordering in Kenya does not explain the steps a customer must take to complain to the CBK, which means the thesis cannot determine whether she incurs lower cost in public or private avenues.

Assuming her costs are lower, this strategy more closely aligns consumer protection and financial inclusion. The customer is able to protect her interests and report on operational failures at lower cost than private ordering. This may encourage the MM firm to establish and monitor an effective operating system. Compliance costs do not increase because no additional public ordering is directly imposed on the MM firm.

However, the tool may not be effective and credible due to regulatory resource constraints. The policymaker will need to institute a range of internal procedures that enables it to process complaints received from mobile money customers. This may impose prohibitively high costs on the policymaker. The potential inability of the policymaker to effectively process complaints may reduce the credibility and ultimate effectiveness of this instrument.

Furthermore, the policymaker would need to take action against the MM firm, which may also be costly. The credibility of detection and enforcement then

determines the extent to which the MM firm will ensure its operating systems are effective.

6.3.4.3 Direct Public Monitoring

A third strategy involves direct public oversight of the operating system. Ex ante, the policymaker would impose basic operating standards to which the MM firm must comply. These standards could focus on the integrity of the operating system.⁵⁹⁷ In addition, standards should impose back-up systems which can be used in the event of theft and mass operational failure.⁵⁹⁸

Public ordering in Kenya imposes such standards. An MM firm must establish operational arrangements, and in particular implement measures to ensure the safety, security, and operational reliability of the service, including contingency arrangements.⁵⁹⁹

The policymaker would also need to monitor the operating system and sanction the MM firm if it does not implement and deliver on the standards imposed. This approach is also used in Kenya. For example, the CBK has standing powers to monitor the operating system.⁶⁰⁰ The CBK can also terminate the licence of the MM firm on a range of grounds, each of which could be extended to operational failure. These include instances in which the MM firm fails to continue operation or public trust is compromised through its activities.⁶⁰¹

⁵⁹⁷ Jeffrey Marquardt, 'Payment System Policy Issues and Analysis' in Summers (ed) (n 120) 2519.

⁵⁹⁸ For a discussion of general back up, see Makin, cited in Klein and Mayer (n 58) 13. For additional discussion of physical destruction or theft, see Chatain and others, also cited in Klein and Mayer (n 58) 13.

⁵⁹⁹ NPS Regulations, reg 27(2)(d).

⁶⁰⁰ NPS Regulations, reg 30.

⁶⁰¹ NPS Regulations, regs 10(b) (ceases or fails) or 10(g) (compromised through its activities).

This tool of public ordering buttresses consumer protection policy goals. Public oversight and the potential for sanctions may encourage the MM firm to effectively address operational risks in its payments system. The model may increase compliance costs because MM firms must implement and comply with the policymaker's standards, which may impair financial inclusion goals. The degree to which this takes place depends on the amount of resources an MM firm must take to amend its pre-existing operating system to comply with the publicly-imposed standards.

However, and similar to the proposals discussed above, the incentives of the MM firm to actually institute and monitor effective operational systems depend on the effectiveness and credibility of this public oversight. The policymaker needs to invest resources determining appropriate operating standards, monitoring the MM firm's compliance with such standards, and taking action in the event the firm fails to do so. Resource constraints on the part of the policymaker mean it may not be able to perform one or all of these steps. Such systems are often complex and involve the gathering, transfer, and dissemination of large amounts of information.

The principles-based approach described in Chapter 1 may enable the policymaker to obtain the information it needs to design and monitor operating standards for mobile money. This is because it can enable the policymaker to gather information from the MM firm on the operations and procedures required to effectively process mobile money payments. As explained in that section, Safaricom and the CBK used this approach to effect a gradual transfer of operational knowledge

from the firm to the CBK.⁶⁰² To this author's knowledge, there is no publicly-available material outlining the effectiveness of the principles-based approach and policymakers' oversight of operating systems, either in Kenya or elsewhere. This means it is not possible to use empirical material to determine its effectiveness.

6.3.5 Conclusion

This section has explained that so long as mobile money actors deliver on storage-related commitments such as holding company, trust structure, and narrow banking obligations, a non-interoperable payment creates operational risks only. This is part of a wider point emphasised by Klein and Mayer (2011) that the actual transfer of value, including of the type that takes place in mobile money payments, creates operational rather than credit or liquidity risks.⁶⁰³ Mobile money firms have limited incentives to create and institute mechanisms that reduce operational risks to socially-desirable levels. Customers are likely to have insufficient ability and incentives to monitor operating systems, creating a role for a public agency.

As a result, rather than prudential regulation, a public agency should impose a range of strategies designed to encourage the MM firm to implement and monitor an effective operating system. Each strategy is subject to potential trade-offs between consumer protection and financial inclusion. Furthermore, these strategies may not be effective due to significant resource constraints on the part of policymakers.

The next section explains the marginal benefits and costs of moving from non-interoperable to interoperable systems. This analysis explains the extent to which, if at

⁶⁰² See Chapter 2 for a discussion of principles-based approach.

⁶⁰³ Klein and Mayer (n 58) 13-15.

all, additional risks arise through interoperable systems and trade-offs involved in addressing them.

6.4 Interoperable

This section follows the same structure as the discussion on non-interoperable systems. That is, examining functions, market failures, private ordering, and public ordering. In each component of analysis, the section explains the marginal benefit and cost of moving from non-interoperable to interoperable systems. In doing so, the section explains the additional regulatory issues, if any, that arise in this process and trade-offs involved in addressing them.

6.4.1 Function

Like a non-interoperable system, an interoperable service provides a payment function. However, it provides a more extensive payment function than a non-interoperable service. This is because it widens the economic network available to individual customers of mobile money schemes. A customer moves from having access to fellow customers in her non-interoperable service to those of all mobile money platforms in the country. In doing so, interoperability creates potentially powerful network effects.⁶⁰⁴

In doing so, interoperability can contribute to the one of Scott's seven core features of payment systems. In turn, this can give mobile money additional functional advantages over cash. This core feature is 'fungibility', which connotes that one or few methods of payment are more convenient to customers than many.⁶⁰⁵

⁶⁰⁴ See Bolt and Humphrey (n 99). See also Armour and others (n 2) 406.

⁶⁰⁵ Scott (n 31) 58.

By expanding the economic network available in mobile money platforms, interoperability better enables the service to achieve the prerequisite for fungibility, which is to be widely, if not universally, accepted by merchants and payees.⁶⁰⁶

Economic networks can sharply increase through moving from non-interoperable to interoperable systems. A comparison of customer bases between Tanzania's non-interoperable and interoperable systems provide a useful example of this point. In the former, a customer of Tigo Tanzania could make payments to around 6.8 million fellow customers of this service. Due to interoperability in Tanzania, which was launched in 2014, she can now make payments to customers of all other MM firms in the country, which are Airtel Money, Zantael, and Vodacom M-Pesa. This expands her economic network to around 31 million people.⁶⁰⁷ It also increases the potential number of merchants that will accept her mobile money payments, although there is no empirical material available on the numbers involved.

6.4.2 Market Failures and Risks

This section does not claim that an interoperable system is necessarily *more* risky than non-interoperable. The opposite may be true in certain circumstances. For example, assuming the insolvency procedure or resolution mechanisms discussed in Chapter 3 have been introduced, a system of multiple MM firms working together provides diversification benefits. This is because if one MM firm fails, customers' funds can be rapidly transferred to another and the payment system continues to flourish. In contrast, a non-interoperable system, particularly one involving a single MM firm,

⁶⁰⁶ *ibid.*

⁶⁰⁷ Musa (n 576).

can concentrate risk. This is because collapse of that MM firm disrupts mobile money payments across the entire sector.

The thesis focuses on the protection of customers' funds, and so it would not be useful to seek to determine whether an interoperable system is more risky than a non-interoperable one. Instead, a more appropriate analysis is the potential additional *types* of risks to customers' funds that might arise in an interoperable as opposed to non-interoperable system, as follows.

By providing a payment function and like non-interoperable systems, interoperable payments are subject to an agency problem. Customers may not effectively monitor actions taken by the managers of the MM firms involved in the interoperable system. As a result, the MM firms may take actions that expose her funds to credit, liquidity, or operational risks. However, interoperability means the payment-related agency problems and resulting risks from non-interoperable systems can be amplified and/or take a different form. Two are particularly important.

Interoperability amplifies operational risk. This is because additional operating systems are required to connect payments between different MM firms. Interoperability also creates the potential for contagion. This is because credit, liquidity, or operational risks at one MM firm may cause the realisation of one or more of these types of risks at other MM firms in the system. This type of contagion is considered in payments literature and international standards, often in the context of systemic risk. For example, the *Core Principles of Systemically Important Payment*

Systems, produced by the Bank for International Settlements in 2001 (BIS Principles), state that systemic risk is:

[T]he risk that the inability of one of the participants to meet its obligations, or a disruption in the system itself, could result in the inability of other system participants or of financial institutions in other parts of the financial system to meet their obligations as they become due. Such a failure could cause widespread liquidity or credit problems and, as a result, could threaten the stability of the system or of financial markets.⁶⁰⁸

As discussed above, the BIS Principles assume that banks are account holders in payment systems, not non-banks such as phone companies.⁶⁰⁹ As a result, these standards cannot be directly applied to mobile money. Chapter 7 explores this topic in greater detail.

Furthermore, and as explained in Chapter 1, the thesis does not address systemic risk. However, the BIS Principles are useful for describing the potential contagion that could arise in interoperable systems. The section below examines the extent to which private ordering in interoperable systems can reduce operational risk and the potential for contagion of credit and liquidity risks to socially-desirable levels.

6.4.3 Private Ordering

Like the discussion on non-interoperable systems, the section below on private ordering in interoperable systems comprises two parts. The first examines the extent to which commitments made by the MM firms can address operational risk and the potential for combination of credit and socially-desirable levels. The second examines

⁶⁰⁸ Bank for International Settlements (n 64) 3.0.1.

⁶⁰⁹ The BIS principles define payment systems 'as the means by which funds are transferred among banks': Bank for International Settlements, 'Core Principles of Systemically Important Payment Systems' (January 2001) Bank for International Settlements, ss 1.1 and 3.0.1 <<http://www.bis.org/cpmi/publ/d43.pdf>> accessed 8 April 2016.

the governance tools available to unbanked customers to monitor the extent to which MM firms are delivering on these commitments and their ability to use them.

6.4.3.1 Commitments

The discussion on commitments comprises two components. The first explores commitments specifically made in relation to interoperable payment systems and the risks they create. The second are storage-related commitments, made in previous chapters, which may address risks in interoperability.

6.4.3.1(a) Commitments

Unlike non-interoperability, it is not possible to review and analyse the contractual provisions through which participating MM firms commit to provide interoperable payments to customers and how. It is therefore not possible to analyse commitments made directly to customers about interoperability.

Relevant evidence might be obtained from examining the operating rules that underpin interoperable models. Such rules can also be conceived as commitments MM firms make in participating in the system. One country in which such rules exist is Tanzania. While the operating rules are confidential and have not been released to the public, discussions with mobile money experts, several of whom contributed to the design of the rules in Tanzania, permit consideration of the basic operation of interoperability in this country's mobile money sector.⁶¹⁰ Based on the findings of these interviews, the analysis below explains the basic procedures involved in an interoperable payment and then the risks that arise through the scheme.

⁶¹⁰ Discussion with mobile money specialist, 8 December 2015.

6.4.3.1(a)(i) Operation

Like M-Pesa transfers, in interoperable systems an MM firm facilitates the transfer of funds in and out of accounts held in the name of the MMHC. Such transfers operate bilaterally between the four MM firms in Tanzania.⁶¹¹ These firms make bilateral transfers between each other without using a switch or other mechanisms used in the inter-bank payment system. Instead, each MM firm commits to direct its MMHC to store certain amounts of e-money in what are called ‘agency accounts’ with other MMHCs.⁶¹² Each MM firm then directs money to flow in and out of these agency accounts as required for transactions.

The section below explains the way in which MM firms 1 and 2 facilitate a payment between MMHCs 1 and 2, respectively. This analysis takes place in a ‘state of nature’; this involves examining the process of performing transactions without reference to any of the storage-related private ordering introduced in Chapter 3, namely the holding company, trust, and narrow banking commitments. This is required so that, as performed below, the chapter can explain how storage-related private ordering addresses many of the potential risks that could otherwise arise in an interoperable system.

Mobile money holding company 1 holds an agent account containing e-float with MMHC 2. The agency account is a regular customer account with MMHC 2. This means, absent the holding company and trust arrangements discussed in Chapter 3, like other customers (such as individual people and cash merchants), MMHC 1 is

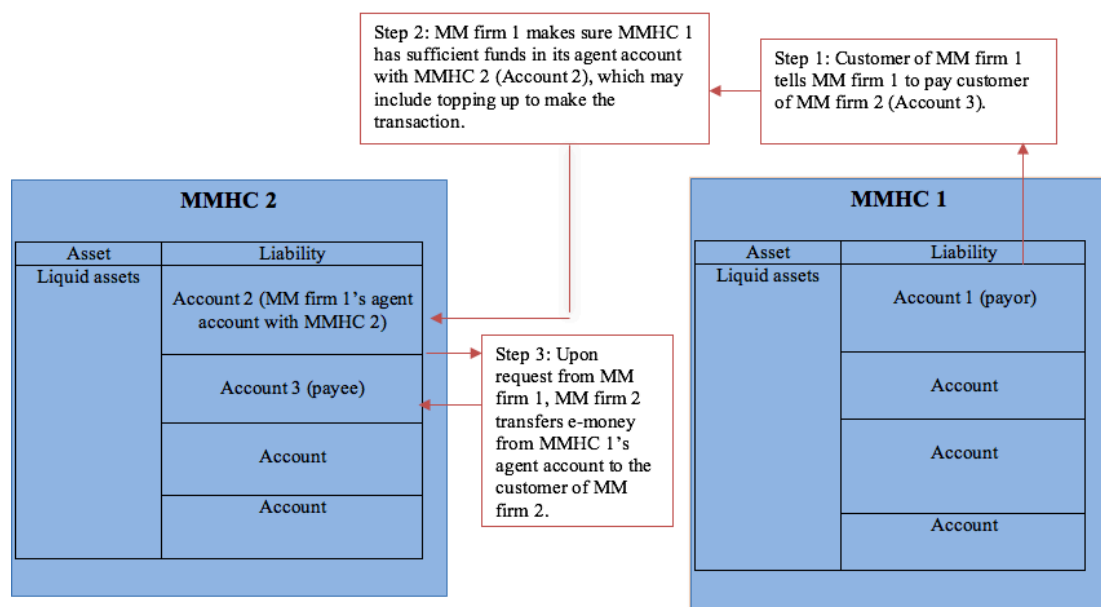
⁶¹¹ As outlined in Part 1.2.2, these firms are Tigo Pesa, Airtel Money, Zantel and Vodacom M-Pesa: see Musa and others (n 402).

⁶¹² Discussion with mobile money specialist, 8 December 2015.

an unsecured creditor of MMHC 2. This has important regulatory consequences that will be examined later in this Chapter.

A customer of MM firm 1 wants to transfer funds to a customer of MM firm 2. For this to take place, MM firm 1 tells MM firm 2 to take money from MMHC 1's agency account with MMHC 2 and transfer it to the customer of MM firm 2. This process is explained in the following diagram.

Diagram 9: The Operation of An Interoperable Mobile Money Transfer (Tanzania)



6.4.3.1(a)(ii) Risks

This section examines the potential risks that may emerge from the operation of this scheme. There is insufficient empirical material on the operation of the interoperable scheme in Tanzania to predict and model 'real life' risks. This is because there is no publicly-available information on the amount of e-float each MMHC stores in their

agency accounts. In turn, this means it is not possible to predict the exposure of one MMHC to the failure of other MMHCs in the interoperable system. As a result, for the sake of analysis, this section assumes that each actor is exposed to the others to the extent that realisation of credit, liquidity, or operational risk at one MMHC will cause realisation of equivalent risks for others MMHCS.

Customers are exposed to several sets of risks in interoperable system. First, an interoperable system creates additional operational risk to a non-interoperable system. This is because the system designed to facilitate transfers between the MMHCs may collapse. This is an additional set of risks because interoperability requires the creation of another level of operating systems to the one used by individual MM firms.

Second, the use of agency accounts may involve a potential *liquidity* risk that does not arise in a non-interoperable system. This is because MMHCs may not keep a sufficient amount of e-money in the agency accounts they hold with other MMHCs. This may mean transfers cannot be made. Using the example from above, MMHC 1 may have insufficient e-money in its agent account (Account 2) to facilitate the transfer to the customer of MM firm 2 (Account 3).

Third, absent private or public ordering to the contrary, interoperable systems create the potential for the transmission of credit risks which did not apply to interoperable systems. Using the example above, MM 2's insolvency may also create an insolvency problem for MM 1. This is because, by holding funds in an agency account, MMHC 1 is a customer of MM firm 2 and so is an unsecured creditor of

MMHC 2, just like any other customer of MM firm 2. It also means in the event of MMHC 2's insolvency, customers' funds (including MM 1's funds) may be used to satisfy owing debts to third parties of MMHC 2.

6.4.3.1(b) Storage-Related Ordering

This subsection examines the extent to which the credit, liquidity, and operational risks discussed in Section 6.4.3.1(a)(ii) above are addressed through private and public ordering designed to address risks in non-interoperable systems (as discussed in Section 6.3 of this Chapter, above) and the storage function (as outlined in chapters 3 (the conflict of interest between shareholders of the MM firm and customers) and 4 (the balance sheet of the MMHC based on assets it purchases with customers' funds)).⁶¹³

Private and public ordering that attaches directly to a non-interoperable mobile money system is unlikely to address the risks in an interoperable system. This is because the latter involves a range of operational, credit, and liquidity risks that do not arise in the former, as discussed above in Section 6.4.3.1(a)(ii) of this Chapter.

However, storage-related ordering can, in part, address credit risk in interoperable systems. For example, the trust arrangements outlined in Chapter 3 can address the potential contagion of credit risk. This is because the trust arrangements will ensure that the funds each MMHC stores in an agent account are held on trust by the MMHC providing that account. This means the funds in the agent account are

⁶¹³ Note the discussion on the funds conversion transaction, which takes place primarily in Chapter 5, is not relevant to this Chapter. This is because the funds conversion transaction is not directly related to payments made through mobile money systems.

segregated from other assets of the MMHC providing the account. As a result, in the example discussed above, in the event of MMHC 2's insolvency, MMHC 1's funds will not be used to satisfy the claims of third party creditors. Furthermore, the modifications to applicable insolvency laws proposed in Section 3.4.2.2 of Chapter 3 may assist in returning such funds to the relevant MMHCs as quickly as possible. This will help protect against the contagion of insolvency problems.

However, a question remains as to whether this special resolution regime would enable funds to be transferred quickly enough to prevent disruption to the payment function. This is because there may be a total disruption to payments in the time it takes to return funds to each MMHC. This is because the MMHC, as a normal customer, would receive its funds at the same time as regular customers of the insolvent MMHC. This may cause significant economic disruption for users.

Furthermore, storage-related private and public ordering cannot address the liquidity risk that arises in an interoperable system. This is because this ordering does not specifically address the risk that one or more MMHCs will leave insufficient e-money in their agency accounts.

6.4.3.2 Governance Tools

The final component of analysis involves determining the extent to which customers, as principals in interoperable mobile money systems, will use governance tools to monitor the extent to which the MM firms deliver on their commitments. As discussed, the author has not been able to determine what governance tools are available to customers in interoperable systems. For this reason, the chapter assumes

that a customer has access to the same type of complaints, resolution, and arbitration schemes that exist in a non-interoperable system, which was examined above in Section 6.3.3.2.

Unbanked customers are unlikely to use governance tools designed to monitor risks in such a system. This is mainly because information asymmetries and coordination problems that exist in non-interoperable systems are likely to become amplified in interoperable systems, as follows.

Information asymmetries between customers and MM firms in non-interoperable systems are likely to be amplified in interoperable platforms. This is primarily because the operating procedures in an interoperable system are likely to be larger and more complex than a non-interoperable system. This is because an interoperable system will process larger numbers of payments. It also facilitates payments across multiple, rather than one MM firm.

Furthermore, absent private or public ordering to the contrary, coordination costs and resulting collection action problems are likely to be stronger in interoperable than non-interoperable systems. This is because there are greater numbers of customers who must determine methods of monitoring the operating system. For example, as discussed in Section 6.4.1, through interoperability, the number of potential payors and payees available to a customer of Tigo Tanzania grows from 6.8 million to 31 million people. This greater number of people increases the already significant coordination problems facing unbanked people and so

increases the likelihood of the type of free riding and ultimately inadequate private monitoring, as discussed in Section 6.3.3.2 of this Chapter.

6.4.3.3 Conclusion

Interoperability creates a range of credit, liquidity, and operational risks that do not arise in non-interoperable systems. Private and public ordering discussed in relation to the storage function of mobile money can, in part, address credit-related risks, but is inapplicable to the operational and liquidity risks in the scheme. The likely significant coordination costs and information asymmetries facing unbanked customers mean they are unlikely to use governance tools available to them in such schemes. For this reason, public ordering can contribute to the efficiency of interoperable systems, as discussed below.

6.4.4 Public Ordering

Similar to the discussion on non-interoperability, the section below explores the extent to which, if at all, public ordering should address the residual risks identified in the previous component of the framework. In doing so, this section explains whether, if at all, public intervention can achieve greater efficiency in interoperable systems than the level achieved through private ordering alone, as examined above. Like other ordering proposed in this thesis, public ordering proposed below aims to enable the MM firm and its associates to more credibly commit to safeguard customers' funds for the purposes of providing payment and storage functions only. Each proposal is subject to the likely resource constraints of the policymaker and potential policy trade-offs in public ordering.

6.4.4.1 Design and Monitor Operating Systems

The first proposal responds to the coordination costs and ultimate collective action problem which prevents unbanked customers from monitoring operational risks in interoperable systems. Like with non-interoperable systems, a policymaker should impose and monitor compliance with operating procedures, covering, amongst other issues, the integrity of the system and back-up systems. These procedures must address operational risk. The lack of publicly- available information means the author is unable to verify whether the policymaker tasked with supervising Tanzania's interoperable system, the Bank of Tanzania (the central bank of Tanzania (BoT)), imposed public ordering that takes this form.

Similar to non-interoperable systems, by imposing and monitoring operating standards, the policymaker can buttress consumer protection objectives. This is because the MM firms use systems that impose socially-desirable levels of operational risks.

As in the non-interoperable system, public monitoring aligns consumer protection through encouraging the MM firm to ensure its operating systems are effective. Also like non-interoperability, such ordering may increase compliance costs and ultimately financial inclusion goals. This is because MM firms must comply with the policymaker's standards. The scale of the compliance costs depends on the amount of resources an MM firm must invest in amending its pre-existing operating system to comply with the publicly-imposed standards.

Also, like the proposals in the non-interoperable system, regulatory constraints of the policymaker is a key factor to the ultimate effectiveness of public ordering. An interoperable system involves an even more extensive set of operating procedures than a non-interoperable platform. The policymaker may have severe resource constraints in seeking to design and monitor operating rules for such as system. As a result, the policymaker is likely to face a significant information asymmetry with MM firms operating the non-interoperable system. This creates opportunities for inadequate rules and regulatory arbitrage.

As explained above, this thesis claims a policymaker can ameliorate, at least in part, the information asymmetry by operating a principles-based relationship with the regulated MM firms. The BoT adopted this approach in the design of the rules for the interoperable system in Tanzania. The policymaker did not seek to design the rules itself. Instead, the BoT believed itself to be an ‘enabling agency’, establishing objectives, mitigating potential systemic risk, and championing consumer protection in the design of the relevant rules.⁶¹⁴ The BoT then enabled participants to design the operating rules behind the interoperable system that would give effect to these principles.⁶¹⁵

There is insufficient empirical material available to determine whether the BoT’s principles-based approach has been ‘successful’ in terms of enabling this institution to understand the operating rules in Tanzania’s system. For the same reason it is not possible to determine the effectiveness of the BoT’s supervision of

⁶¹⁴ International Finance Corporation, World Bank Group (IFC) ‘Achieving Interoperability in Mobile Financial Services: Tanzania Case Study’ (undated)
<https://www.ifc.org/wps/wcm/connect/8d518d004799ebf1bb8fff299ede9589/IFC+Tanzania+Case+study+10_03_2015.pdf?MOD=AJPERES> accessed 17 December 2016.

⁶¹⁵ *ibid.*

Tanzania's interoperable system, nor potential regulatory capture in the scheme. However, the principles-based approach taken is, as explained above, the most likely to ameliorate the information asymmetry and enable a knowledge transfer and sharing between the MM firms involved and the policymaker.

6.4.4.2 Accelerated Resolution Regimes

The second proposed tool of public ordering responds to the potential delay in returning funds to MMHCs in the event that an MMHC in the interoperable system becomes insolvent. This delay was discussed in Section, above. A policymaker should impose an accelerated resolution regime that is tailored to the interoperable payment system. Such a regime could prioritise the return of funds to the payor MMHC. It would prioritise the MMHC's claims over those of the insolvent MMHC's other mobile money customers. In doing so this would minimise the potential for disruption while the claim of the payor MMHC is identified. Such a scheme could minimise the knock-on effects throughout the mobile money system.

In a similar point to the monitoring of the system, the credibility of this tool depends upon the expertise of the policymaker, which is likely to suffer significant resource constraints. While the author has insufficient empirical material to make anything other than a tentative claim, it is likely that a policymaker will face particularly severe resource constraints when seeking to design and execute special resolution regimes. This point is discussed above in Chapter 3.

Conclusion

Chapter 1 included a functional comparison between mobile money and cash, using a framework drawn from Scott (2014). The comparison focused on the speed and safety advantages of mobile money, and included a discussion on a person's potential protection from opportunism when using mobile money platforms. Scott (2014) also explored the ability of different payment systems to achieve financial inclusion. He explained that cash can be a cause of financial exclusion because of difficulties of using this tool for large items, personal security concerns when transferring large amounts of cash, and cash usage surcharges in advanced economies.⁶¹⁶

Scott (2014) did not explicitly examine the potential for mobile money to achieve financial inclusion as a payment system. This chapter has explained that mobile money can contribute to this end because it presents a more limited risk profile than the inter-bank payment system and so regulatory costs can be lower, as follows. Most payment systems, particularly those in developed countries, are premised on the inter-bank structure. A bank is the account holder into which funds are deposited and withdrawn. This means three functions – liquidity, payments, and delegated monitoring – are bundled within the one institution, the bank.⁶¹⁷

The bundled model has efficiency and intermediation benefits. It enables maximum mobilisation of household funds, and enables returns to be paid on such monies. However, the efficiency also creates a *cost*. The bundled model means that

⁶¹⁶ Scott (n 31) 55.

⁶¹⁷ Retail payment providers unbundle this model by providing a retail payment function. However, even then, liquidity and delegated monitoring remain bundled. This is because normally retail payment providers simply transfer rather than store funds. The funds remain stored with the bank away transfer where they are subject to liquidity, maturity and credit transformation. Furthermore, banks still tend to perform larger scale payments and transfers. See a discussion of the institutional design of retail and inter-bank payments systems: text to n 123.

the payment system is *vulnerable* to risks from a bank's delegated monitoring function, including liquidity runs. The bundling of payments with liquidity and delegated monitoring also has ramifications for the *consequences* of failure. Collapse of the inter-bank payment system could damage a bank's liquidity and delegated monitoring functions. In the event of contagion throughout the banking system, such impairment would contribute to reducing the amount of credit in the economy.⁶¹⁸

The bundling together of these three functions also has regulatory consequences. It means inter-bank payments regulation must address the full set of risks from the bundled banking model, particularly those due to credit, liquidity, and maturity transformation. The result is extensive compliance costs.

The payment function of mobile money moves from the opposite starting point. Unlike retail payment providers such as Western Union and MoneyGram, mobile money provides both payments *and* storage. This means mobile money is capable of meeting a wider range of the economic and liquidity needs of unbanked people than payment providers alone. Furthermore, unlike the inter-bank payment system, in mobile money the payment function is *unbundled* from delegated monitoring. The commitments through which the MM and its associates credibly commit to safeguard the funds of the mobile money customers, particularly funds stored in a central bank like in Columbia and El Salvador, mean mobile money provides a payment function *without* performing or exposure to credit, liquidity, and maturity transformation.

⁶¹⁸ This means failure of the payment system can cause 'financial instability' in terms of contagious external effects elsewhere within the financial system and with consequences for social welfare. Stephen and Saporta, in Haldane, Millard and Saporta (n 23) 575.

This type of payment system destroys much of the efficiency and intermediation benefits that inheres in the bundled banking model. For this reason, it should not be encouraged in relation to large value payments normally made through the inter-bank system. Funds mobilised for such payments are sufficiently large that, through simultaneous credit, liquidity, and maturity transformation, the system drives a considerable amount of economic growth.

However, the insulated mobile money systems of Columbia and El Salvador may be particularly useful for enabling unbanked people in developing countries to access a payment function. Once the trust and narrow banking procedures have been introduced, as discussed in chapters 3 and 4, mobile money does not directly face credit, maturity, and liquidity transformation. Instead, the scheme creates operational risks only. The exposure of mobile money to indirect intermediation has been examined in Chapter 4.

Moving from non-interoperable to interoperable systems widens the economic networks available to customers. This can facilitate payments through larger numbers of people. The operating system used to facilitate interoperability in mobile money is a source of additional credit, liquidity, and operational risks to those that inhere in non-interoperable. As explained in this Chapter, a relatively simple set of public ordering can address these risks. Public ordering should focus on public monitoring of operational risks and the imposition of accelerated resolution regimes.

The limited compliance costs in non-interoperable and interoperable systems enables phone companies to enter the sector and profitably provide a payment

function to large numbers of unbanked customers. The financial inclusion benefits of doing so can be significant, as demonstrated by the popularity of mobile money across Africa and other developing regions of the world.

CHAPTER 7: CONCLUSION

Introduction

This chapter concludes the thesis and proposes next steps in research. It has three parts. The first reviews the main findings of the thesis. The second explores how such findings can be used in debates surrounding the institutional design of banking and payment systems. The third proposes several next steps in research.

7.1 The Key Findings from the Thesis

The thesis has made three main claims. First, as explained in Chapter 2, mobile money operates as a *shadow retail deposit* system. In doing so mobile money can perform formal, electronic payment and storage functions to unbanked customer who are beyond the reach of the banking system. Mobile money provides equivalent payment functions as a bank deposit by enabling customers to make transfers of value to other users, including merchants. In addition, mobile money provides equivalent storage functions as a bank deposit. This is because, like a deposit, a mobile money customer can convert her electronic funds into cash, for their nominal, face value – which they have retained in electronic form – at any time.

Second, mobile money provides functionally equivalent electronic payment and storage functions as a bank deposit through a *different legal structure*. This structure emerges through commitments through which the MM firm and its associates credibly commit to safeguard the funds of the mobile money customers for the purposes of providing payment and storage functions only. The combined effect

of these commitments is that the MM firm maintains a 1:1 relationship between cash received from customers, stored within the system as highly liquid assets, and e-money which customers use in the mobile money service. As a result, unlike banking, mobile money does not directly involve credit and liquidity, maturity, and credit transformation.

However, mobile money is not risk-free. The risks that remain tend to be operational in nature. Chapter 3 examined the holding company, trust, and narrow banking commitments, which underpin the storage function of mobile money. Collectively these commitments protect customers' funds from a range of credit and liquidity risks but are subject to operational risk, particularly that the actors responsible for making these commitments, the MM firm and MMHC, will not deliver upon them. Chapter 4 explained that the narrow banking commitment introduces a form of indirect intermediation, which can be removed if customers' funds are stored in a bank. Chapter 5 explained that cash merchants introduce operational risk to the service because they may fail to manage their stores of e-money and cash effectively. Chapter 6 explained that in non-interoperable systems, payment introduces a form of operational risk only, in the form of potential collapse of the payment processing system. Interoperability can introduce credit and liquidity risks due the potential for contagion between participating MMHCs, which requires additional regulatory responses.

Third, as explained in Chapter 2 and proposed at various stage in each of the subsequent chapters, public ordering can increase the efficiency of the commitments in addressing risks in mobile money platforms through an 'active' approach. This

approach means a policymaker monitors a greater range of risks and more closely than what might be expected in other comparable principal-agent relationships, such as retail investors and financial intermediaries, and depositors and banks. This approach may not seem necessary in mobile money. This is because, without credit, liquidity, and maturity transformation, mobile money does not involve the financial opacity which justifies much of banking regulation. However, the approach is appropriate because unbanked customers are likely to face significant information asymmetries with MM firms and coordination problems amongst themselves. This means they are unlikely to use governance strategies at their disposal to address risks in mobile money. As a result, the active approach manifests in regulatory strategies where governance strategies might have traditionally been considered appropriate.

However, these regulatory strategies need to respond to the likely resource constraints of policymakers. To this end, a policymaker should authorise the launch of simple rather than complex financial products, and engaging in an on-going relationship with regulated firms. Also, as explored in the thesis, these resource constraints mean certain ex ante tools such as accelerated resolution schemes and deposit guarantee schemes may not be feasible in many of the countries in which mobile money operates.

7.2 Institutional Design of Banking and Payment Systems

This section has two main parts. The first examines the growing policy divergence over a socially desirable role for mobile money. The second outlines several of the key debates, market and regulatory developments on the institutional design of banking and payment systems, including in the context of financial inclusion. The

third combines these discussions, and explores how insights from the thesis into the key policy and regulatory issues in mobile money can contribute to debates about institutional design of banking and payment systems.

7.2.1 Mobile Money

Mobile money has grown rapidly over the course of writing this thesis. In June 2012, when the author chose this topic, there were 30 million active mobile money accounts.⁶¹⁹ By December 2015 this figure stood at 134 million.⁶²⁰

This growth has been accompanied by regulatory developments that have enabled mobile money to widen its functionality. This is creating a policy divergence about a socially-desirable role for the service, namely what function should it perform in a financial system? More specifically, to what extent should it complement or substitute the financial system? In some countries, policymakers continue to view mobile money in a *complementary* role to the banking and financial system. This involves promoting mobile money as just one of a range of formal financial services available to unbanked customers.⁶²¹ Such customers are encouraged to use mobile money for basic transfers and move any surplus funds to the banking system where they can be intermediated.⁶²²

Usually, to this end, mobile money is not permitted or encouraged to provide the full functionality of a bank deposit. For example, in Kenya, public ordering prohibits mobile money from providing an investment function because customers

⁶¹⁹ GSMA (n 82).

⁶²⁰ See Chapter 1.

⁶²¹ See the discussion in Chapter 2 outlining the limitations on the functionality of the storage function of M-Pesa and other mobile money products in Kenya.

⁶²² For example, see the discussion of M-Shwari in Chapter 3.

cannot receive interest payments on their mobile money accounts.⁶²³ Furthermore, this system is non-interoperable. This means mobile money does not provide the functionality of the inter-bank system in which depositors of different banks can make payments to each other. Finally, as of yet, mobile money does not enjoy explicit ex post government support of the type that applies to banks, such as deposit insurance.

Policymakers have also permitted the launch of products specifically designed to encourage mobile money to customers to move surplus funds into the banking system. For example, and as discussed in Chapter 4, the CBK has authorised the launch of and encourages the use of M-Shwari, in which customers can transfer funds from their mobile money account with Safaricom to a linked bank deposit provided by the CBA.

In contrast, in other countries, such as Tanzania and Nigeria, policymakers have permitted mobile money to develop greater functionality to the point that this service can *substitute* for the interbank system. This means the unbanked can meet most, if not all, of their basic economic and liquidity needs without using the banking system. For example, in Tanzania, a customer can access an investment function through mobile money because she obtains interest payments on her accounts. Furthermore, through interoperability, she can access a network of payees and payors that rivals the network provided by the country's banking system.⁶²⁴

In addition, in other countries, mobile money accounts increasingly receive the type of ex post protections normally extended to bank deposits. For example, and

⁶²³ Chapter 2 discusses this point.

⁶²⁴ Chapter 4 discussed interest payments in relation to Tigo Tanzania and Airtel. Chapter 5 discussed interoperability.

as discussed in Chapter 2, in Nigeria, pass-through deposit insurance is available on customers' funds.⁶²⁵

7.2.2 Banking and Payment Systems

The policy divergence about a socially-desirable role for mobile money coincides with on-going debates and developments that impact the design of payments, banking and financial systems. Three debates and developments are particularly important.

7.2.2.1 Design of Financial Systems

The first is the institutional design of financial systems. Traditionally, financial systems have comprised financial intermediaries and financial markets.⁶²⁶ Each of these traditional institutional 'pockets' is capable of performing most, if not all, of the core functions of the other.⁶²⁷

However, in recent years it has become increasingly difficult to maintain this institutional distinction across a large number of countries. For example, banks have become more directly reliant on financial markets by raising funds from money markets in which banks lend and borrow from each other. Banks have also raised funds through bond markets. In addition, non-banking firms that are often linked to banks in various ways have begun providing many of the functions of these institutions, particularly credit intermediation, without being subject to bank

⁶²⁵ Chapter 3 discussed this point.

⁶²⁶ The financial system has traditionally been divided into two components. One is intermediaries such as banks, savings and lending institutions, pension funds, mutual funds and insurance companies. The other are financial markets such as equity markets, bond markets, derivative and options markets, futures and commodity markets, and ancillary actors which facilitate the production and dissemination of information that enable markets to operate: Armour and others (n 2) ch 1, 23.

⁶²⁷ *ibid.*

regulation. These ‘shadow banks’ include MMMFs, hedge funds, and a range of other institutions.⁶²⁸

This chapter has insufficient space to fully explore these market developments. Nor can it explain their regulatory and policy implications. Instead, the Chapter simply cites these developments to demonstrate that in recent years, the traditional institutional design of financial systems has changed, particularly due to increasing interrelationships between banks and financial markets.

7.2.2.2 Rise of Financial Inclusion

The second policy development relates to the criteria used to assess the effectiveness of financial regulation. Traditionally, financial regulation is judged by its ability to increase efficiency, particularly in relation to intermediation.⁶²⁹ However, as discussed in Chapter 1, financial inclusion is becoming an increasingly important criterion against which regulation is assessed.⁶³⁰

Initially, interest in financial inclusion was limited to developing countries. However, this objective is becoming increasingly relevant in developed countries. For example, on 14 October 2015, Democrat Presidential candidate Bernie Sanders advocated for the use of the U.S. Postal Service to reach unbanked and under-banked Americans. Like this thesis, he justified this program on the grounds that, without access to a bank deposit, unbanked people must often use alternative mechanisms that are of limited use in managing their economic and liquidity needs, as outlined in the

⁶²⁸ See a discussion in Armour and others (n 2) ch 20, 433.

⁶²⁹ Text to n 323.

⁶³⁰ Text to n 323.

following statement:

[I]f you are a low-income person, it is, depending upon where you live, very difficult to find normal banking. Banks don't want you. And what people are forced to do is go to payday lenders who charge outrageously high interest rates. You go to check-cashing places, which rip you off. And, yes, I think that the postal service, in fact, can play an important role in providing modest types of banking service to folks who need it.⁶³¹

Bernie Sanders was supporting a proposal issued by the Office of Inspector General, which was on released on 21 May 2015.⁶³² Senator Elizabeth Warren, the Democrat Senator from Massachusetts, also publicly backed this plan.⁶³³

Other developed countries are investing in achieving financial inclusion objectives. For example, a Select Committee on Financial Exclusion has been formed in the United Kingdom's House of Lords.⁶³⁴ This Committee aims to explore methods of enhancing financial inclusion in the UK.

Financial inclusion is now relevant to the work of a number of international institutions. For example, in November 2015, the G20 issued a white paper exploring financial exclusion.⁶³⁵ This paper documented the work into financial inclusion

⁶³¹ See Felix Salmon, 'Bernie Sanders: 'Invest in Jobs and Education, Rather Than Jails and Incarceration'' (Fusion, 20 October 2015) <<http://fusion.net/story/216948/bernie-sanders-felix-salmon-interview-economy/>> accessed 15 April 2016.

⁶³² The aim is to enable unbanked and under banked communities to small loans, cash checks, pay bills, and open savings accounts at their local post office: see Office of Inspector General: United States Postal Service, 'The Road Ahead for Postal Financial Services' (*Uspsoig*, 21 May 2015) <https://www.uspsoig.gov/sites/default/files/document-library-files/2015/rarc-wp-15-011_0.pdf> accessed 15 April 2016.

⁶³³ Elizabeth Warren, 'Coming to a Post Office Near You: Loans You Can Trust?' (*Huffington Post*, 1 February 2014) <http://www.huffingtonpost.com/elizabeth-warren/coming-to-a-post-office-n_b_4709485.html> accessed 15 April 2016.

⁶³⁴ Lords Select Committee, 'Financial Exclusion Committee', (*UK Parliament*, 2016) <<https://www.parliament.uk/financial-exclusion>> accessed 29 December 2016.

⁶³⁵ The G20, Global Standard-Setting s and Financial Inclusion –The Evolving Landscape (November 2015) <http://www.gpfi.org/sites/default/files/documents/GPFI_White%20Paper%20Consultation%20Document%2013%20NOVEMBER%202015.pdf> accessed 7 April 2016. See also donor and government support for the Better Than Cash Alliance (BCTA). This institution aims to support countries to move towards digitalised financial

currently conducted by the Financial Stability Board, the Basel Committee for Banking Supervision, the Committee on Payments and Market Infrastructures, the Financial Action Task Force, the International Association of Deposit Insurers, the International Association of Insurance Supervisors, and the International Organisation of Securities Commissions. More recently, in April 2016, the Bank for International Settlements and World Bank Group issued guiding principles designed to assist countries that seek to use payment systems to advance financial inclusion.⁶³⁶

7.2.2.3 The Design of Payment Systems

The third development has taken place in relation to the design of payment systems. Many of these developments focus on the type of narrow banking structure used in mobile money, as introduced in Chapter 3. Periodically, payments literature has advocated for the creation of payment banks. Firms operating as payment banks could provide payment and storage functions while subject to narrow banking rules.⁶³⁷ Usually these proposals fail to gain traction within scholarship on payment systems. This is because literature tends to argue that the full liquidity requirements that underpin narrow banking, and by extension payment banks, impose a socially-undesirable opportunity cost of unmobilised capital.⁶³⁸

services: BCTA, Main Page, <<http://betterthancash.org/about/>> accessed 29 September 2015.

⁶³⁶ Bank for International Settlements and World Bank Group, 'Payment Aspects of Financial Inclusion' (April 2016) Committee on Payments and Market Infrastructures, World Bank Group <<http://www.bis.org/cpmi/publ/d144.pdf>> accessed 15 April 2016.

⁶³⁷ See a discussion of potential different payment models in Harry Leinonen, 'E-Settlement: Soon a Reality?' in Haldane, Millard and Saporta (n 23) 4072.

⁶³⁸ Goodfriend in Humphrey (n 122) 93. See also Edward J Green, 'Some Challenges for Research in Payments' in Haldane, Millard and Saporta (n 23) 1472.

However, in recent years, a number of developing countries have begun to create payment bank licences.⁶³⁹ For example, in 2013, the National Banking and Securities Commission of Colombia approved the launch of ‘banco de nicho’ banks.⁶⁴⁰ In 2015, the Mexican financial regulator launched ‘specialised, limited-purpose financial institutions’.⁶⁴¹ Furthermore, in 2014, the Reserve Bank of India announced the launch of ‘payment bank’ licences. Like mobile money, all of the licences discussed above enable firms to provide payments and storage functions while subject to narrow banking obligations.

The chapter has insufficient space to examine these new licences in depth. However, it briefly outlines some of the basic components of the payment bank licence used in India to draw a comparison to mobile money. Like mobile money, payment banks can provide payment and storage functions.⁶⁴² Furthermore, and also like MM firms and MMHCs, payment banks cannot undertake lending activities.⁶⁴³

Both banks and non-banks, such as India Post and four phone companies, have been awarded payment bank licences.⁶⁴⁴ None of these firms have officially launched their payment bank activities. As a result, it is not possible to examine the business

⁶³⁹ This may have occurred as policymakers observe the apparent success in mobile money of reaching unbanked people and what appears to be the stability of this system. However, there is insufficient empirical material to determine this point conclusively.

⁶⁴⁰ María del Rosario Moreno Sánchez, ‘New Financial Inclusion Innovation in Colombia: Electronic Deposits’ (2015) Alliance for Financial Inclusion (AFI), 11 February 2015 <<http://www.afi-global.org/blog/2015/02/new-financial-inclusion-innovation-colombia-electronic-deposits>> accessed 28 December 2016.

⁶⁴¹ To do so, the Bank of Mexico, National Banking and Securities Commission, and Secretariat of Finance and Public Credit harmonised different regulations which existed in Mexico at the time. See BBVA ‘Mobile Banking in Mexico as a Mechanism for Financial Inclusion: Recent Developments and a Closer Look into the Potential Market’ BBVA Working Papers Number 13/20 <<http://www.rrojasdatabank.info/mobilebanking4.pdf>> accessed 20 April 2016.

⁶⁴² See Reserve Bank of India, ‘Guidelines for Licencing of Payment Banks’: authority to accept demand deposits (iii)(a) and perform payments (iii)(c).

⁶⁴³ RBI Guidelines for Payment Banks: (iv)(a) ‘the payments bank cannot undertake lending activities’.

⁶⁴⁴ See Rajesh Pandathil, ‘11 Entities Get Payments Bank Licences: What it Means for Indian Banking Sector’ (*First Post*, 20 August 2015) <<http://www.firstpost.com/business/ril-aditya-birla-et-al-getting-payment-bank-licences-what-it-means-for-the-indias-banking-sector-2399840.html>> accessed 20 April 2016.

models of payment banks. However, the introduction of payment bank licences in India and comparable schemes in Mexico and Colombia, combined with the spread of mobile money, demonstrates the growing use of the narrow banking structure as a means of providing payment and storage functions.

The next sub-section combines the three debates, and market and policy developments. It explains how insights from the regulation of mobile money, as discussed in this thesis, can contribute to debates around the institutional design of payment systems, financial inclusion, and socially desirable roles for banks.

7.2.3 An Insulated Retail Payments and Storage System

A key insight from mobile money is that, depending on where the MMHC stores customers' funds, retail payments and storage functions can be performed by firms with little, if any, interaction with the financial system.⁶⁴⁵ In particular customers' funds can be stored in the central bank. While still exposed to risks such as inflation, foreign exchange risk, or appropriation by the state, customers' funds are entirely insulated from the financial system. This section builds on the debates and developments discussed in Section 2.2 to explore the social desirability of an insulated payment and storage system in which customers' funds are stored in the central bank, which is the case in Columbia and El Salvador.⁶⁴⁶

A starting point for such an analysis involves returning to a key motivation for the thesis. As discussed in Chapter 1, mobile money has a range of functional advantages over informal payment and storage tools that the unbanked must normally

⁶⁴⁵ See Klein and Mayer (2011) emphasising this point: Klein and Mayer (n 58).

⁶⁴⁶ Chapter 4 discusses the approach taken in Columbia and El Salvador:

use, particularly cash.⁶⁴⁷ However, what advantages, if any, would an insulated payment and storage system operating on the business model and commitments adopted by the MM firm and its associates have over the current bank-based payment system, if any?

The answer to this question depends upon the desired functionality of the payment and storage system. A key insight running through the thesis is that when financial inclusion is prioritised over efficiency, an insulated payment and storage system becomes socially desirable. As discussed above, payments literature emphasising that narrow banking requirements, in this case storing customers' funds in a central bank, imposes a high opportunity cost. This is because such funds are stored in the central bank and so cannot be mobilised for intermediation into the economy through a bank's delegated monitoring function. For this reason, an insulated payment and storage system is not socially desirable in relation to the inter-bank payment system, which facilitates the flow of large value funds transfers between different financial institutions. Imposing a narrow banking model on banks in this system would destroy the liquidity, maturity, and credit transformation that drives much economic growth.

However, the opportunity cost of unmobilised capital is less relevant in retail payments systems, particularly when financial inclusion predominates over intermediation. Ultimately, the insulated retail payment and storage system may be more socially desirable, particularly in the context of financial inclusion, for four main reasons.

⁶⁴⁷ Text to n 52.

First, detaching payment and storage functions from the inter-bank system minimises *compliance costs*. As this thesis has explained, when mobile money operates on the Colombia and El Salvador model, prudential regulation is not required for this service. This enables non-banks to enter the sector. They can use their administrative advantages over banks to provide payments and storage functions to unbanked people, as discussed in Chapter 1.

Second, in doing so, the unbanked gain access to formal payment and storage functions. As emphasised in Chapter 1, such access can increase the ability of unbanked households to manage their economic and liquidity needs.

Third, and perhaps counter-intuitively, an insulated retail payment and storage system may increase the amount of intermediation in the economy. Currently, unbanked people are beyond the reach of the inter-bank payment system. As a result, their funds are not intermediated through investment.

The low-cost model of mobile money enables customers to access payment and storage services. In doing so, the customer could build up funds in her mobile money account and allocate surplus funds into the banking system so that she can obtain interest payments.⁶⁴⁸ In doing so, at least a portion of customers' funds become subject to a bank's delegated monitoring function and intermediated into the economy.

⁶⁴⁸ Klein and Mayer (n 58) 28.

An insulated system could achieve this objective through adopting the type of M-Shwari model introduced in Chapter 3. In this model, M-Pesa customers can build up money in their mobile money account and transfer surplus funds into a linked bank deposit provided by the CBA. Customers' funds obtain interest payments and are intermediated into the economy, like regular deposits provided by the CBA.

Overall then, an insulated payment and storage system may be able to deliver on financial inclusion with only partial, if any, impairment of intermediation and efficiency objectives. This insight can be a useful addition to the debates on the institutional design of payment and banking systems, discussed above. It may also explain the spread of payment banks and mobile money across the developing world.

The veracity of the findings in this section and the thesis more generally are limited by a number of empirical issues. The next section examines these issues and proposes that research should focus upon them in order to more fully explore the key policy and regulatory issues in mobile money.

7.3 Next Steps in Research

This section proposes that future research should prioritise the following six issues. First, potential behavioural problems of unbanked people. Second, the potential for financial crime and money laundering in mobile money platforms. Third, competition-related regulatory problems. Fourth, potential regulatory capture and other important political economy problems. Fifth, the potential effect of reputation in constraining risk taking in mobile money platforms. Sixth, the potential operation of systemic risk and regulatory tools to address its occurrence.

The author intends to conduct additional fieldwork into the regulation of mobile money in Kenya during February-March 2017. During this fieldwork he intends to obtain additional primary and secondary material on these topics. While not part of this DPhil research project, he intends to use such material in contributing to research on these topics, explored below.

7.3.1 Potential Behavioural Problems of Unbanked

This thesis has assumed the unbanked behave rationally.⁶⁴⁹ As a result, much of the policy and regulatory recommendations respond to information asymmetries between customers and formal firms in the mobile money system, rather than behavioural problems. The thesis was required to use this assumption because there is insufficient scholarship on the behavioural problems of unbanked customers.⁶⁵⁰ Furthermore, the thesis has assumed that the unbanked have minimal ability to use governance strategies.

Moving forward, research should focus upon determining the behavioural problems of unbanked people, to the extent feasible.⁶⁵¹ It should also examine the variations of behavioural problems across countries and regions, if any. There are several starting points for research. For example, there is some evidence that the unbanked face behavioural problems in relation to lending.⁶⁵² There is also limited but

⁶⁴⁹ As discussed in Chapter 2.

⁶⁵⁰ Also as discussed in Chapter 2.

⁶⁵¹ See literature exploring the need for research into the unbanked: Pickens, Porteous and Rotman (n 19), 3.

⁶⁵² Shawn Cole, Anna Paulson and Gauri Kartini Shastry, 'Smart Money? The Effect of Education on Financial Behaviour' (2012) Harvard Business School Finance Working Paper No. 09-071, March 2012 <<http://www.people.hbs.edu/scole/papers&publications/Working/Smart%20Money.pdf>> accessed 17 December 2016; Leandro S. Carvalho, Stephan Meier and Stephanie W. Wang, 'Poverty and Economic Decision-Making: Evidence from Changes in Financial Resources at Payday' (2 February 2016) American Economic Review, 106(2): 260-84 <<http://pubs.aeaweb.org/doi/pdfplus/10.1257/aer.20140481>> accessed 17 December 2016;

growing research into the possible behavioural constraints of the unbanked in relation to planning facilities, inattention and time inconsistent preferences.⁶⁵³ However, this research is yet to be applied to the two functions of particular focus for this thesis: payment and storage. This makes this research of little direct use for this thesis. More generally, this research is yet to be organised into a coherent body of scholarship on the behavioural preferences of unbanked people that can be used in this thesis. More research is required on this topic.

Insights from such research can be used for a number of purposes in relation to regulation of mobile money. In particular, it can be used to more closely determine the ability of customers to use governance strategies. As discussed above, the thesis has assumed that this ability is minimal. Furthermore, better understanding of behavioural problems of the unbanked can enable a determination of the effectiveness of disclosed material, the potential for such people to confuse mobile money accounts with bank deposits, and the circumstances in which they will engage in run-like behaviour. Such insights can also facilitate the design of regulation that will more effectively address these risks.

A tentative claim is that the unbanked's poverty and lack of formal education and experience with formal financial tools mean they will face stronger behavioural problems than depositors and retail and wholesale investors. This claim is consistent with several studies from the United States, which suggest that poor households are

Fernando Aportela, 'Effects of Financial Access on Savings by Low-Income People' (1999) Banco de México Research Department, December 1999

<<http://citeseerx.ist.psu.edu/viewdoc/download?doi=10.1.1.194.5270&rep=rep1&type=pdf>> accessed 17 December 2016; Abhijit Vinayak Banerjee (2013), 'Microcredit Under the Microscope: What Have We Learned in the Past Two Decades, and What Do We Need to Know?' *Annual Review of Economics*, Vol. 5: 487-519.

⁶⁵³ For example, Karlan and others argue that the unbanked are more subject to scarcity impinging on decision making, however do not explore this question in depth: Karlan, Ratan and Zinman (n 48). Dupas and others (n 57) 38.

more likely to suffer from behavioural biases than unbanked customers.⁶⁵⁴ For example, Shah, Mullainathan, and Shafir (2012) argue that poverty means unbanked people focus on day-to-day financial struggles and so are not capable of developing the type of financial know-how needed to make ‘good’ investment decisions. The authors label this cognitive overload.⁶⁵⁵ The struggle to survive consumes mental resources, which means mistakes are more likely to be made in financial affairs.⁶⁵⁶

There are several methodological barriers to using these studies to make claims about the behavioural problems of unbanked people in developed countries. For example, empirically demonstrating the causal effects of economic circumstances on decision-making is a major challenge.⁶⁵⁷ Shah, Mullainathan, and Shafir (2012) have been critiqued rigorously, particularly due to issues arising through their methodology.⁶⁵⁸ Furthermore, these studies apply to developed countries, particularly the United States, and so may have limited relevance to unbanked people in developing countries. Additional research should address these methodological challenges and focus more closely on unbanked people in developing countries.

7.3.2 Financial Crime

The second key regulatory issue to explore in greater depth is potential financial crime in mobile money platforms. For reasons of space, this thesis has not examined

⁶⁵⁴ Patricio S. Dalton, Sayantan Ghosal and Anandi Mani, ‘Poverty and Aspirations Failure’ (2016) *The Economic Journal*, 126, February 2016, 165–188. Doi: 10.1111/ec oj.12210 <<http://onlinelibrary.wiley.com/doi/10.1111/ecoj.12210/epdf>> accessed 17 December 2016.

⁶⁵⁵ Anuj K. Shah, Sendhil Mullainathan and Eldar Shafir, ‘Some Consequences of Having Too Little’ (2012) 338(6107) *Science*, 2 November 2012, 682 <<http://science.sciencemag.org/content/338/6107/682?sid=0bf56659-ed44-4545-9ae6-5afc539fd004>> accessed 29 December 2016, 684, 1. See also discussion in Bertrand, Mullainathan and Shafir 2004 (n 20).

⁶⁵⁶ Anandi Mani, Sendhil Mullainathan, Eldar Shafir and Jiaying Zhao, ‘Poverty Impedes Cognitive Function’ (2013) 341(6149) *Science*, 13 August 2013, 976, 980.

⁶⁵⁷ Mani *ibid.* See also Carvalho, Meier and Wang (n 660). Marianne A. Hilgert and Jeanne M. Hogarth, ‘Household financial management: The connection between knowledge and behaviour’ (2003) 89(7) *Federal Reserve Bulletin*, 309 <<https://www.federalreserve.gov/pubs/bulletin/2003/0703lead.pdf>> accessed 28 December 2016.

⁶⁵⁸ See eg, Carvalho, Meier and Wang (n 660).

this topic. However, financial crime is an important issue, because there is potential regulatory gap in relation to this topic. Private ordering, often with the implicit or explicit support of policymakers, tends to impose simpler know-your-customer (KYC) requirements on customers using mobile money than on bank depositors. For example, in M-Pesa, a customer's SIM card can serve as a form of identification.⁶⁵⁹

Lower levels of KYC for mobile money may serve financial inclusion objectives. This is because unbanked customers may have access to a mobile phone, but not the additional, more extensive set of identification usually required to open a bank account. Furthermore, encouraging customers to shift from cash to mobile money can facilitate efforts to track financial crime. This is because, as discussed in Chapter 1, mobile money has a record-keeping feature, in which transaction information is stored and can latter be reviewed by policymakers to trace crime.⁶⁶⁰ This feature can provide at least some protection from financial crime, particularly when compared to cash which is largely untraceable.⁶⁶¹

However, lower KYC requirements may enable laundered money to enter electronic form more easily than through the banking system. Furthermore, the lower KYC requirements may mean policymakers have less opportunity to determine the source of cash entering the system.

There is a potential regulatory trade-off in imposing tools designed to address financial crime. Increasing KYC requirements can enable policymakers to more easily identity customers and potentially reduce financial crime. However, this increase may

⁶⁵⁹ Text to n 275.

⁶⁶⁰ See the functional comparison between mobile money and cash in Chapter 1.

⁶⁶¹ See a discussion above in Scott (n 31): text to n 52.

impair financial inclusion efforts. This is because unbanked customers may be unable to comply with more rigorous KYC standards.

Moving forward, research is needed on this potential trade-off and methods to alleviate it, if any. The international community has begun this discussion. For example, in June 2013, the Financial Action Task Force issued a guidance note titled *Guidance for a Risk-Based Approach: Prepaid Cards, Mobile Payments and Internet-Based Payment Services*.⁶⁶² This document is designed to stimulate discussion and research into methods of tailoring traditional, bank-based KYC requirements for mobile money in the interests of balancing financial inclusion with the goal of minimising financial crime. Additional research is required on this topic.

7.3.3 Competition

The third key regulatory issue to explore is competition. The thesis has assumed the existence of effective competition in mobile money platforms. In reality, however, many mobile money sectors exhibit oligopolistic or monopolistic market features. For example, Safaricom maintains an overwhelming dominance of Kenya's mobile money landscape. Its M-Pesa service reaches around 80% of Kenya's mobile money users.⁶⁶³ As explained in Chapter 6, M-Pesa retains this market dominance because, amongst other reasons such as Safaricom's considerable first-mover advantage, the

⁶⁶² Financial Action Task Force (FATF), 'Guidance for a Risk-Based Approach: Prepaid Cards, Mobile Payments and Internet-Based Payment Services' (June 2013) <<http://www.fatf-gafi.org/media/fatf/documents/recommendations/Guidance-RBA-NPPS.pdf>> accessed 29 December 2016.

⁶⁶³ Rival MM firms are becoming increasingly aggressive in challenging Safaricom's market dominance, including through action in courts. For example, in response to intense lobbying, on 22 August 2014, the Communication Authority of Kenya (the public agency charged with licencing and supervising actors in the communications sector) ordered Safaricom to allow rival MM firms to use cash merchants that were previously only permitted to provide M-Pesa services: Hilary Heuler, 'How Kenya's Mobile Money is Opening Up Now Middlemen Have Been Set Free' (*ZD Net*, 22 August 2014) <<http://www.zdnet.com/article/how-kenyas-mobile-money-is-opening-up-now-middlemen-have-been-set-free/>> accessed 14 April 2016.

system remains non-interoperable.⁶⁶⁴ This means customers of newer, smaller firms such as Airtel and Tigo cannot send payments to M-Pesa customers. In turn, this reduces the attractiveness of Airtel and Tigo, which in turn strengthens Safaricom's market dominance.

It may be assumed that a policymaker should immediately implement measures that can increase competition, such as reducing barriers to entry.⁶⁶⁵ However, economic theory suggests such tools may not necessarily deliver desired objectives, particularly in relation to financial inclusion. For example, the monopolist MM firm may actually be beneficial to customers because it might innovate more than it would in a textbook competitive market.⁶⁶⁶ Measures other than regulation, such as technology, might be more effective in breaking up monopolies and oligopolistic mobile money sectors.⁶⁶⁷ Furthermore, identifying competition failure in markets can be difficult.⁶⁶⁸ Finally, the very process of intervening in the market to address perceived competition problems may create the potential for regulatory capture. This is because the monopolist MM firm may collude with the policymaker in ways that ultimately strengthen, rather than undermine, its market dominance.⁶⁶⁹

Research should focus on potential competition problems, regulatory tools that can address them, and potential regulatory capture problems. This is a useful point at

⁶⁶⁴ *ibid.*

⁶⁶⁵ Greenacre, Malady and Buckley (n 32).

⁶⁶⁶ Joseph Alois Schumpeter, *The Theory of Economic Development* (Oxford University Press, 1934) cited in Sussman (n 178) 13; Sussman (n 178) ch 6, 10.

⁶⁶⁷ *ibid.*; Sussman (n 178) ch 6, 10.

⁶⁶⁸ See difficulties of distinguishing Bertrand competition and Cournot Competition: Bertrand: [4] J. Bertrand. *Théorie mathématique de la richesse sociale*. *Journal des Savants*, 67:499–508, 1883; Cournot: A. Cournot. *Recherches sur les Principes Mathématique de la Théorie des Richesses*. Hachette, Paris, 1838. English translation by N.T. Bacon, published in *Economic Classics*, Macmillan, 1897, and reprinted in 1960 by Augustus M. Kelley.

⁶⁶⁹ Rand Stigler, 'The Theory of Economic Regulation' (1971) 2(1) *The Bell Journal of Economics and Management Science*, Spring 1971 <<http://www.rasmusen.org/zg601/readings/Stigler.1971.pdf>> cited in Sussman (n 178) 4.

which to move on to the next issue that requires attention, which is political economy problems and institutional design.

7.3.4 Political Economy and Institutional Design

The thesis has assumed that the relevant policymaker wants to produce the regulation proposed in this thesis. In short, the policymaker acts in the public interest, even if resource constraints impair its ability to implement and supervise certain types of tools. In the real world, however, policymakers are usually subject to a range of forces and incentives that impairs the design and implementation of regulation. These incentives mean policymakers may design and implement regulation that responds to the interests of politicians or their own staff, rather than those of the public.⁶⁷⁰

Potential political economy problems, particularly regulatory capture, may arise in mobile money. The policymaker may be ‘captured’ by one or more MM firms due to the principles-based approach proposed in the thesis or efforts to address competition, as discussed above. Alternatively, banks, facing increased competition due to the entry of MM firms into the payment and storage functions, may pressure policymakers to design and implement regulation that disadvantages the mobile money sector.

To the author’s knowledge, the only investigation into potential regulatory capture relates to the attempt of Kenyan banks to shut down M-Pesa. Despite intense bank lobbying, the CBK refused to take this step.⁶⁷¹

⁶⁷⁰ Simon Johnson and James Kwak, *13 Bankers: The Wall Street Takeover and the Next Financial Meltdown* (Vintage Books, 2011).

⁶⁷¹ Mas and Radcliffe (n 12) 32.

On a related point, there is a lack of clarity over which policymaker or groups of policymakers should be responsible for regulating mobile money. This lack of clarity arises because mobile money traverses a range of sectors and issues, including telecommunications, payments, banking, and competition.⁶⁷² The thesis has assumed that the central bank has this responsibility due to the prevalence of this approach in countries in which mobile money operates.⁶⁷³

Next steps in research should include exploring potential regulatory capture, particularly based on current institutional frameworks in which the central bank acts as the lead regulator. Research should also examine the extent to which other policymakers may be better able to resist regulatory capture.

7.3.5 Reputation

Another important issue to examine is reputational incentives of different actors in mobile money to deliver on commitments contained in private ordering. Reputation may have particularly-important constraining effects in mobile money. This is because, as discussed, MM firms, as phone companies, have attached and often highly profitable mobile phone services. A combination of mobile money and mobile phone businesses may create significant charter value for MM firms.

⁶⁷² Increasingly, the need for such collaboration in mobile money policy and regulation results in memorandum of understanding between policymakers. As of March 2014, Malawi such memoranda operate between the Reserve Bank of Malawi (RBM), Malawi Communications Regulatory Authority (MACRA) and Ministry of Finance; the Competition and Fraud Trading Commission and MACRA; and the RBM and MACRA. See Greenacre, Malady and Buckley (n 32) 17.

⁶⁷³ In addition, a central bank (the Central Bank of Kenya) regulates M-Pesa, the focus service of this thesis.

The thesis had insufficient empirical information to make a claim about the effects of reputation in constraining risk-taking in M-Pesa and other schemes. Research should be conducted on this topic.

7.3.6 Trusts

A sixth important issue to address is the enforceability of trusts across jurisdictions. As explained in Chapter 3, trusts are a key instrument that underpin private and public ordering for mobile money. As discussed above, policymakers in a number of countries have expressed concern that trust arrangements for mobile money may not be adequately constituted.

7.3.7 Systemic Risk

A seventh, and final area to be examined is systemic risk. This thesis did not examine systemic risk in mobile money. This topic needs to be explored in greater depth and research conducted into whether or the extent to which mobile money causes negative externalities and systemic risk. Armour and Awrey (2015) have advocated for an analysis into this topic.⁶⁷⁴ This is becoming increasingly important as mobile money grows.

Existing literature suggests that even in the most sophisticated mobile money sectors, such as Kenya and Tanzania, the service does not cause systemic risk.⁶⁷⁵ However, this view may be subject to methodological deficiencies. Researchers and

⁶⁷⁴ Armour and Awrey (n 134).

⁶⁷⁵ See references below, and refer to n 188 for an additional discussion of systemic risk.

policymakers may be searching for the type of systemic risk that arises through failure of bank-based payment and storage systems, rather than mobile money.

A key challenge in assessing the systemic risk of mobile money using current literature and regulatory frameworks is that it is bank-centric. For example, as discussed above in Chapter 6, the Core Principles of Systemically Important Payment Systems assume that banks, not MMHCs, provide the accounts into which funds are deposited, withdrawn and paid out. Various risks and regulatory approaches to them are determined on these assumptions.

Literature is yet to determine the extent to which, if at all, systemic risk differs from those of bank-based systems. For example, Lauer and Tarazi (2012) argue that mobile money does not present a systemic risk due to the limited funds involved.⁶⁷⁶ Lyman, Pickens, and Porteous (2012) state that growth of mobile money means that while individual retail payment transactions remain small in value fix, collectively they may come to carry system-wide and systemic significance.⁶⁷⁷ Kimenyi and Ndung'u (2011) argue that several vulnerabilities of the mobile banking system can contribute to systemic risk and compromise the stability of the financial system. These include fraudulent movement of funds, network hitches, and mismatch of cash balances at pay points.⁶⁷⁸ Alexandre, Mas, and Radcliffe (2011) claim that technology-based models can present electronic data security issues, which may

⁶⁷⁶ Lauer and Tarazi (n 183), 1, 3 and 4.

⁶⁷⁷ Lauer and Tarazi (n 157) 1, 3 and 4.

⁶⁷⁸ Mwangi S. Kimenyi and Njuguna S. Ndung'u, 'Expanding the Financial Services Frontier: Lessons From Mobile Phone Banking in Kenya' (2009), *Brookings*, 16 October 2009 <<https://www.brookings.edu/articles/expanding-the-financial-services-frontier-lessons-from-mobile-phone-banking-in-kenya/>> accessed 17 December 2016.

contribute to the broader problem of systemic risk if significant amounts of data are compromised.⁶⁷⁹

A tentative claim, which should be explored through additional research, is that systemic risk due to collapse of mobile money may take a different form than a bank-based payment system. This form may be difficult to predict using bank-based tools. Much of the form of systemic risk is informed by the fact that mobile money is the unbanked customer's first step into the formal financial system. The product serves as a bridge between the unbanked, who operate in the informal economy, and the formal financial system. This means collapse of a mobile money system, whether in relation to payments or storage, could have the following four consequences.

First, most obviously, collapse of mobile money is likely to impose direct harm on the real economy by disrupting the ability of customers to make payments and storage. Depending on the interrelationship between mobile money and the formal financial system, collapse of the former may have no direct impact on the latter. For example, in the Columbia and El Salvador model, in which customers' funds are stored in the central bank, collapse of mobile money will not directly impact the formal financial system. As a result, such a collapse will not cause the traditional realisation of systemic risk, which focuses on the impairment to banks' lending function and ultimately a reduction of credit in the economy.⁶⁸⁰

⁶⁷⁹ Alexandre, Mas and Radcliffe (n 41), 4; See also discussion in Pierre Chatain, Raul Hernandez-Coss, Kamil Borowik, and Andrew Zerzan 'Integrity in Mobile Phone Financial Services: Measures for Mitigating Risks from Money Laundering and Terrorist Financing,' (2008) World Bank Working Paper 146 <http://siteresources.worldbank.org/INTAML/Resources/WP146_Web.pdf> accessed 29 December 2016; Claire Alexandre and Lynn Chang Eisenhart, 'Mobile Money as an Engine of Financial Inclusion and Lynchpin of Financial Integrity' (2013) 8(3) Washington Journal of Law, Technology and Arts 285.

⁶⁸⁰ Armour and others (n 2).

Second, disruption caused by collapse of mobile money may have particularly severe adverse economic consequences for unbanked people, in ways that might not be identified and analysed using existing systemic-risk related tools. This is primarily because of the likely unavailability of substitutes, which is used in payments material to determine the scope of systemic risk.⁶⁸¹

In developed countries, if one bank fails, usually depositors of that bank can eventually make payments through another bank. This is because depositor guarantee schemes protect her funds which can eventually be transferred to another, solvent bank.⁶⁸² In contrast, if an MM firm fails, an unbanked customer may lose access to electronic transfers altogether. This is because, depending on the level of competition in the economy, there may be no competing MM firm to fill the gap.

Third, and a related point, collapse of mobile money may disrupt a significant amount of activity in the real economy in ways that are not commonly modelled. This is because, by operating as a bridge in the way discussed above, collapse of mobile money may disrupt the customer's ability to honour obligations she has incurred in the real economy. In the event of collapse of a large mobile money service, such as mobile money with 20 million customers, or the entire system such as Tanzania with 31 million customers, such a knock-on could be considerable.

This is because in many developing countries the informal economy comprises a significant portion of overall economic activity – often between 40-

⁶⁸¹ See Millard and Saporta in Haldane, Millard and Saporta (n 23) 623.

⁶⁸² See discussion on deposit insurance schemes in Chapter 3 and Chapter 4.

70%.⁶⁸³ This means, depending on the number of unbanked people using the service and the transaction volume and value, mobile money, collapse of this system may cause signifying disruption throughout the informal economy. In turn, this may impede a country's overall economy activity.

Such an outcome may mean that mobile money causes a negative externality and a form of systemic risk. The potentially large number of people potentially affected in the informal and formal economy means they are unlikely to co-ordinate their actions and protect against such an occurrence ex ante.

Fourth, collapse of mobile money may cause unbanked customers to lose confidence in formal financial services more generally. This may impair government's financial inclusion efforts.

Research should focus on these four and additional issues in relation to the potential form of negative externalities and systemic risk in mobile money. Such research should also focus on designing regulatory tools that can address them.

Conclusion

In conclusion, mobile money already serves very large numbers of unbanked people across all developing regions of the world. Its rapid growth and apparent profitability

⁶⁸³ For example, in a World Bank report Laoyza, Servén and Sugawara (2009) estimate the informal economy in Latin America produces 40% of the GDP and employs 70% of the labor force informally : Norman V. Loayza, Luis Servén and Naotaka Sugawara, 'Informality in Latin America and the Caribbean' (2009) The World Bank Development Research Group Macroeconomics and Growth Team, Policy Research Working Paper 4888, March 2009 <<http://library1.nida.ac.th/worldbankf/fulltext/wps04888.pdf>> accessed 29 December 2016. Other studies, such as La Porta and Schleifer (2008) emphasise the size of the informal economy may be around 29% to 57.3% compared to the overall economy: Rafael La Porta and Andrei Shleifer, 'The Unofficial Economy and Economic Development' (2008) Brookings Papers on Economic Activity, Fall 2008, 275 <https://www.brookings.edu/wp-content/uploads/2008/09/2008b_bpea_laporta.pdf> accessed 28 December 2016, 2. However, these scholars also note the difficulties of measuring the informal economy given the prevalence of hidden firms and outputs. These may be hidden from police, tax authorities and regulators, to minimise tax and potentially for other reasons: 5.

makes it a worthy subject of research and attention. And there appears significant opportunity for mobile money to continue to grow. As discussed in Chapter 1, over 2 billion people are not served by banks, however, 1.6 billion of them have access to a mobile phone.⁶⁸⁴

There is considerable humanitarian potential in these developments, and potential costs. Much of the growth is occurring without underlying regulatory understanding. For example, very little information is available on the behavioural problems of the unbanked. There is a lack of understanding on limitations of asset partitioning of customers' funds in common and civil law countries, and the desired form of ex post regulation that could and, as this thesis has argued, should apply to mobile money.

The thesis has engaged in a range of important issues and explored regulatory and policy trade-offs involved in addressing them. Additional research on these and other important regulatory issues is required for three main reasons. First, financial innovation without adequate regulatory understanding often ends in disaster and 'Main Street' must often foot the bill.⁶⁸⁵ The economic vulnerability of unbanked customers, particularly the lack of government support, suggests they have a very great deal to lose if mobile money fails.

Second, and perhaps more fundamentally, a major failure of mobile money may have significant follow-on effects that are difficult to predict in advance. It may cause a range of types of economic disruption to the informal markets in which the

⁶⁸⁴ ITU News, 'Focus Group on Digital Financial Services' (December 2015) <<https://itunews.itu.int/en/6027-ITU-Focus-Group-on-Digital-Financial-Services.note.aspx>> accessed 28 December 2016.

⁶⁸⁵ This process emerges from the political economic cycle of financial regulation: see Culpepper (n 83).

unbanked live and work. Furthermore, collapse of mobile money may impair financial inclusion efforts by causing unbanked people to lose confidence in formal financial services.

The third and final reason relates to the institutional design of payments, banking and financial systems across developed and developing countries. The thesis has explained that mobile money contributes to recent market and policy developments and debates by demonstrating the value of a payment and storage system that is insulated from the financial system. As discussed in this chapter and the thesis as a whole, such a system can grow rapidly through a very limited risk profile and can reach the poorest members of the community.

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