

THE BOOK OF PAYMENTS

*Historical and Contemporary
Views on the Cashless Society*

Edited by

BERNARDO BÁTIZ-LAZO
and **LEONIDAS EFTHYMIOU**



The Book of Payments

Bernardo Bátiz-Lazo • Leonidas Efthymiou
Editors

The Book of Payments

Historical and Contemporary Views on the
Cashless Society

palgrave
macmillan

Editors

Bernardo Bátiz-Lazo
Bangor Business School
Bangor, United Kingdom

Leonidas Efthymiou
Intercollege Larnaca
Larnaca, Cyprus

ISBN 978-1-137-60230-5

DOI 10.1057/978-1-137-60231-2

ISBN 978-1-137-60231-2 (eBook)

Library of Congress Control Number: 2016957724

© The Editor(s) (if applicable) and The Author(s) 2016

The author(s) has/have asserted their right(s) to be identified as the author(s) of this work in accordance with the Copyright, Designs and Patents Act 1988.

This work is subject to copyright. All rights are solely and exclusively licensed by the Publisher, whether the whole or part of the material is concerned, specifically the rights of translation, reprinting, reuse of illustrations, recitation, broadcasting, reproduction on microfilms or in any other physical way, and transmission or information storage and retrieval, electronic adaptation, computer software, or by similar or dissimilar methodology now known or hereafter developed.

The use of general descriptive names, registered names, trademarks, service marks, etc. in this publication does not imply, even in the absence of a specific statement, that such names are exempt from the relevant protective laws and regulations and therefore free for general use.

The publisher, the authors and the editors are safe to assume that the advice and information in this book are believed to be true and accurate at the date of publication. Neither the publisher nor the authors or the editors give a warranty, express or implied, with respect to the material contained herein or for any errors or omissions that may have been made.

Cover image © julydfg / Alamy Stock Vector

Printed on acid-free paper

This Palgrave Macmillan imprint is published by Springer Nature

The registered company is Macmillan Publishers Ltd.

The registered company address is: The Campus, 4 Crinan Street, London, N1 9XW, United Kingdom

Foreword: Friction and Fantasies of the Cashless Future

The present collaborative volume takes a look back and a look forward at a historical moment when money and payment seems up for grabs in a way that would not have been possible just 30 years ago. If the twentieth century was an era of cash, checks, and plastic credit cards, the twenty-first is one of rapidly proliferating forms of electronic value transfer systems, each running on different platforms using different protocols and network infrastructures. When I first enrolled at college in 1985, the ATM was a marvel to me. In goes the plastic card; out comes cash! We lined up sometimes for a half hourbrail to use it. And there was only one, later two, on the entire campus. My students today can access and part with their money using Venmo, a mobile application and web-based service that allows person-to-person payments; using Apple Pay, tapping their Near-field Communication (NFC)-enabled mobile phone to a point-of-sale terminal; using Amazon.com and other online merchants' one-click payment methods to make purchases online; as well as with all manner of plastic cards and other devices with at least a half-dozen embedded communications technologies to facilitate value transfer. My list is partial but includes NFC, radio frequency identification (RFID), Bluetooth radio waves, magnetic stripes, wireless radio signals (Wi-Fi), supersonic sound waves, barcodes, QR codes, and other graphic representations that can be scanned electronically using an optical scanner. All this to facilitate frictionless, efficient payments, the transfer of value from one party to

another and the clearance and settlement of those transactions in a rapid, secure, and verifiable fashion.

A handbag that automatically locks shut whenever its owner walks too near a “danger zone,” a known location where self-control breaks down and the owner is likely to make an impulse purchase. A brass device modeled on ovoid Japanese Tokugawa coinage that generates a visual and tactile response whenever it is used to pay at an electronic terminal. These are but two technology prototypes from the summer of 2016 developed to create *more* friction in payments—a direct response to electronic payment systems that make it so easy to spend. Their designers made them intentionally to interrupt the ease with which the cashlessness of today’s electronic value transfer systems allows people to part with their hard-earned money. According to the founder of NewDealDesign—the very name, intentionally or not, evokes the history of financial crisis and political economic reconstruction—the vision behind the coin-like device is to “do something inefficient that people really do have to pay attention to, that’s quite literally trying to stimulate the pain receptors in your body” (Wilson 2016). The handbag is the venture of a personal finance website and is similarly meant to “make shoppers aware of their spending urges in the moment and … even physically deter them from accessing their wallets when they are at their most vulnerable” (Finextra 2016).

So why not just use cash? From an individual person’s point of view, after all, cash is also relatively frictionless: I hand a banknote to you, and you receive it. Transaction completed. Naysayers will argue that cash is cumbersome, costs money to move and store, is prone to theft or loss, is filthy. More important, perhaps, people feel cash, and when they hand it over, they feel its loss. A one-click payment sure is easy to make, and to make thoughtlessly. Hence the self-locking purse and the coin that sends little braille-like bumps into your flesh whenever you use it to pay.

The contributors to this volume bring perspectives from diverse academic and professional fields—from sociology, business, economics, computer science; from finance, information technology, journalism, management consulting. They are from countries as distant, and different, as Chile and Thailand. Providing rich case studies on cash and cashlessness in comparative and historical context, the chapters, together, help place in context the emerging present: a time when global inequal-

ity, consumer debt, political economic instability, and environmental destruction go hand in hand with technological utopianism, new forms of social and political organization—and new ways to pay, new monies even. As money dematerializes for some strata of global society, cash becomes an ever more significant part of the daily lives of others. There are zones of intense payment innovation, as well as payment deserts. Sometimes they are side by side, literally occupying the same geographic space: panhandling in tech hot-spot cities has become a real challenge, when no would-be benefactor carries cash anymore. Just a few blocks from my house, there are stores that only accept cash, that only accept cash in denominations of US\$20 or lower, that only accept cash at certain times of the day, that use telephone dial-up modems to process credit card transactions, that have an always-broken ATM or all-too-frequent skimming devices on gasoline pump payment stations.

Understanding payment is a matter of profound public significance. Purveyors of cashless payment systems are not just doing it for the consumer, after all—they have a stake in the value they can glean from encouraging more and more people to pay their way. New payment providers are getting in the game for tolls on transactions, for spending and consumer preference data that can be leveraged for advertising revenue, for cutting out the middleman by inserting themselves in its place. For some, that middleman is the state, and the effort to provide frictionless electronic payment is a play for the disintermediation of the state from the means of exchange. If, as I have argued elsewhere, payment is a public good, understanding new forms of payment through case studies like the ones this volume offers is a necessary part of our contemporary political education. Indeed, we may need it even more than a self-locking purse.

Bill Maurer

Dean, School of Social Sciences
Professor, Anthropology, Law, and
Criminology, Law and Society
Director, Institute for Money,
Technology and Financial Inclusion
University of California, Irvine

References

- Finextra. (2016). Handbag locks impulse spenders out of their wallets. Finextra, 25 August 2016. Available at: https://www.finextra.com/newsarticle/29349/handbag-locks-impulse-spenders-out-of-their-wallets?utm_medium=dailynewsletter&utm_source=2016-8-26. Accessed 25 Sept 2016.
- Wilson, M. (2016). This beautiful copper coin could transform how we spend money. FastCoDesign.com, 22 September 2016. Available at: <https://www.fastcodesign.com/3063923/a-beautiful-copper-coin-that-could-transform-how-we-spend>. Accessed 25 Sept 2016.

Preface: News from the Cashless Front

The second half of the twentieth century observed new ways of thinking systematically about methods for retail payments. Successive generations of researchers and managers in financial institutions debated and theorised their use while visualising their societies in a future where there was no role for material representations of money. This agenda roots to the emergence of the term “cashless/checkless society”, which appears to have originated within the world of business. It was coined in the USA in the mid-1950s to describe a future state of the economy in which a system of electronic transactions replaced the use of coins, cheques, and banknotes as media of exchange.¹ Such a milestone provides the basis for our examination of retail payments while trying to examine questions such as: How did it come about? What have been the most significant developments since then? What is the future of banknotes and coins? As the readers of the contributions to this edited book will see, the discourse and practices around *cashless* and *payment* imply wide human, societal, historical and technological trends, many of which have consequences on a global scale.

In its many forms, nuances and variations, the term cashless denotes the “absence of” without actually proposing a solution. Interestingly, it has been embraced throughout the global financial services industry. Replacing cash with payment cards, for instance, has shown to be resilient and broken through geographic, language, religious, and currency borders.² More recently, payment cards embody an international strategy

to increase financial inclusion by allowing ready access to financial markets for low income and remote populations located far from economic centres and banks. In this sense, the diffusion and adoption of cashless technologies often lead to increased communication, participation and social support.

Cashless also symbolises technological globalisation. Diffusion of technology matters and very much so in the early twenty-first century, when this book went into print. Cashless technologies provide worldwide payment networks and business solutions, at the same time as payment technologies are continually in development, passing through extended life cycle stages. These developments are not in isolation but take part in an ever-growing global retail payments ecosystem. Through the contributions to this book we place contemporary developments in a long-term context by detailing the computerisation and automation of payments in their historic context, as well as examining how different parts of the world adopted cashless solutions at different speeds and points in time.

Cashless also involves an element of risk—particularly when considering there is no consensus in the way forward while many compete to impose their preferred solution to replace cash. In this book we explain how institutions supporting cashless attempts are often risky ventures. These risks often emerge associated with a lack of legislation, poor strategy, failure in operation, lack of market interest, even fear and uncertainty in the adoption of new technologies. In this edited book we document occasions where cashless technological innovations could not be implemented due to a lack of appropriate legislation, while on other occasions, a lack of a clearly defined regulatory framework had the opposite effect of incentivising trade and commerce to take the initiative and develop its own cashless payment instruments. There were also cases where, ahead of their time, early cashless technologies failed to perform, adding obstacles to implementing visions of the future or causing uncertainty around the technologies that followed. In other instances, it was the banks that rejected the adoption of cashless solutions as it was considered too risky a venture.

Cashless, however, is not an end in itself but it is rather part of a wider payment revolution. In this context, cash is more than simply a method to fulfil a transaction, numeral or store of value as economists' conceptions often suggest. In fact, and at the time of writing, the circulation of cash in many economies is rising. Although customers are increasingly finding

other ways to pay for goods and services, such as payment cards, mobile phones, Internet payments and more, paper money is still popular.

Yet people are not replacing one payment media for another. Rather, they adopt the one that is more suitable for the transaction given a particular context. Paper money is convenient as a medium of exchange, easy to handle, anonymous, reliable and widely accepted. Importantly, cash is more than welcome when other payment methods fail during power outages and natural disasters. At the same time, cash has its own disadvantages, as it is not practical for large transactions. Also, it is difficult to track when it comes to tax collection or law enforcement. This is the sort of complex framework this book deals with when exploring the interaction of technology and on-the-spot purchases.

Before we turn to the subject matter of this book we would like to thank a number of people who helped in this project. First and foremost, all the authors in joining us throughout the journey and particularly Dave Stearns, with whom we conceptualised the original idea. D'Maris Coffman for her advice. Alexandra Morton and Aimee Dibbens at Palgrave for their patience and most excellent support throughout the editorial process. Sophia Michael generously helped with the review and editions while Alexander Zarifis helped with the indexing. Finally, Bangor University and Intercollege Larnaca provided the time and space to bring the project to fruition. In particular, Phil Molyneux, Kostas Nikolopoulos and John Thornton particularly deserve special appreciation given their unconditional support.

Bernardo Batiz-Lazo
Bangor, Wales

Leonidas Efthymiou
Intercollege Larnaca, Cyprus

Notes

1. Bernardo Bátiz-Lazo, Thomas Haigh, and David. Stearns, “How the Future Shaped the Past: The Case of the Cashless Society,” *Enterprise and Society* (2014): 15(1), pp. 103–131. Also, Chap. 10 in this book.
2. Stearns David, ‘*Electronic Value Exchange: Origins of the VISA Electronic Payment System*’, (London, Springer, 2011). Also, Chap. 14 in this book.

Contents

1	Introduction: The 360 Degrees of Cashlessness	1
	<i>Bernardo Bátiz-Lazo and Leonidas Efthymiou</i>	
Part 1	Banknotes, Coins, Materiality and Barter	11
2	Pre-1900 Utopian Visions of the ‘Cashless Society’	13
	<i>Matthew Hollow</i>	
3	The Banknote, a Momentous Innovation in Spain	23
	<i>Yolanda Blasco-Martel and Carles Sudrià-Triay</i>	
4	Innovating Means of Payment in Chile, 1840s–1860	33
	<i>César Ross</i>	
5	The Many Monies of King Cotton: Domestic and Foreign Currencies in New Orleans, 1856–1860	43
	<i>Manuel A. Bautista-González</i>	

6	The Art of Lending in the Pampas: Commercial Credit and Financial Intermediation in Argentina, 1900–1930	55
	<i>Andrea Lluch</i>	
7	Matching Cash and Kind: Argentina's Experimentation with Multiple Currencies, 1995–2005	65
	<i>Georgina M. Gómez</i>	
8	A South American Experience on Bartering: The Case of Tradaq in Brazil	75
	<i>José E. Rivero García</i>	
Part 2 Emergence and Future of Cashless Technologies		83
9	Dematerialization and the Cashless Society: A Look Backward, a Look Sideward	85
	<i>Patrice Baubéau</i>	
10	Origins of the Modern Concept of a Cashless Society, 1950s–1970s	95
	<i>Bernardo Bátiz-Lazo, Thomas Haigh, and David L. Stearns</i>	
11	From Teleprocessing to Cashless Payment Technologies: “La Caixa” 1960–2015	107
	<i>J. Carles Maixé-Altés</i>	
12	Limits to Cashless Payments and the Persistence of Cash. Hypotheses About Mexico	117
	<i>Gustavo A. Del Angel</i>	
13	The Cyprus Cash Crash: A Case of Collective Punishment	131
	<i>Leonidas Efthymiou and Sophia Michael</i>	

14	CajaVecina: The Bancarization of Chile Through Corner Shops <i>Juan Felipe Espinosa Cristia and José Ignacio Alarcón Molina</i>	141
Part 3 Paying with Plastic		153
15	Entrée: The Rocky Origins of Visa's Debit Card <i>David L. Stearns</i>	155
16	Protecting Plastic: Credit Card Fraud in Historical Perspective <i>Sean H. Vanatta</i>	167
17	Mondex and VisaCash: A First (Failed) Attempt at an Electronic Purse <i>Bernardo Bátiz-Lazo and Tony Moretta</i>	177
18	The Matter of Payment <i>Joe Deville</i>	187
19	The Russian Payments Scheme: Politics, Innovation and the Cash Problem <i>Daniel Gusev</i>	201
20	Who Holds Credit Cards and Bank Accounts in Uruguay? Evidence from Survey of Uruguayan Households Finances <i>Graciela Sanroman and Guillermo Santos</i>	211
Part 4 Mobile Payments		231
21	Mobile Banking in Africa: The Current State of Play <i>Marybeth Rouse and Grietjie Verhoeef</i>	233

22	Mobile Payments in Turkey (as of 2013) <i>Nurdilek Dalziel and Can Ali Avunduk</i>	259
23	Electronic Payment System of Thailand: Mobile Banking Market Competition <i>Jarunee Wonglimpiyarat</i>	269
24	The Determinants of Mobile Payment Adoption: An Intercultural Study <i>Uwe Hack</i>	283
25	Can Mobile Money Replace Cash in India? <i>Lakshmi Kumar</i>	297
26	A Gentle Introduction to Side Channel Attacks on Smartphones <i>Laurent Simon</i>	311
27	Barriers and Drivers to Future Bank Adoption of Mobile Banking: A Stakeholder Perspective <i>Jennifer Mullan, Laura Bradley, and Sharon Loane</i>	325
Part 5 Payments Systems and Digital Currencies		339
28	European Payments: A Path Towards the Single Market for Payments <i>Ruth Wandhöfer</i>	341
29	The Single Euro Payment Area (SEPA): Implementation in Spain <i>Santiago Carbo-Valverde and Francisco Rodríguez Fernández</i>	351

30	Revolutionizing Cashless Payments in Mexico: The Case of Mimoni/Lumbra	
	<i>Gabriel Manjarrez</i>	359
31	The Future of Money	
	<i>Anette Brolo</i> s	367
32	Payments as We Know Them Are Changing—ebarts the Social eCurrency: Tomorrow’s Cash	
	<i>Yasmine Arafa, Cornelia Boldyreff, and Miriam Morris</i>	379
33	Milestones for a Global Cashless Economy	
	<i>Bernardo Bátiz-Lazo, Leonidas Efthymiou, and Sophia Michael</i>	391
	Index	403

List of Contributors (Brief Curricula)

José Ignacio Alarcón Molina received his degree in sociology from Universidad Católica Silva Henríquez (UCSH). He is currently a postgraduate student at Universidad de Chile. José research interests are related with economic sociology and sociology of money. He is holder of a CONICYT scholarship and also works as research assistant at a Fondecyt sponsored project.

Yasmine Arafa has over 15 years' experience in software engineering and IT project management across vertical segments commercially and in academia. She has led research and development projects that involved the multidisciplinary areas of effective computing, social interaction design, multi-agent systems, and their application in real-time smart systems. Her focus is on creating new technology with social significance. Recent projects include context-aware smart systems that enable next generation applications for mobile, social computing and semantic web services.

Can Ali Avunduk has been working on digital platforms and mobile financial services since 2008. He is currently acting as the agency business manager for Google Turkey. Prior to his work at Google, Mr Avunduk was in charge of Garanti Bank's products and services running on mobile platforms. Before Garanti, he was a member of the founding team at Mikro Odeme, Turkey's first mobile payment service provider. Mr Avunduk received his BSc degree from Bilkent University, with a major in industrial engineering in 2007, and his MSc degree from Bosphorus University's Technology Management Program.

Bernardo Bátiz-Lazo read economics (at ITAM, Mexico and Autónoma de Barcelona, Spain), history (Oxford) and received a doctorate in business administration (Manchester Business School). He has been studying financial markets and institutions since 1988. He joined Bangor as professor of business history and bank management after appointments in Leicester, Open University and Queen's University of Belfast. He combined full-time appointments with consulting and executive training in Europe, the Gulf States, Latin America and Asia. Bernardo has over 35 refereed articles, three books and eight distance learning books. He is a Fellow of the Royal Historical Society, research associate of Fundación Estudios Financieros (Fundef – ITAM), and edits a weekly report on new working papers in Payments and Financial Technology (see <http://lists.repec.org/mailman/listinfo/nep-pay>).

Patrice Baubéau is associate professor in economic history (tenured) at Université Paris Ouest Nanterre La Défense – U.F.R. S.S.A. research centre: I.D.H.E.S./CNRS (U.M.R. 8533) and associate professor at Sciences Po (Paris). Recent publications include P. Baubéau, “L’histoire de France en ‘vignettes’: deux siècles de circulation fiduciaire”, *Revue Numismatique*, accepted, to be published in 2015, and P. Baubéau, “War Finance (France)”, in the 1914–1918 online *International Encyclopedia of the First World War*, 2014.

Manuel A. Bautista-González (Mexico City, 1984) is a doctoral candidate in United States History at Columbia University in the City of New York, funded by CONACYT’s International Postgraduate Studies Fellowship, and Columbia’s Richard Hofstadter Fellowship. Manuel specializes in the economic, business, and financial history of the United States. For his dissertation, Manuel is studying the concurrent use of domestic and foreign currencies as means of payment and their relationship with interregional and international trade circuits and financial markets in antebellum New Orleans. Manuel obtained a Licentiate (BA) in economics at the National Autonomous University of Mexico, where he specialized in Economic theory and economic history. He has worked in media, commercial banking, higher education and research. Manuel is a member of the Executive Board of the Mexican Economic History Association for the period 2013–2016. He has also been a member of the Editorial Board of the NEP-HIS blog since February 2012. He can be contacted at mab2306@columbia.edu.

Yolanda Blasco Martel is a lecturer of economic history at University of Barcelona (UB). Her research focuses on banking and financial history. She has published in refereed journals such as *Business History*, and written for publishers such as Oxford University Press, as well as various Spanish academic journals.

The book: *El Banco de Barcelona 1844–1874. Historia de un banco emisor*, with Carles Sudrià, was awarded a special mention by the Prize City of Barcelona, 2009, and has been reviewed in important journals of economic history. Her research is available in her personal webpage: <http://www.ub.edu/histeco/cat/membre.php?page=blasco.htm>

Cornelia Boldyreff lives in Greenwich (London) and is a visiting professor at the University of Greenwich in the School of Computing and Mathematical Sciences. She was previously the associate dean (Research and Enterprise) at the School of Architecture, Computing and Engineering at the University of East London from 2009–February 2013. Cornelia gained her PhD in software engineering from the University of Durham where she worked from 1992; she was a reader in the Computer Science Department when she left. In 2004 she moved to the University of Lincoln to become the first professor of software engineering at the university, where she co-founded and directed the Centre for Research in Open Source Software. She has over 25 years' experience in software engineering research and has published extensively on her research in the field. She is a fellow of the British Computer Society, and a founding committee member of the BCS Women Specialist Group, a committee member of the BCS e-Learning Specialist Group, and currently (2013) chair of the BCS Open Source Specialist Group. She has been actively campaigning for more women in STEM throughout her career. Together with Miriam Joy Morris and Yasmine Arafa, she founded the start-up, ebartex Ltd, and together they are developing a new digital bartering currency, ebarts.

Laura Bradley is a lecturer in marketing at the Department of International Business, Ulster Business School. Her research interests relate mainly to the area of diffusion of innovations with a specific interest in financial services and mobile/Internet-based distribution channels. She is keenly involved in pedagogic research in the area of employability. Her research has appeared in a number of publications such as *Marketing Intelligence and Planning*, *Journal of Marketing Management* and the *International Journal of Bank Marketing*. In addition, she has presented at a number of conferences including the Academy of Marketing, Irish Academy of Management and the Academy of International Business. She is actively involved in academic enterprise engaging process, product and market development projects with SMEs through knowledge transfer projects such as KTPs and Innovation Voucher Schemes. She has a keen interest in third sector/social economy and is a board member of a number of organisations.

Anette Broloes has previously been CFO and director of development in the financial sector and led large financial IT projects. She has an MSc in Economics, a PhD from University of Southern Denmark and an eMBS in Global e-management from Copenhagen Business School. Furthermore, she is sitting as a member of the Industrial Researcher Committee of the Ministry of Science, Innovation and Higher Education Business.

Santiago Carbó Valverde was born in Gandía (Valencia, Spain) in 1966. He holds a BA in economics (Universidad de Valencia, Spain), PhD in economics and a master's in banking and finance (University of Wales, Bangor, UK). He is professor of economics and finance at the Bangor Business School, UK, and is also head of financial studies of the Spanish Savings Bank Foundation (FUNCAS). He is president of the Rating Committee of Axesor. Santiago is an independent board director of Cecabank. He has been (and in some cases still is) consultant for public institutions such as the European Central Bank, the European Commission, the Spanish Ministry of Science and Innovation, the Spanish Ministry of Labour and the Institute of European Finance) and for private institutions such as banks (i.e. research department of BMN) and leading economic consulting companies; he is also a former consultant at the Federal Reserve Bank of Chicago. He has written over 200 articles and other publications on the financial system and has published articles in peer-reviewed journals such as *European Economic Review*, *Review of Finance*, *Journal of Money*, *Credit and Banking*, *Journal of International Money and Finance* and *Journal of Banking and Finance*. He has given conferences, lectures and seminars at international institutions (G-20, World Bank, World Savings Banks Institute), central banks and government bodies.

Nurdilek Dalziel gained a doctorate in business from the Open University, with a dissertation entitled: "The Impact of Marketing Communications on Customer Relationships: An Investigation into the UK Banking Sector", Open University Business School. MSc in Management and Business Research Methods, Open University Business School MPhil, "The Development of Retail Banking in the UK and Turkey: Some Implications from the UK", University of Exeter, BSc in Economics, Istanbul University Academic Experience includes a position as lecturer at the Institute of Financial Services, IFS University College (since February 2013) associate lecturer at the School of Management, University of Leicester (since July 2007), Henry Grunfeld Research Fellow, Institute of Financial Services, IFS University College (February 2013–January 2014), and

visiting research fellow, Open University Business School (July 2008–June 2010).

Gustavo A. Del Angel joined the Department of Economics of CIDE in Mexico City in 2001 where he is currently professor of economic history. His areas of research are financial history, banking and microfinance. All of them focus on Mexico. International appointments include national fellow at the Hoover Institution in Stanford University (2015–2016), professeur visitant at the Université de Paris III-Sorbonne Nouvelle (2006) and visiting research fellow at the Center for US–Mexican Studies at the UC-San Diego (2000). He received the Manuel Espinosa Yglesias Award for Economic, Political and Social Thought (Mexico 2007). He is a member of the Mexican Academy of Sciences and research associate at Fundación Estudios Financieros (Fundef – ITAM). Gustavo has also worked in non-academic projects. In 2009–2011 he worked in Banco de México, the Mexican central bank. In the last ten years he also has participated in consulting projects for public sector entities, international organizations, private sector and NGO. He has been non-executive directorate in microfinance organizations. He holds a PhD in History from Stanford University (2002) and a BA in Economics from ITAM (Mexico, 1992).

Joe Deville is a lecturer at Lancaster University, based jointly in the Departments of Organisation, Work & Technology and Sociology. A major focus of his work has been the encounter between defaulting consumer credit debtor and debt collector, which was the subject of his first book *Lived Economies of Default*, published by Routledge in 2015. Other areas of interest include disaster preparedness, comparative and digital methods, behavioural economics, and theories of money. He has published single and co-authored articles on these and related issues in *Journal of Cultural Economy*, *Consumption Markets and Culture*, *Cultural Studies*, and *Sociological Review*, as well as in two Routledge edited collections. With Greg Seigworth, he recently co-edited a Special Issue of *Cultural Studies* on ‘Everyday Debt and Credit’ and is the co-editor of two forthcoming books, one on the practical work of social scientific comparison (Mattering Press), and the other a book in the CRESC series examining techniques of market attachment (Routledge). He is an editor at the *Journal of Cultural Economy* and a co-founder and editor of both Mattering Press, an Open Access book publisher, and the online consumer studies research network Charisma.

Leonidas Efthymiou is coordinator of the Business Department at Intercollege Larnaca and lecturer at UNICAF since 2010. He received his PhD from the University of Leicester in 2011 through an ethnographic study on workplace

control and resistance. His PhD Thesis received the 2012 Best Dissertation award at the Academy of Management Meeting, held at Boston, Massachusetts. He is interested in a wide range of business phenomena, varying from service workers performing emotional, affective and aesthetic labour to cashless payments in the context of corporate legitimacy and sociology of finance. Recent works examine the role of payment infrastructures during banking shutdowns, insolvencies and bank runs.

Juan Felipe Espinosa Cristia grew up in Viña del Mar (Chile). He obtained the “Commercial Engineer” professional title in 1996 and then worked for 10 years developing new companies and as an executive in a chemical transnational company. In 2002, he obtained a MBA degree and began a part-time academic career. Then in 2006, Juan switched to a full-time academic and research career obtaining a postgraduate diploma in research methodology at the Social Sciences Faculty of the University of Chile. In 2009 he came to the School of Management, University of Leicester to study for a full time PhD under the sponsorship of the Chilean Government. Juan obtained his PhD in December 2014 with a thesis about the innovation process in nascent British medical device companies. Juan broad actual research interests are located within the social studies of finance and accounting, financial and accounting innovation, and philosophy, science and technology studies.

Georgina M. Gómez interests centre on the variety of economic organisations, namely of money, markets and enterprises. She is fascinated by the many ways in which people organize their exchanges at the local level. That takes many formats: creating a complementary currency, engineering a local market, coordinating a value chain or a local system of production, forming a producers' association or social enterprise, and so on. All of these initiatives require the building of institutions, which are the systems of rules that structure socioeconomic life. The two most critical institutions around exchange are money and markets. Often organised by economic actors locally, they exist in great diversity: there is exchange without markets, markets without money, money that doesn't look like such and is not used in markets, and so on.

Daniel Gusev is an active contributor to a global financial services innovation movement, who through his blogging and factual contribution in many projects on the Russian financial scene became an *esprit de corps* of good and socially beneficial products and services. A former consultant with SAP and Roland Berger Strategy Consultants, he has started his innovation course by accident, cementing it by a now influential blog in his 6th year of operation and numerous projects at leading banks, leading to several hit products, crafted in his most

recent position as Head of Innovation at a TOP 10 Russian bank. A cranky reading hobbyist with a fear of missing out all the latest financial service trends and features that might be of greater good to the general public, he believes in certain core principles, one of which is the socially empowering role of technology, which he now tries to apply to his start-up in a field of ‘payment heuristics’, as well as openly helping international players in whatever capacity they see his skills fit for their cause. Daniel majored in History from Moscow State University in 2006 and in Finance from Russian Financial Academy in 2010.

Uwe Hack is a graduate in business administration and has a doctorate in banking and finance from Manchester Business School (MBS), University of Manchester. During his time at MBS, his work focused on the research and theory of scoring models and the financing of small and medium-sized enterprises. Dr Hack started his professional career with Deutsche Bank in Frankfurt where he worked in various areas of investment banking and was European head of asset-backed finance. From 1999 to 2001 he was the Managing Director of Deutsche Bank’s corporate finance department. In May 2001, Dr Hack joined the board of schlott sebaldus AG to become the CFO of the group. He joined GRENKELEASING AG in October 2005. As the CFO and deputy CEO he had responsibility for investor relations, treasury, finance, risk management, controlling, and regulatory reporting. In February 2009, he became the CEO of Grenke Bank AG and responsible for strategy, risk management and IT. Since March 2012 he has been a professor for international finance and accounting at Furtwangen University.

Thomas Haigh is an associate professor of information studies at the University of Wisconsin–Milwaukee and from 2005 to 2014 chaired the SIGCIS group for historians of information technology. He has published widely on the history of computing, including ENIAC in Action: Making and Remaking the Modern Computer (MIT, 2016) with Mark Priestley and Crispin Rope. Learn more at www.tomandmaria.com/tom.

Matthew Hollow is lecturer in strategy at The York Management School, University of York. Previously he was a researcher on the Leverhulme Trust-funded “Tipping Points” Project. This research explored financial crises in the British Banking sector, both past and present, so as to understand the causes and implications of such changes and to work out how to better deal with their effects in the future. His doctoral dissertation was entitled: ‘Housing Needs: Power, Subjectivity and Public Housing in England, 1920–1970’ (University of Oxford (Wolfson College), History Department, fully funded by the Arts and Humanities Research Council (AHRC). Selected publications include:

'Boredom: The Forgotten Factor in Fraud Prevention?', *Journal of Corporate Accounting and Finance* 24 (2013), pp. 19–24; 'The 1920 Farrow's Bank Fraud: A Case of Managerial Hubris?', *Journal of Management History*, 20:2 (2014); 'Strategic Inertia, Financial Fragility and Organizational Failure: The Case of the Birkbeck Bank, 1870–1911', *Business History*, 56:2 (2014); *Rogue Banking: A History of Financial Fraud in Interwar Britain* (Palgrave, 2015); and *Complexity, Crisis and the Evolution of the Financial System: Critical Perspectives on American and British Banking* (Edward Elgar, 2015) (edited with F. Akinbami and R. Michie).

Lakshmi Kumar received a doctorate from Indian Institute of Technology (ITT) Madras, India. Earlier she completed her masters in econometrics and graduated in mathematics from the University of Madras. Since 1987 she has worked in several academic institutions including S P Jain Institute of Management, Rizvi College and Sophia College in Mumbai. She was an economist at the Madras Chamber of Commerce and Industry between 1997 and 2000. In the year 2000 she joined the Institute for Financial Management and Research (IFMR), Chennai as a research associate. Subsequently she was promoted as assistant professor and since 2012 is associate professor and program chairperson, PGDM at IFMR.

Her primary areas of interest evolve around understanding savings behaviour of low-income households, rural livelihoods and analysis of government-provided basic services. In this connection, she has been part of various field-based studies in Tamil Nadu, including projects sponsored by Harvard University, University of California, Irvine and NABARD, India. She teaches macroeconomics, managerial economics, entrepreneurship, international business and microfinance to business and management students.

Andrea Lluch is researcher at the National Council of Scientific and Technical Research of Argentina (CONICET), professor at National University of La Pampa in Argentina and affiliated researcher at the David Rockefeller Center for Latin American Studies at Harvard University. Between 2006 and 2009 she was the Harvard-Newcomen Fellow in business history and a research fellow at the Harvard Business School. She received her PhD from the Universidad Nacional del Centro de Buenos Aires. She researches the history of direct foreign investment, family business and corporate networks in Latin America during the twentieth century.

Sharon Loane is a lecturer at the Department of International Business, Ulster Business School. Her research interests centre on international busi-

ness/international entrepreneurship, which examine rapidly internationalising SMEs. A particular area of research interest relates to the Internet/Web 2.0 and internationalisation, as well as investigating the resources and knowledge required for international growth. She also has an interest in regional economic development and public policy support mechanisms associated with enhancing the competitiveness of small rapidly internationalising firms. Her publications have appeared in, for example, the *Journal of World Business*, *International Small Business Journal*, *Canadian Journal of Administrative Science*, *Journal of Marketing Management*, *International Business Review* and *International Marketing Review*. Sharon regularly undertakes knowledge transfer projects with SMEs, particularly around new product/service development issues. She is a member of the executive committee of The Academy of International Business (UK & I) Chapter and of the IE Scholars network.

J. Carles Maixé-Altés read both economics and history at the University of Barcelona, where he later received a doctorate in economic history, 1992 (cum laude). He has held the position of assistant professor of economic and business history at the University of La Coruña, Spain since 1992. He is a visiting scholar in Italy (Istituto Internazionale di Storia Economica “Francesco Datini”, Prato; University of Genoa and European University Institute, Florence); and UK (University of Leicester, School of Management and University of Glasgow, Department of Economic and Social History). His research interests include automation and mechanization of financial services in the twentieth century, and structural change in European grocery retailing 1950–2010. He is project leader and collaborator on diverse state-sponsored research projects and has research contracts with companies and public administration (A Coruña Provincial authority, A Coruña Chamber of Commerce, Eroski, and “la Caixa” among others).

Gabriel Manjarrez is co-founder and CEO of Mimoní, a company that since 2008 has been developing proprietary scoring processes and algorithms focused on instant credit approval for the unbanked middle- and bottom-of-the-pyramid majority in developing countries. Gabriel and his co-founder, Pedro Zayas, were selected as Endeavor Global entrepreneurs in late 2011 and also as top 10 entrepreneurs for 2011 in Mexico by CNN/Expansion. Mimoní’s investors include Omidyar Network and Ignia, two of the top global impact investment firms, as well as the Silicon Valley VC firms Bay Partners and Storm Ventures. Prior to Mimoní, Gabriel established Progreso Financiero, a US-based, Greylock-backed consumer financial services company focused on providing unsecured loans to the unbanked and underbanked Hispanic immigrant community in the

USA. Since 2005 Progreso has made over US\$1 billion worth of loans to US-based Hispanic immigrants in California and Texas. Gabriel received an MBA from Stanford University and a bachelor's degree in economics from the Instituto Tecnológico Autónomo de México (ITAM). He divides his time between Palo Alto, California and Mexico City.

Sophia Michael (MA, University of Warwick) is the English department head at Intercollege Larnaca, Cyprus. She has always been fascinated by the automation of payment systems and has currently begun researching on the use of contactless cards in Cyprus.

Tony Moretta spent the first 10 years of his career in financial services, at NatWest Bank in the UK and then at Visa International. For the last five of those he worked on both Mondex and Visa Cash, developing a range of new propositions in closed user groups, transport and mobile, and marketing the technology around the world to other banks. After a period working in the digital television and radio sectors, he returned to the payments world when planning and launching the mobile advertising and payments joint venture in the UK between EE, Telefonica and Vodafone–Weve. Tony currently advises a number of companies on projects within the digital space, including on mobile payment strategy for some major retailers.

Miriam Morris has 20 years' experience as a marketing and communications director. She has worked on urban design and community planning projects across the EU, USA, Japan and the Middle East. Also, she developed and promoted services for older people, and vulnerable young people and children in the UK. Recently she worked with Positive Money to develop their campaign strategy, and is part of NEF's New Economics Organisers Network. The idea for ebarts originated with Miriam Morris.

Jennifer Mullan is currently enrolled as a PhD student at the Magee Campus University of Ulster. She is in the final stages of writing up her thesis. Her research is based upon mobile banking and its diffusion within the global retail banking industry. She conducted an exploratory study that used an innovative methodology, which combined blogging and the Delphi technique. She has particular interest in innovative service industry distribution channels and the use of web 2.0 technology tools as regards innovative methodology development. She has presented her research at several conferences, including Academy of International Business and Academy of Marketing. She has previously taught as a part-time lecturer in marketing and is a PhD demonstrator within the University of Ulster.

José Eduardo Rivero García has a Bachelor's degree in economics from Instituto Tecnológico Autónomo de México (ITAM). He worked in the banking sector in Citibank Mexico and Switzerland before obtaining an MBA (Finance) at London Business School. He has resided in Brazil for the past 15 years, where he worked at Banco Pactual and Booz, Allen before he opened the first retail Barter Network in the country, Tradaq Ltda, which he has managed as CEO for the last 13 years.

Francisco Rodríguez Fernández was born in Granada (Spain) in 1975. He has a BA in economics and a PhD in economics and business, both from the University of Granada, and he has also followed PhD studies in the universities of Bologna and Modena. He is a professor of economics at the University of Granada. He is senior researcher at the Spanish Savings Banks Foundation-Funcas. He has conducted several R&D projects for international public and private bodies. He has been vice-dean–research of the School of Economics and Business at the University of Granada. He has also been visiting research fellow for institutions such as the New York University, and the University of Alberta, Canada. He is author of several articles and publications in top-leading international economics and finance journals such as *Journal of Money Credit and Banking*, *Review of Finance*, *European Economic Review* and the *Journal of Banking and Finance*.

César Ross Orellana is full professor in history and director of the Doctorate of American Studies at Universidad de Santiago de Chile. His main research intersects economic history and the history of international relations. He has published substantially on Latin American studies particularly around the commercial relations between Japan and Chile as has also contributed to document the banking history of Chile.

Marybeth Rouse completed a Bachelor's of commerce accounting (honours) at the Rand Afrikaans University in South Africa and joined PricewaterhouseCoopers. After qualifying as a chartered accountant, CA (SA), she was appointed as a senior manager in the consulting division of PricewaterhouseCoopers. She was then appointed as a senior lecturer in the Department of Accountancy at the University of Johannesburg and obtained a Masters of Commerce in International Accounting at the University of Johannesburg. She is currently pursuing a PhD in Accounting and Finance at the University of Bangor, Wales. Her research interests are retail payments, mobile payment innovations and financial inclusion in Africa.

Graciela Sanroman holds a PhD in economics (2008) from the Centro de Estudios Monetarios y Financieros, (CEMFI, Madrid) and a Master's in economics and finance (2000). Currently she is professor titular at the Departamento de Economía, Facultad de Ciencias Sociales. Recent articles include the "Cost and preference heterogeneity in the risky financial markets", 2015, *Journal of Applied Econometrics*, 30(2) and "Social Security and Retirement in Uruguay", 2015, with Alvaro Forteza, *Journal of Development Studies*, 2015, 51(4).

Guillermo Santos is a teaching and research assistant at Departamento de Economía, Facultad de Ciencias Sociales, Universidad de la Republica Uruguay. He has also been a team member of EFHU (Encuesta Financiera de los Hogares Uruguayos) since 2014.

Laurent Simon is a doctoral candidate at the Computer Laboratory, University of Cambridge while working on mobile security and privacy. Publications include: Laurent Simon and Ross Anderson. "Pin skimmer: Inferring pins through the camera and microphone." In Proceedings of 3rd Annual ACM CCS Workshop on Security and Privacy in Smartphones and Mobile Devices (SPSM), 2013; Laurent Simon, Saengudomlert Poompat, and U. Ketprom. 'Speed adjustment algorithm for an RFID reader and conveyor belt system performing dynamic framed slotted aloha. In RFID, 2008 IEEE International Conference on, pages 199–206, 2008.

David L. Stearns holds a PhD in science and technology studies, University of Edinburgh, 2008; BBA in information systems, Pacific Lutheran University, 1991. Since 2013 he has held the post of senior lecturer, Information School, University of Washington (Seattle). Publications include: Bátiz-Lazo, Haigh, Stearns, "How the Future Shaped the Past: The Case of the Cashless Society," *Enterprise & Society*, volume 15, issue 1, 2014. Bátiz-Lazo, Haigh, Stearns, "Will We Ever Have a Cash Free Society," *Mercury Magazine* (Department of Business Studies at Uppsala University) volume 1, issue 1, 2012; Stearns, *Electronic Value Exchange: Origins of the VISA Electronic Payment System*, Springer, 2011. Stearns, "Automating Payments: Origins of the VISA Electronic Payment System," in *Technology Innovation in Retail Finance: International Historical Perspectives*, Bátiz-Lazo, Maixé-Altés, and Thomes (eds.) Routledge 2011.

Carles Sudrià Triay is professor of economic history at the University of Barcelona (UB). He has published widely on industrial and energy issues and on

financial history. Among his books are *Historia de 'la Caixa'* (2003, with J. Nadal); *Caixa Sabadell, finanzas y acción social, 1859–2009* (2008, with J.M. Benaul and A. Garrido); and *El Banco de Barcelona 1844–1874. Historia de un banco emisor* (2010, with Y. Blasco). His articles appear at *Revista de Historia Económica*, *Financial History Review*, *Business History*, *Revista de Historia Industrial* and *Investigaciones de Historia Económica*.

Sean H. Vanatta is a PhD candidate in history at Princeton University, where he is completing his dissertation, entitled, “Making Credit Convenient: The Political Economy of Bank Credit Cards in Postwar America.” This project shows, first, how bankers and policymakers constructed the US credit card market through business practice and novel legal regime in the 1950s and 1960s, and then how bankers used cards as a weapon against restrictive regulation in the 1970s and 1980s. Sean is currently the John Rovensky Fellow in US business and economic history. His article, “Citibank, Credit Cards, and the Local Politics of National Consumer Finance, 1968–1991,” is forthcoming in the *Business History Review*.

Grietjie Verhoef is professor in accounting, economic and business history and has published contributions in 15 books and published 59 peer-reviewed articles. She completed doctoral study at the Rand Afrikaans University on banking in twentieth-century South Africa. Her research specialisation is economic history of nineteenth and twentieth-century South Africa; business history of Africa and corporate South Africa, especially banking and insurance history; and globalisation and African entrepreneurship. Her work on the professionalization of accounting in South Africa has led to publications on the accounting profession and regulation.

Ruth Wandhöfer is a regulatory expert in the field of banking and one of the foremost authorities on transaction banking regulatory matters. She is global head of regulatory and market strategy for Citi Group’s Treasury and Trade Solutions business in London. In this role Ruth’s key responsibilities include driving regulatory and industry dialogue and developing product and market strategy in line with the evolving regulatory landscape. Ruth chairs a number of influential industry bodies. She is also a member of the European Commission Payment Systems Market Expert Group (PSMEG), a very small group of hand-picked industry experts and member of the ECB Contact Group on Euro Payments Strategy. Her publications include *EU Payments Integration – the Tale of SEPA, PSD and other Milestones along the Road* (London: Palgrave MacMillan, 2010) and *Transaction Banking and the*

Implications of Regulatory Change: Basel III and other challenges for the global economy (London: Palgrave MacMillan, 2014).

Jarunee Wonglimpiyarat is a member of the College of Innovation, Thammasat University, Thailand and visiting professor at Boston University, USA. She received a doctorate in business while specialising in technology management from Manchester Business School, University of Manchester. She has postdoctoral fellowships at Boston University and Harvard University. Her industry experience includes PricewaterhouseCoopers, Standard Chartered Bank, Citibank N.A., and the US Securities and Exchange Commission. Amongst other distinctions she now sits on the editorial board of the International Journal of Innovation, Management and Technology.

List of Figures

Fig. 10.1	Use of the terms “cashless society”, “checkless society” and “electronic payments”, 1950–2008	98
Fig. 12.1	Volume of credit cards and debit cards issued (<i>left axis</i>) and number of transactions in POS terminals (<i>right axis</i>), 2002–2015. Index, first quarter of 2002=100	122
Fig. 12.2	Volume of EFTs same bank (<i>left axis</i>) and interbank (<i>right axis</i>), 2002–2015. Index, first quarter of 2002=100	123
Fig. 12.3	Monetary base in hands of the public (inflation adjusted pesos), monetary base in hands of the public as a ratio of GDP, and value of transactions in ATMs, 2002–2015. Index, first quarter of 2002=100	124
Fig. 12.4	Ratio of cash transactions for consumer payments in retail sales. Brazil, Mexico, Argentina, Colombia and Chile, 2009–2013. Data from estimates by Visa and Euromonitor	125
Fig. 14.1	Banks correspondents per year	143
Fig. 18.1	Automatic till, Paris, 2016	188
Fig. 22.1	An illustration of how the mobile payment system works	262
Fig. 23.1	Mobile banking innovation system in Thailand	271
Fig. 23.2	Mobile penetration rates in Thailand, years 2010–2015	272
Fig. 23.3	Managing migration paths model and the future of mobile banking competition in Thailand	275
Fig. 24.1	Global mobile payment transaction volume from 2011 to 2017	284

Fig. 25.1	The international mobile money model	300
Fig. 25.2	The India mobile money model	301
Fig. 25.3	A Model for mobile money ecosystem in India	309
Fig. 26.1	Computer program taking input I and giving output O	312
Fig. 26.2	Example of PIN pad	316
Fig. 26.3	Game played by users in the training phase. Users win if they touch the identical icons	317
Fig. 26.4	Typical patterns of pitch angles and roll angles when different digit keys are pressed	318
Fig. 26.5	Supporting fingers push the phone upwards to touch a digit	321
Fig. 26.6	Key points of OK-button picture (<i>left</i>) and digit one picture (<i>right</i>)	322
Fig. 31.1	Three basic needs when selecting means of payment	376
Fig. 33.1	Visualization of the top 100 most popular concepts in the book	392

List of Tables

Table 20.1	Sample statistics	214
Table 20.2	Probit estimations	217
Table 20.3	Marginal effects after probit estimation	219
Table 20.4	Probit estimations	221
Table 20.5	Marginal effects after probit estimation	223
Table 20.6	Biprobit estimation	224
Table 20.7	Marginal effects after biprobit estimations	226
Table 20.8	Expected effect of making compulsory the payment of wages through bank deposits	227
Table 23.1	Summary the competitive landscape in the Thai mobile banking, 2014	276
Table 23.2	SWOT analysis of the competitive landscape in the Thai mobile banking, 2014	278
Table 24.1	Socioeconomic factors	287
Table 24.2	Technical resources and skills	289
Table 24.3	Main components of perceived usefulness, ease of use and trust	293
Table 25.1	Descriptive statistics	305
Table 25.2	Impact of mobile money user on average money sent	306
Table 25.3	Impact of mobile money user on emergency money sent	307
Table 27.1	Panel response for driver variables, Round 1 and Round 2	329

Table 27.2	Correlation matrix driver variables	332
Table 27.3	Panel response for barrier variables, Round 1 and Round 2	334
Table 27.4	Correlation matrix for barrier variables	336

1

Introduction: The 360 Degrees of Cashlessness

Bernardo Bátiz-Lazo and Leonidas Efthymiou

The case studies in this book look in detail into the building blocks of the development and transition to a cashless economy. Research from different areas in academia combined with views from practitioners, enables us to explore the term ‘cashless’ from a wide range of perspectives, uses, contexts and eras. We believe that the notion of ‘cashless’ is multifaceted, broad and important to be handled in a casual manner. With these concerns in mind, contributions to this edited book form a rich portfolio aiming to assess some of the most significant phenomena in retail payments in a comprehensive, long-term perspective. Contributions from six different continents enable an exploration and assessment of a global transition to a cashless economy, cashless systems,

B. Bátiz-Lazo (✉)
Bangor University, Bangor, UK
e-mail: b.batiz-lazo@bangor.ac.uk

L. Efthymiou
Intercollege Larnaca, Larnaca, Cyprus
e-mail: l.efthymiou@intercollege-larnaca.com

and a contemplation of future alternatives to banknotes, coins, cheques and plastic. The objective is to formulate a better understanding of innovation in payment systems and how it co-evolves with changes in society and organisations through personal, corporate and governmental processes.

All chapters are unique, easy-to-read case studies, offering an understanding of the emergence and future of important technologies in the area of retail payments. All accounts are comprehensive, yet, the language used to explain instruments and processes are intended to be well understood by everyone. This collection is not intended to be read from cover to cover, but rather for you to pick and choose the contents. To facilitate selection, contributions are divided into five main themes as follows:

Theme A: Banknotes and Barter

Contributions to this book begin with a unique historical accounts aiming at offering an understanding of the role of paper money and barter in society. Chapters in this section describe Western society's obsession with, and dependence on, physical representations of money as stores of value. Chapter 2 tells about ideas and proto-visions of cashless societies and alternative notes-and-coins monetary systems appearing in literature as early as the fifteenth century. Practical and ethical problems associated with what was then conventional money engaged utopian thinkers like Thomas More (1478–1535) and laid the grounds for visions, debates and developments that followed. For writers like Robert Owen (1771–1858), William Morris (1834–1896), Samuel Butler (1835–1902) and Edward Bellamy (1850–1898), to mention a few, physical expressions of money were a drawback to human civilisation's peace, human relations and prosperity. A cashless society (and in some instances eliminating money completely) was desirable and potentially a way to escape the greed and corruption accompanying capitalistic monetary systems.

The writings of these early visionaries somewhat overlapped with real practical problems concerning the introduction of the first private and

state-issued paper money. The process of introducing banknotes in Spain, for example, lasted over a century. While the first banknotes were circulated back in 1783, it could be said that the process of institutionalisation was not complete until 1946, with the nationalization of the Bank of Spain as the central bank. This process was permeated by elements such as inflation, public debt, convertibility, legislative innovations, multiple currencies, credibility, and civil war. Together, all this provides the context of the many attempts to introduce paper money in Spain, which are documented in Chap. 3 to provide a review on the development of paper money, its purposes and challenges.

In a similar vein, the issuance of new payment methods in Chile prior to 1860 was a difficult process. As will be explained in Chap. 4, the lack of a regulatory framework and a series of failed attempts to create a state bank, in combination with increased demand for credit, resulted in commerce having to take the lead and introduce an innovative means of payment. Between 1837 and 1839, an informal bank was created while its notes entered in circulation, serving as an autonomous nerve centre for the economic development of post-colonial Chile. The situation remained until the 1860s when banks could formally print and circulate their own notes.

Since the advent of the industrial revolution and during the so called “great divergence”, nations have developed at different rates while inequality between the rich and poor has also become ever more evident. Disparity in growth rates is explained through a variety of reasons such as macroeconomic stability, openness to international trade, institutional development, better means of transportation, rates of innovation and many others. A combination of these factors was the case in the Pampas in the early 1900s (Chap. 6). They provided a fertile ground for advance payments, discounting bills of exchange, vouchers and other financial instruments that served as active financial intermediaries, leading to a significant transformation in the agrarian capitalism of Argentina during the so-called “Belle Époque”.

As evidenced in all chapters in this first part of the book, prior to the twentieth century there was widespread use and coexistence of multiple currencies as means of payment in daily transactions. Indeed, it seems that single current payment systems are almost unique to the twentieth

century. In this context, Chap. 5 documents monetary plurality in the antebellum New Orleans as well as its socioeconomic and financial benefits during and after the panic of 1857.

But the use of multiple currencies is not a story of the past. For instance, Chap. 7 provides an understanding of how several types of paper money were serving as complementary to each other between 1995 and 2005 in Argentina. A sequence of events and economic realities, including inflation since the 1950s, hyperinflation between the late 1980s and early 1990s, the major economic crises of the mid-1990s, hyper-unemployment, poverty, social unrest, and fiscal deficits found Argentineans transacting with multiple paper currencies such as pesos, dollars, private vouchers, community vouchers such as the *Credito*, and quasi-currencies. All these together served the three main functions that are usually carried out by a single currency.

Moreover, the anthropological origins of payments and money could not overlook the established practice of bartering. There is a debate as to whether barter dates all the way back to early civilisations, through direct exchange of goods and services for other goods and services. Side stepping this debate, one of our contributors shows how there is a modern role for such a mode of exchange. The arrival of commerce over the Internet, enabling electronic barter networks around the world, indicate sophisticated and organised systems of exchange through promising entrepreneurial investments. Companies like Tradaq, covered in Chap. 8, reflect the continuation of barter through millenniums and points out the obstacles and benefits of new generation bartering in Brazil.

Theme B: Cash vs. Cashless Technologies

Technological visions and adoption are often linked to the disappearance of paper money. In other words, the idea of a cashless society since the 1950s implies a technologically-led move towards the dematerialization of money. The account in Chap. 9, nevertheless, contradicts the dichotomy between cash and dematerialisation. The analysis breaks through the dividing walls as the meanings of cash, payment and materiality become blurred through various meanings and contradictions.

Another case of how futuristic visions drive new applications long before their established economic viability is the example of cashless/checkless society in the United States in the 1950s. The theme in Chap. 10 focuses on how the discourse of the future had stimulated the early computerisation of retail financial intermediates. The ‘checkless society’ proposition included sleek, efficient and safe electronic transactions as opposed to costly, inflexible and easily-forged paper checks. Back then, checks were considered as the best established alternative to banknotes and coins. Interestingly, while the propositions for business adoption of technology were presented as a step towards realising future goals, their failure to perform was often characterised as a setback rather than a challenge to arriving at the desired, future destination.

Chapter 11 returns to the 1960s to reconsider the impact that information technology had in the development of new payment technologies. The analysis presents the case of the former Catalonian and Balearic Islands Saving Bank, today known as “la Caixa”. An important milestone for la Caixa was the arrival of the first IBM computer in 1962, enabling automation, including the offline automation of a wide range of operations. After that point, an array of mature technologies were adopted, such as teleprocessing (first through online networks, and later online in real time), which favoured the company’s leadership of cashless technologies.

A common theme in today’s narrative is that greater use of cashless payments can and will increase financial inclusion. This is the topic of Chap. 12 as illustrated by Mexico, a country with a well-developed financial system and telecommunications sector. However, financial inclusion remains low. At the same time, there is a large shadow economy (also known as parallel, grey, unrecorded, black, or informal). The Mexican government has put in place a number of initiatives to limit the growth of the informal economy and promote financial inclusion by encouraging the adoption of a number of cashless payment methods. In this context, Mexico provides us with an interesting case where the growth of cashless instruments, combined with the persistent use of cash, enables a discussion of the coexistence of several forms of payments.

Located almost 12,000 kilometres away from Mexico, Cyprus is another country with a large shadow economy. In line with studies in the ‘sociology of money’ framework, Chap. 13 presents a recollection of

the events that occurred in 2013 when the Cypriot economy collapsed. During the crisis the government shut down the banking system to avoid a bank run, leaving people subsisting solely on cash distributed by ATMs and purchasing goods in the handful of stores that accepted payment cards. Three years later and through the lens of the corporate legitimacy framework, the authors of this chapter revisit the events to examine the role of local bankers, key local, European and supranational institutions and other stakeholders.

Also within the body of ‘sociology of money’ literature, Chap. 14 analyses a Chilean financial inclusion network of correspondent retailers called CajaVecina. As explained by the authors, this network was born as part of a larger strategy promoting not only increase in financial inclusion but also increased communication, socialisation and universalisation of money, while leading to increased participation and social support.

Theme C: Paying with Plastic

Payment cards have transformed the way we borrow and spend. This part of the book offers insights into the evolution, implications, risks, successes and failures of card technologies and innovations from their conception to the present day. For instance, Chap. 15 recounts the origins of the first debit card, known as the Entrée card and launched in the USA by Visa. This chapter tells why it took more than 20 years for debit cards to become widely adopted by the member banks of Visa.

In a similar historic manner, Chap. 16 reveals the development of card fraud since the 1950s, as well as the technologies and strategies implemented by issuers to prevent it. The story departs in the 1910s when Americans started using payment cards in department stores. Through the mid-twentieth century, cards moved out of department stores and into wider circulation. At that point, the landscape began to change. Novel universal credit cards by firms like Diners Club (1950) and American Express (1958) inspired a sense of wonder, consumer abundance, boundless prosperity as well as fraud and widespread criminal consumption.

Since its creation in the 1950s, the payment cards business entered a relentless race of sometimes successful and quite often failed innovations of cashless technologies. One of these great failures was the first electronic purses by Mondex (1991) and VisaCash (1996). Although very promising, electronic cash failed to take off. These two examples, together with a long list of other failed e-cash and electronic purse schemes, demonstrate that convincing people to adopt high-tech alternatives to cash is often hard, risky and very expensive (Chap. 17).

Moreover, we want to argue that consumers' choices are often hidden behind the financial decisions they make. Failure to understand hidden values and behaviours, continually problematise customers' selection and adoption of cashless payments. Chapter 18 emphasizes the importance of understanding the materiality of money; that is, the tangible qualities of money. The attention, however, is not on cash but the payment card. The focus of the analysis is on adaptation and calculation. The first refers to the change of money over time as well as the transformation of payment devices supporting its function. The second concerns how the material properties of money shape financial decisions. Understanding the material aspect of payments leads to a better understanding of needs, desires and behaviour of both users and merchants.

User behaviour is also central in both Chaps. 19 and 20. With over 100 million Visa cards issued since mid-2013 and an ever expanding ATM network, Chap. 19 tells the story of a sudden economic downturn in Russia. The dangerous blend of international politics, sanctions, currency depreciation and economic instability resulted in the Russians launching a local, commercially independent payment scheme.

Chapter 20 uses the 'Survey of Uruguayan Households Finance' (**SUHF1**) to investigate the behaviour of household debt in that country. The study links banking, payment cards and access to credit, to study the determinants of financial inclusion. Among other results, the analysis shows that households' level of income, education and working status are the main determinants of the probability of holding credit cards and having access to bank accounts in Uruguay.

Theme D: Mobile Payments

The chapters appearing in this part communicate the emergence and diffusion of mobile payments in different parts of the world. These include discussions about whether, when and where cashless payments play or have played a significant role in the formulation of financial inclusion policy in various countries. The authors demonstrate how mobile technology has been promoted under the assumption that it enables the delivery of financial services while facilitating transactions at affordable costs to sections of disadvantaged, remotely located and low-income segments of society.

Chapter 21 tackles head on the theme of mobile payments and financial inclusion in Africa. This while discussing how fast growing economies with limited formal banking services experience greater financial exclusion and transaction curtailment.

Chapter 22 looks at the development and characteristics of mobile payments in Turkey. The case study explores the limitations, strengths and potential of underserved target markets for mobile payment services in a market of over 72 million users. Chapter 23 analyses the competitive landscape of mobile banking in Thailand using the Managing Migration Paths Model. In particular, the study is focused on mobile banking, electronic payment strategies and innovative solutions, as well as strategic alliances among leading banks such as the Bangkok Bank, Kasikorn Bank, Siam Commercial Bank, Krung Thai Bank and Bank of Ayudhya. Chapter 24 examines data on the attitudes, perceptions and choices of potential users from different cultural and ethnic backgrounds in Germany. Interestingly, the analysis explores questions such whether single device mobile payments replace all other forms of payment at some point in the future. Chapter 25 proposes a model for the transition to a cashless society in India.

In Chap. 26, the analysis explores the world of smartphones, apps innovation and security. Aiming to raise awareness among practitioners, the authors survey the principles and effectiveness of several sensor-based side-channel attacks known to date on smartphones.

As with other cashless technologies, mobile banking is evolving and in transition. An important milestone in this development was the advent of Wireless Application Protocol (WAP). Failure, however, was once again disguised behind various elements such as security, limited service provision and consumer preferences. Today, despite the availability of technology and customer demand, the market is yet to mature. Chapter 27 takes a stakeholder perspective and explores the barriers and drivers to future bank adoption.

Theme E: Payment Systems and Digital Currencies

Chapter 28 deals with the development of a single market for payments through an initiative for integration across the European Union known as Single Euro Payment Area (SEPA). The analysis in Chap. 28 looks at how the existence of separate national payment infrastructures, systems, formats and processes will give way to a more efficient, harmonised and central payments infrastructure, which would allow for borderless payments across a single Market. Chapter 29 continues with the theme of SEPA to explore its implementation in Spain. Specifically, the analysis focuses on the consequences of SEPA on the Spanish payment card market.

The analysis in Chap. 30 draws on cash-related costs to support the claim that, sooner or later, the transition to a cashless society is unavoidable. The study employs the case of Mimoní, the largest online consumer lender in Latin America, and examines the impact of loan costs and ways to minimise them. Minimising the cost generated by cash friction will reduce the complexity and cost for households and individuals.

In the area of financial innovation and financial behaviour, Chap. 31 examines Denmark's vision of becoming the world's first and foremost digital, cashless society. The analysis is based on the findings of a systematic study, aiming to map Danish attitudes and practices towards money, and exploring the challenges of a potential cashless society.

In the final contribution, Chap. 32, the authors contend that global finances and economics are not an accurate representation of the real economy. As a result, conventional money is not indicative of people's social, economic and environmental needs. Inspired by the notion of virtual currencies, the authors introduce the so called 'ebarts', with the aim of becoming as universal and useful as conventional money. Unlike other virtual or digital currencies, ebarts is a social currency; a mutual credit system created by its users in exchange of real goods and services.

Part 1

Banknotes, Coins, Materiality and Barter

2

Pre-1900 Utopian Visions of the 'Cashless Society'

Matthew Hollow

Historically, one of the most prominent mediums through which new ideas about monetary systems have been presented and debated is the utopian treatise. That this was the case is, in many ways, not surprising since one of the core attractions of utopias is that they offer – to both readers and writers – discursive spaces, free from the clutter and constraints of the present, within which alternate (improved) social and political systems can be laid out and analysed in their totality. As such, they provided a means through which thinkers of all political persuasions could articulate their thoughts and ideas as to how to overcome the various practical and ethical problems associated with money. Although a great many of the forecasts for the future of money that were put forward in this way had distinctly socialist undertones and were closely tied-in with the wider goals of alleviating poverty and social dislocation, this did not mean that the practical problems involved in actually establishing

M. Hollow (✉)
University of York, York, UK
e-mail: matthew.hollow@york.ac.uk

alternate monetary systems were not considered in depth.¹ Indeed, the issue of whether or not there was a better alternative to conventional cash (or, indeed, if society could operate without it) was one that attracted a great deal of attention and continued to vex utopian thinkers right up until the twenty-first century.²

Like with so many other areas of utopian thought, Thomas More's (1478–1535) epochal novel *Utopia* (1516) laid the groundwork for many of the later debates surrounding the issue of money. Above all else, More sought to show how Western society's infatuation with, and dependence upon, money as a carrier of value actually served as a hindrance to what he saw as the overarching goal of human civilization: namely, peace and prosperity.³ In particular, More worried about the effects that the placing of such high value in monetary forms had upon societal relations, pointing out that 'frauds, thefts, robberies, quarrels, tumults, contentions, seditions, murders, treacheries, and witchcrafts' all tended to originate from disputes over money. More also found his contemporaries' infatuation with gold and silver intolerable and delights in describing how the inhabitants of the fictional Island of Utopia hold both metals in so little esteem, using them either for the 'humblest items of domestic equipment' (including chamber pots) or as symbolic markers of shame to be worn by those who have committed crimes.⁴

¹ As Gregory Claeys notes, most pre-twenty-first-century utopian novels 'trace the corruption of mankind to the origins of government and the foundation of private property.' See, Gregory Claeys, *Utopias of the British Enlightenment* (Cambridge: Cambridge University Press, 1994), xi–xvii.

² As Frederic Jameson notes, one of the oldest utopian traits is the 'dream of abolishing money, and of imagining a life without it...[and] the lived misery of money, the desperation of poorer societies, the pitiful media spectacles of the rich ones.' See, Fredric Jameson, *Archaeologies of the Future: The Desire Called Utopia and Other Science Fictions* (London: Verso, 2005), 231.

³ As Raphael Hythloday, the lost voyager narrating the account, tells his companions: 'As long as there is property, and while money is the standard of all things, I cannot think that a nation can be governed either justly or happily.' More, Sir Thomas, *Utopia* (Peterborough, Ont.: Broadview; London : Eurospan [distributor], 2010), 39.

⁴ More also describes an incident where a travelling party of foreign diplomats, unfamiliar with the customs of the Island of Utopia, sought to impress their hosts by dressing up in the most ornate and elaborate gold jewellery only to find themselves being laughed at and mocked by the locals of Utopia. See, *Ibid*, 95–100.

For More at least, the best way to overcome the many problems associated with money is to do away with it altogether:

So easy a thing would it be to supply all the necessities of life, if that blessed thing called money, which is pretended to be invented for procuring them was not really the only thing that obstructed their being procured!

Yet, as More goes on to explain, in order for this monetary revolution to take place, there first needs to be a fundamental reorganisation of society. Indeed, on More's fictional Island of Utopia the concept of private ownership is unknown and the doors to every house are left unlocked. The economy too is organised on much more communal lines with every citizen being taught the basics of agriculture and at least one of the other essential trades (weaving, carpentry, metalwork or masonry), and all surplus produce stored in communal warehouses from which those in need are free to procure as much as they require. As a result, More explains, none of the inhabitants of Island of Utopia suffer from a lack of anything and all are free to 'live in a great abundance of things.' In this way, then, More's visions for the cashless society of the future can be seen to have been very much premised on a yearning to break free from (what he saw as) the messiness and complexity of the financial systems of his day and return to a more direct and simpler method of exchange in which people traded goods of real value without the need for a symbolic holder of value.

One utopian thinker who was certainly influenced by More's utopian ideas was the Welsh social reformer Robert Owen (1771–1858).⁵ A firm believer in corporatist principles, Owen similarly despaired of the 'insane money-system' of his day and detested the fact that productive labourers were dependent upon wholesale merchants and traders for the basic necessities of life. Instead of this 'insane' system, Owen proposed that

⁵ As he put it, the idea that 'thousands and millions of our fellow men should be unemployed, in poverty, in ignorance, and many actually starving for want of the most common necessities of life, solely because there are not sufficient quantities of certain metals of little intrinsic value, to circulate as artificial money' was 'not only one of the most wild and absurd of all insane notions; but is also one of the most lamentable and criminal.' Robert Owen, *The Revolution in the Mind and Practice of the Human Race; or, the Coming Change from Irrationality to Rationality. With a Supplement 1849* (Clifton [N.J.] A. M. Kelley, 1973), 34–35.

communal ‘Bazaars’ and ‘Exchanges’ should be set up in every local community so that members could directly exchange their surplus produce with one another free of the interference of profit-seeking middlemen. Moreover, like More, Owen was also heavily critical of the use of gold and silver as a means of exchange and was particularly concerned about the effect that a shortage of either could have upon the welfare of the poor.⁶

In an ideal world, Owen hoped to do away with money and gold altogether, arguing that:

When prices vary, it is caused by gold or some artificial circumstance; for real wealth for use has a permanent unchanging value; and the most valuable wealth is composed of articles of the first necessity, as good food, clothes, dwellings, education, etc.; and having these, within superior surrounding circumstances, and personal liberty, all might become intelligent and happy, although there were not an ounce of gold in the world.⁷

However, unlike many other socialist thinkers of his day, Owen was also a very successful businessman and was pragmatic enough to recognise that significant changes—both at a societal and an individual level—would need to be made before people were ready to accept a world without some form of money. As a compromise, therefore, he suggested that gold and silver should be replaced with a medium of exchange that:

must possess the quality of expansion and contraction to a fractional accuracy as wealth for exchange expands or contracts; it must, also, while it represents wealth, be unchanging in value.⁸

What exactly this medium of exchange should be, or what it would look like, Owen never explicitly said.⁹ Nevertheless, his ideas did prove

⁶ Owen, Robert, *The Revolution in the Mind and Practice of the Human Race; or, the Coming Change from Irrationality to Rationality. With a Supplement 1849*, 53–54.

⁷ *Ibid.*, 36.

⁸ Owen, Robert, *Book of the New Moral World Pts 1–7*, 26 (part II).

⁹ He was, however, broadly in favour of the Bank of England’s decision to suspend the convertibility of its bank notes in 1797, pointing out that ‘did not this nation support a most hazardous and expensive war for upwards of twenty years, with a circulating medium created by a private bankrupt company, and that merely through the declaration of a few men, deemed wealthy, that they would

extremely influential and during the nineteenth century numerous attempts were made—both in Britain and America—to implement his corporatist theories in real life. Typically, these communities would issue their own bank notes with labour input being used as the common standard of value. On top of this, a number of 'Owenite Equitable Labour Exchanges' were also set up during the 1830s with the intention of providing spaces where people could directly and freely trade their goods and labour. Unfortunately for Owen and his followers, however, the success of these communities was negligible; only a small number lasted more than a few years and most tended to be muddled, unorganised and 'plagued by internal strife.'

Despite these apparent setbacks, however, utopian writers of a socialist persuasion continued to conjure up images of the future in which money had become obsolete. For instance, in William Morris' (1834–1896) classic utopian text *News from Nowhere* (1890) the protagonist of the novel is amazed to find that in the future money no longer holds any value, describing how 'the idea of being paid for work was a very funny joke.'¹⁰ Instead, just as on More's Island of Utopia, the citizens of Morris' bucolic utopian society have no concept of private property or commercial profit and work simply because they find pleasure in tilling the land. This heavily romanticised and nostalgic desire to escape from the greed and corruption that, for many, seemed to accompany the emergence of modern monetary systems was something that was very much a feature of nineteenth century British (and, to a lesser extent, American) socialist thought and reflected a deep-seated unease that many contemporaries felt about the pace of economic and industrial development.

One of the more remarkable accounts that dealt with this issue of where Western economies were heading was Samuel Butler's (1835–1902) satirical utopian text *Erewhon* (1872). Originally published anonymously, Butler's novel presents the reader with a disturbingly organised society in which ill people are jailed and criminals treated in hospital.

receive their paper as money?' See, *The Revolution in the Mind and Practice of the Human Race; or, the Coming Change from Irrationality to Rationality. With a Supplement* 1849, 53 (part II).

¹⁰William Morris, *News from Nowhere (or An Epoch of Rest)* (pp. 278. Roberts Bros.: Boston [Mass.], 1890), 9.

The monetary system in this disorientated society is even more perplexing, with two distinct currencies seemingly operating at once. The official and ‘respected’ currency is dispensed from what Butler describes as ‘Musical Banks’; grand, church-like structures where each mercantile transaction is accompanied by a specific musical recording that reflects the nature of the deal being done.¹¹ Even more bizarrely, the coins themselves—made out of cheap base metals and described by Butler as being like ‘toy money’—seem to hold little value and are rarely used in the day-to-day transactions of the Erewhon community. Whilst (as is typical of his style) it is not immediately obvious what message Butler is trying to give, the fact that the Musical Banks appear to be so ill-suited to the increasingly fast-moving economy of Erewhon seems to imply that Butler felt there was a need for a fundamental reshaping of the (out-worn) financial services market of his era. Likewise, the purely performative and superficial functions that the Musical Bank coinage fulfils in the society of Erewhon can be very much read as a critique of the classical notes and coins monetary system of the Western world.

Yet, perhaps the most in-depth treatment of the money problem by any utopian writer in this period was provided by Edward Bellamy (1850–1898) in his 1887 classic *Looking Backward*.¹² In many ways, Bellamy’s utopian vision of America in the year 2000 seems to echo very closely those of his socialist contemporaries: merchants and bankers have been disposed of, private property has been abolished and everyone works for the common good of society. Yet, unlike the cosy, small-scale communal utopias of Morris or Owen’s imaginations, the utopia that Bellamy conjured up was heavily statist in character. Indeed, in Bellamy’s America all of the nation’s property and capital is in the hands of the state which is, in turn, solely responsible for the planning and distributing of the nation’s wealth. The upshot of this comprehensive nationalisa-

¹¹ As Butler puts it, ‘everyone knew that their commercial value was *nil*, but all those who wished to be considered respectable thought it incumbent upon them to retain a few coins in their possession, and to let them be seen from time to time in their hands and purses.’ Samuel Butler, *Erewhon: or Over the Range*, 2nd Ed. ed. ([S.I.]: Trubner, 1872), 156.

¹² Edward Bellamy, *Looking Backward, 2000–1887*, Third Edition (London: Ward, Lock, & Co., 1888).

tion, suggests Bellamy, is that the need for conventional money is simply eradicated:

Money was needed in your day simply because the business of production was left in private hands...but as soon as the nation became the sole producer...there was no need of exchanges between individuals...everything was procurable from one source.¹³

Nevertheless, Bellamy's America is not a 'help yourself' society in the same sense as More's Island of Utopia and in order to procure goods from the state each citizen is granted a set number of 'credits' that they can use to purchase items from any one of the state's standardised 'sample shops' (the only retail outlets that exist in Bellamy's America). The credits themselves, Bellamy explains, are meant to represent each citizen's 'share of the annual product of the nation' and are issued at the start of every year in the form of a pasteboard 'credit card' featuring holes that are 'pricked out' as and when the citizen spends their credits. Duplicate receipts are also produced after each transaction, ensuring that purchasers can keep track of the amount of credits they have spent and to ensure that any mistakes can be 'easily traced and rectified'. Finally, owing to the fact that in Bellamy's future all the nations of the world have made steps to adopt similar systems, these 'credit cards' are also able to be used anywhere in the world.

Yet, despite the fact that Bellamy is often referred to as the 'inventor' of the credit card, it would be a mistake to view his payment system as coming anywhere close to replicating the types of systems in use today. Firstly, Bellamy was very much against the idea of debt, writing how the citizens of his America could only 'obtain a limited advance on the next year's credit...though this practice is not encouraged.' Indeed, for Bellamy the expectation was that his future America would be so bountiful and productive that its citizens would want for nothing (although, somewhat contradictorily, he does note that the saving up of credits is 'permitted to a certain extent when a special outlay is anticipated'). Finally, Bellamy

¹³ Ibid., 49.

also goes to great lengths to point out that all credit is ‘strictly personal’ and, hence, not transferable between individuals.

Like so many of the other authors mentioned in this paper, then, Bellamy’s aspirations for a society free of cash seems to have been based upon a deep-rooted desire to do away with the messiness and complexities of the monetary systems of his age. Indeed, one of the core themes of Bellamy’s novel is the question of how to overcome what he saw as the overly abstract and mercantile nature of free-market economics. In particular, Bellamy seems to hold those involved in the businesses of trade and banking in especially low regard, writing how in his moneyless America:

Another item wherein we save is the disuse of money and the thousand occupations connected with financial operations of all sorts, whereby an army of men was formerly taken away from useful employment.¹⁴

Likewise, methods of international trade have become far more simplified in Bellamy’s imagined future, with ‘only a dozen or so merchants in the whole world’ who use ‘a simple system of book accounts...to regulate their dealings.’ For Bellamy, the key benefit of these changes is that they have restored money (or ‘credit’) to a position whereby it directly correlates to the actual value of commodities in existence, rather than to intangible ‘promises of more money’.

Despite these differences, however, there is still much of note in Bellamy’s ‘credit system’ to those with an interest in the idea of the ‘cashless society’. Above all else, his work represents the first real attempt by a utopian thinker to tackle the ‘money problem’ in a way that does not necessitate abolishing all trade and personal consumption. Indeed, for Bellamy, one of the major benefits of his imagined ‘credit system’ is that, by cutting out the need for merchants, financiers or exchange rates, it actually makes direct account-to-account trade both easier and more accurate. Likewise, the fact that values in his ‘credit system’ are anchored directly to the commodities they represent, rather than to some artificial carrier of value (such as gold or silver), also helps to rid

¹⁴ Ibid., 138.

his idealised society of sudden fluctuation in prices. Yet, it is the practical details about how Bellamy's 'credit-system' functions in practice that are perhaps of most interest. His pasteboard 'credit cards' not only provide consumers with a far more portable and convenient payment method than that offered by conventional notes and coins systems, but, through the use of visible prick-marks and duplicate receipts, also enable both purchasers and sellers to more accurately keep track of their accounts. Thus, whilst he still may have been a considerable distance away from actually coming up with a fully workable financial system, his work nonetheless proved highly significant in that it fundamentally shifted the terms of debate as regards the 'cashless society' question and helped lay the groundwork for later discussions about potential alternatives to conventional money forms.

Overall, then, what can those interested in current mobile payment systems and the idea of the 'cashless society' take away from this body of pre-1900 utopian literature? Well, the first and most obvious thing to note is that these texts clearly confirm that the desire to do away with conventional notes-and-coins monetary systems is certainly nothing new. Indeed, as Thomas More's writings so aptly demonstrate, it has long been recognised that paying for goods with notes and/or coins is neither particularly practical nor especially secure. Likewise, the urge to find a more efficient and less exploitable way of allowing people to trade directly with one another, free of any intermediaries, is also something that is very much present in all of the texts discussed above.

Yet, at the same time, the fact that there seems—at least up until the publication of Bellamy's *Looking Backward*—to have been an inability to conceive of a cashless society in any way other than that which involved the abolition of private property and free trade suggests that the 'cashless question' might not just be a mere technical one. Whilst, of course, this notion that in order to change the monetary system one had also to affect some sort of revolution in societal relations was to a certain extent a reflection of the broadly socialist ideals of the above-mentioned writers, it was also very much a recognition of the fact that notes-and-coins payment methods had become so entrenched in western society that it would take some fairly major transformations to wean people away from cash. As Robert Owen so forcefully put it: 'Until the human mind shall

have been disabused of this insane money-mystery, it is impossible that men can think or act like rational beings'. In short, then, what these utopian texts ultimately remind us is that, although conventional notes-and-coins monetary systems may well be inherently impractical, insecure and inefficient, it may, nonetheless, take more than the introduction of some new, more efficient method of payment to completely rid society of its obsession with cash.

Further Reading

- Arestis, P., & Sawyer, M. (Eds.). (2006). *A handbook of alternative monetary economics*. London: Edward Elgar Publishing.
- Butler, S. (Ed.). (1872). *Erewhon, or, over the range* (2nd ed.). London: Trübner.
- Gorb, P. (1951). Robert Owen as businessman. *Bulletin of the Business History Society*, 25(3), 127–148.
- Hardy, D. (1979). *Alternative communities in nineteenth century England*. London: Longman.
- Schroeder, J. E. (2000). The consumer in society: Utopian visions revisited. *Marketing Intelligence & Planning*, 18(6/7), 381–387.
- Wegner, P. (2002). *Imaginary communities: Utopia, the nation, and the spatial histories of modernity*. Berkeley/London: University of California Press.
- Weinberg, R. (2001). Looking backward, going forward. *The Nation*. <http://www.thenation.com/article/looking-backward-going-forward>. Accessed 25 Apr 2015.
- Wiener, M. (1985/1981). *English culture and the decline of the industrial spirit*. Harmondsworth: Penguin.

3

The Banknote, a Momentous Innovation in Spain

Yolanda Blasco-Martel and Carles Sudrià-Triay

Introduction

Throughout history, mankind has used many goods as means of payment. Some societies have used shells, gemstones or cigarettes for the same purpose of facilitating exchanges. Although, in theory, any exchangeable good could fulfil this role, not all are equally useful to perform it efficiently. Metals, especially metals of high value per unit of weight, have been widely used as means of payment.

All these instruments are characterized by having their own unique value, besides their use as currency. However, their availability depended mostly on new discoveries and other random factors. Deflation is likely to follow if the supply of gold, silver or whatever other good used as money diminishes or does not grow at the same pace as the real economy. In an

Y. Blasco-Martel (✉) • C. Sudrià-Triay
Universidad de Barcelona, Barcelona, Spain
e-mail: yolandablasco@ub.edu

extreme case, these goods would become useless as a means of exchange. Hence the importance of the banknote: a standardized promise of payment issued by a trusted institution, which initially complemented and later replaced metallic currency.

Paper money is ultimately a promissory note and can be issued by private or public institutions. Early instances of state-issued money include the Tang Dynasty in China during the seventh century; examples in the Western world include *Vales Reales* in Spain (1780), *Assignants* in France (1790), and *Greenbacks* in USA (1862). In cases where government finances were in a poor state, the public was reluctant to accept government-issued notes because there was a high risk that the notes would not be convertible to gold or silver. As a result, several countries chartered 'national' banks. These were usually privately owned but supervised by the state. Their aim was to provide some assurances that the volume of paper money would be managed, more or less, independently of the state.

At the beginning, the banknote was only a way to facilitate exchanges in specific, urban markets. Issuing banks exchanged notes for metallic money, that is, gold coins and bullion, standard silver coins and bullion, or minor coins (sometimes minted in copper). A customer would go to the bank and deposit his/her metallic money in order to avoid the high risk of it being stolen, as well as other inconveniences. The bank offered to safely store the metallic in its coffers, until the customer (or his/her agent) brought the note back to exchange for metallic. As a result, customers received two benefits: comfort and peace of mind.

A big innovation took place when bankers realised there was no need to hold one-to-one parity between issued notes and metallic money in their coffers. This was possible because people would not redeem the notes immediately. Some of the money could be lent to other clients as metallic. Alternatively, the bank could issue more notes than the metallic held in its coffers. Whichever way the result was the same. Fractional reserve, as this system came to be called, made it possible to multiply resources available for lending without actually having to increase the stock of gold or silver. The acceptance and dissemination of banknotes via the fractional reserve system was a crucial improvement that allowed industrialization and growth from late eighteenth century onwards.

Requirements, Regulation and Benefits

As ingenious as the system of fractional reserve was, it had several weaknesses. Two of them are crucial to better understand the system; namely, credibility and demand for credit. The banknote is a fiduciary instrument. This means its acceptance in trade depends on the credibility of the issuer. The milestone of credibility was convertibility. Each individual banknote clearly stated that the issuer was committed to exchange it for metallic at bearer's will. If the issuer kept parity of reserves and issued notes there was no problem. However, under fractional reserve the issuer could be in difficulty if, at any given point in time, the value of notes redeemed was greater than metallic in the coffers. This crisis of liquidity was famously portrayed for Hollywood by James Stewart in *It's a Wonderful Life* (1946) and in real life, by Northern Rock in the UK (2007).

Counterfeit notes were, and still are, a risk for both banknote users and issuers. Hence why, from the outset, the importance of making the notes difficult to imitate was clear. Improvements in paper and printing techniques were instrumental in making banknotes widely acceptable.

The success of the fractional reserve system also rested in a healthy demand for credit. If no one borrowed from the issuer, it would need to maintain metallic and banknotes. This suggests that fluctuations in the demand for credit had a direct impact on the amount of money (i.e. banknotes and metallic) in circulation.

The success of the fractional reserve system led to a debate around the causality between the demand for credit and money supply. For instance, in the nineteenth century the so-called *British Currency School* supported the idea that the supply of money accommodated demand for credit through the issuing of banknotes. As a result, no statutory limit was needed for the amount of banknotes issued by the banks. This is because any excess in money creation would be rapidly corrected by the market itself. Some economists close to the *free banking school* agreed, but included an important caveat: automatic money market adjustment might not work properly. The reason for this lies

in the market structure: if a bank enjoyed some kind of privilege or an excessive market share, this could lead to inflation or other forms of disequilibrium. Therefore, argued the *free banking* people, the market would self-correct only by allowing full and unrestricted competition in banknote issuing.

Conversely, the members of the so-called *banking school* were mostly in favour of tight financial regulation. From their point of view, banks of issue could be tempted to print excess money and, therefore, cause inflation (i.e. too many banknotes pursuing few goods would result in an increase in prices).

The fear of inflation, very much present amongst British politicians, led to the restriction of the activities of money-issuing banks through the passing of the Bank Charter Act of 1844 (also known as Peel Act for the sake of its promoter, Robert Peel). Under the Act, no bank in England and Wales, other than the Bank of England, could issue new banknotes, and issuing banks would have to withdraw their existing notes in the event of their being the subject of a takeover. At the same time, the Bank of England was restricted to issuing new banknotes only if they were 100 % backed by gold or up to £14 million in government debt. The Act served to restrict the supply of new notes reaching circulation, and gave the Bank of England an effective monopoly on the printing of new notes.

Other countries followed suit and also introduced restrictions to the issuing of banknotes. The most common restriction was to set limits on the amount of notes issued in relation to the bank's capital. Alternatively, the issuing bank was required to maintain reserve in metallic equal to a fixed and known proportion of the amount of banknotes in circulation.

A second set of common regulations was related to who was allowed to issue banknotes. But in this regard there were acute differences both among countries and through time. We can summarise these differences through three main categories; namely, monopoly, plurality with a privileged larger issuer, and plurality without privileges. Throughout the nineteenth century most countries experimented with two or three of these situations. Additionally, one must take into account that plurality did not always translate into greater competition. In France and Spain, for

instance, at one point in time there were several banks of issue but each one acted as a sole issuer (i.e. monopoly) for their host region.

Beyond regulation and its consequences, the introduction of banknotes as a financial instrument was a crucial innovation that allowed for trade increase, the spread of industrialization and accelerated economic growth. Like any other innovation, banknotes provided a total factor productivity increase. In this case, the innovation consisted in more and much safer transactions taking place with a smaller amount of inputs. As Adam Smith explained in one of his characteristic parables:

The judicious operations of banking, by substituting paper in the room of a great part of this gold and silver, enable the country to convert a great part of this dead stock into active and productive stock; into stock which produces something to the country. The gold and silver money which circulates in any country may very properly be compared to a highway, which, while it circulates and carries to market all the grass and corn of the country, produces itself not a single pile of either. The judicious operations of banking, by providing, if I may be allowed so violent a metaphor, a sort of waggon-way through the air enable the country to convert, as it were, a great part of its highways into good pastures and cornfields, and thereby to increase very considerably the annual produce of its land and labour.¹

Banknotes in Spain: Issuing Plurality

The first banknotes which circulated in Spain were those issued by the *Banco Nacional de San Carlos* (National Bank of San Carlos) in 1783, a private bank established by the Royal Decree on 2 June 1782, aiming to regulate the trading and movement of the circulating public debt. San Carlos National Bank's banknotes failed to generate acceptance and were removed a couple of years later. The large and growing indebtedness of the Spanish Crown ran down this bank and so in 1829, San Carlos was absorbed by a new institution, the *Banco Español de San*

¹A. Smith An inquiry into the Nature and Causes of the Wealth of the Nations, Book 2, Chap. 2, Sec. 2 (1776).

Fernando (Spanish Bank of San Fernando). This new bank was allowed to issue an undetermined quantity of banknotes, which could be converted into metallic and “pay the bearer at sight” (“on demand”²) in accordance with the bank’s government, whose rulings would later be sanctioned by the king.

The decree that originated this privilege was the Royal Decree of 9 July, 1829. This legislation did not specify limits for the issuing of this bank, nor did it specify any relationship between the issued banknotes and the bank’s capital, and it did not explain how to ensure the convertibility of the bank’s reserves into banknotes.

In 1844, the opening of two new issuing banks was allowed, one in Madrid and the other in Barcelona. The bank that was established in Madrid was the *Banco de Isabel II* (Bank of Isabel II). It was authorized to issue banknotes for an amount that did not exceed twice the paid capital. Afterwards this bank opened an office in Cádiz. Unfortunately, the Bank of Isabel II had an ephemeral life and was absorbed by the Spanish Bank of San Fernando in 1847.

In Barcelona the “Banco de Barcelona” (Bank of Barcelona) was given permission to issue banknotes up to twice its capital.³ The authorising regulation of this bank also specified that their banknotes had to be guaranteed. For this reason, this bank, and later the Bank of Cádiz, had to keep a reserve equal to a third of the issued banknotes in metallic. Interestingly, the directors of the Bank of Barcelona knew about the so-called “Palmer Rule”, which required keeping in cash a third of the institution’s responsibilities. The cash funds which guaranteed the banknotes of the Bank of Barcelona were always higher than those established by the Spanish regulations.

In 1849 and 1851 two additional regulations aimed to reorganize the situation of issuing banks in Spain. These legislative innovations modified the framework under which the three exiting banks (Madrid, Barcelona

²Literally “paguese al portador”. This had to do with the origins of banknotes as promissory notes, as in the eighteenth and nineteenth centuries some notes were only payable to a named person and/or at a specific date. “On demand” others were anonymous and would not expire, therefore, tradable as a financial security.

³The Banco de Barcelona followed the catalan monetary tradition and issued its banknotes in “pesos Fuertes”. One “escudo” equaled 2.5 pesetas and one peso fuerte (also called “duro”) 5 pesetas.

and Cadiz) were established. The main objective of these regulations was to limit the issuing of banknotes as well as to restrict the creation of new banks. The new regulations required that the issuing of banknotes be at par; that is, the value of issued notes could not overstep the actual capital of the bank. As a result, the laws of 1849 and 1851 led to a reduction in the issuing of banknotes, and notes in circulation actually contracted. Banks in Cadiz and Barcelona, for instance, observed a huge substitution effect. Specifically, when the issuing of banknotes was cut back, the banks in those cities received a huge inflow of resources in the form of current account deposits. These regulations appear to have been of great importance in learning how to increase the use of current accounts in these two cities.

On January 28, 1856, another regulatory innovation again modified the banking scene by allowing new banks to emerge. It extended the right to issue notes and therefore implemented issuing plurality in Spain. The law of 1856 on bank issuing empowered provincial banks by allowing them to issue banknotes up to three times their paid-up capital. This law also required that each bank had a third of the value of the issued banknotes in metallic as a guarantee. As a result of this law, the Spanish Bank of San Fernando changed its name to *Banco de España* (Bank of Spain, which later became the central bank).

There was a quick response to the approval of the law of 1856. Private initiatives submitted applications to open new issuing banks across Spain. In total, 18 new issuing banks were established between the passing of the 1856 law and 1864 in places such as Bilbao, Burgos, Jerez de la Frontera, La Coruña, Málaga, Mallorca, Oviedo, Palencia, Pamplona, Reus, San Sebastián, Santander, Santiago de Compostela, Sevilla, Tarragona, Valladolid, Vitoria y Zaragoza. In provinces where no bank was created during that period, the Bank of Spain was allowed to open offices, as it did in Alicante and Valencia. These issuing banks were truly responsible for the broadening use and acceptance of banknotes across Spain in the mid to late nineteenth century.

Between 1844 and the early 1870s, banknote issuing in Spain multiplied by a factor of six. The face value of banknotes in Spain during the mid-nineteenth century fluctuated between 5 and 200 pesetas. These notes circulated mainly in major cities amongst trading

sectors. The notes themselves were initially printed in Spain but this industry did not prosper among other things because of advances in printing techniques abroad, which resulted in banknotes being made overseas, mainly in London.

Banknotes in Spain: Bank of Spain's Issuing Monopoly

In January 1874 a new law ended with issuing plurality and handed over to the Bank of Spain the monopoly of banknote emission. The creation of an emission monopoly directly resulted from the difficulties by the Spanish state to service a growing mountain of debt, which was accumulated after a long a period of internal unrest, as well as financing (and losing) colonial wars.

After replacing the banknotes of provincial banks with its own, the Bank of Spain—still a privately owned bank—assumed two main objectives: giving credibility to its notes and extending their circulation to all parts of the Spanish peninsula. In order to achieve the latter, from 1884 onwards the bank made active use of an increased number of branch offices in provincial cities.

During the last few decades of the nineteenth century, banknote emissions by the Bank of Spain lost connection with its paid capital. In just two decades, the relationship between paid capital and banknotes increased tenfold. On the other hand, from 1882 the bank only redeemed its banknotes in silver, allowing for a free float of the peseta, whose exchange rate fluctuated below its official gold value. However, the Bank of Spain continued to maintain its emission guarantee, as it was still obliged to keep the equivalent of a third (or fourth) of the value of issued notes in gold and silver reserves.

Later, in 1921, a new law (the *Ley de Ordenacion Bancaria* or Banking Ordinance Law) set the framework that regulated the functioning of the whole Spanish financial system from that time up to the start of the civil war in 1936. This law demanded that 45 % of the value of issued notes had to be guaranteed in gold reserves. The 1921 law, also known as *Ley Cambo*, was also responsible for the conversion of the activities of Bank of Spain to fit the “modern” concept of the central bank. In

this process it increased the bank's capital, extending by 25 years its monopoly on issuing of banknotes, giving it the duty of inspecting private banks and establishing preferential interest rates for rediscounting with other banks.

Between 1936 and 1939 the civil war impinged a temporary hiatus on currency circulation. The Bank of Spain separated itself into two different entities: one that focused on issuing banknotes for the "national zone" (based in Burgos) and a second one for the "republican zone" (initially based upon Madrid, although it moved to Valencia and later to Barcelona). The currency issued by both banks represented each side of the conflict, and their value was only recognised in their respective zones of influence.

Once the Spanish civil war ended in 1939, something that had been feared throughout the nineteenth century happened. The inconvertibility of banknotes into metallic was decreed (*cours forcé*) through a regulation of Franco's regime. This move took place after the law of 9 November 1939, which declared that the banknotes issued by the Bank of Spain were legal tender (*poder liberatorio*) but removed the need to hold guarantees (which had been demanded up until then). The passing of this law was partially forced by these circumstances but its contents were confirmed and amplified by the Bank Ordinance Law of 1946 (*Ley de Ordenación Bancaria*). This law specifically stated:

the privilege of issuing, in all circumstances, and in particular when this concession entails the faculty of creating money which is fully legal tender, without any metallic counterpart, should not be the object of a contract with the state. The state, as part of its sovereignty, has the power to confer and determine what is money in circulation, the state is the only one who has the duty of regulating the concession and use of the aforementioned privilege.

From 1946 onwards, the Spanish state institutionalised that it would be the authority regulating everything with regards to money emission and circulation (including banknotes). However, it must not be forgotten that, in those days, the Bank of Spain was still a private entity. Its shareholders still had an important role in the decision-making for

the institution, even though their representation in the *Consejo General Bancario* (General Banking Council) had been reduced. Finally in 1962, the Bank of Spain was nationalised and was given the powers of a central bank.

Further Reading

- Bagehot, W. (1873). *Lombard street. A description of the money market*. London: Kegan Paul.
- Bell, S. (2001). The role of the state in the hierarchy of money. *Cambridge Journal of Economics*, 25, 149–163.
- Blasco-Martel, Y., & Sudrià, C. (2010). *El Banco de Barcelona (1844–1874): historia de un banco emisor*. Madrid: LID.
- Castañeda, L. (2001). *El Banco de España (1874–1900). La red de sucursales y los nuevos servicios financieros*. Madrid: Banco de España.
- Juglar, C. (1867). *Enquête Sur Les Principes et Les Faits Généraux Qui Régissent La Circulation Monétaire et Fiduciaire, Observations Présentées Par M. Clément Juglar*. Paris: Impr. Impériale.
- Sardà, J. (1970). El Banco de España, 1930–1962. In El Banco de España (Ed.), *Una historia económica* (pp. 429–479). Madrid: Banco de España.
- Sudrià C., & Blasco-Martel Y. (Eds.). (2016). *La pluralidad de emisión en España 1844–1874*. Madrid: Fundación BBVA.
- Sudrià, C., Martín-Aceña, P., & Pons, M. A. (1994). Spanish banking after the Civil War, 1940–1962. *Financial History Review*, I, 121–138.
- Tedde, P. (1988). *El Banco de San Carlos (1782–1829)*. Madrid: Banco de España.
- Tedde, P. (1999). *El Banco de San Fernando (1829–1856)*. Madrid: Alianza Editorial.
- Thornton, H. (Ed.). (1938). *An inquiry into the nature and effects of the paper credit of Great Britain*. F.A. von Hayek, London: George Allen & Unwin, [1802].

4

Innovating Means of Payment in Chile, 1840s–1860

César Ross

Introduction

This chapter deals with the emergence of banking activity in Chile. Specifically, how early entrants articulated means of payment within commercial and financial markets prior to the enactment of the General Banking Law of 1860. This regulation typified commercial activities unique to banks and its enactment accelerated the development of the Chilean banking sector. Pre-1860 banking markets were populated by merchants, commercial houses and enablers, all of which engaged in advancing loans, accepting deposits, and issuing bank notes as means of payment. Some of these activities were unregulated while others were formalized by regulation enacted in 1840 (such as the Law on Advances in Credit, which was modified in 1854). During the 1850s proto-banking activities grew and some firms explicitly adopted the term “bank” to

C. Ross (✉)

Universidad de Santiago de Chile, Santiago, Chile

e-mail: cesar.ross@usach.cl

signal their aims such as the *Banco de Depósitos y Descuentos de Valparaíso* and *Banco de Chile de Arcos y Co.*

In spite of these developments and prior to 1860, payment methods were precarious. Facing restrictions on and unsatisfied with available ways to settle transactions, the commercial sector decided to take into its own hands the solution to the problem. Towards the end of the 1830s, trading houses began to issue notes that effectively acted as paper money. As circulation grew its issuers even attempted to make the State accept them to settle financial operations. But the State reacted with mistrust and even banned some of these initiatives.

Accordingly, in the early years of the Chilean republic innovations in payment methods, if any, came from the market as it is shown by the development of informal methods that emerged in the 1830s. However, the economic dynamism associated with two important cycles exporters (copper, 1840–1872; and flour-wheat, 1848–1861), increased the domestic market's demand for fiat means of payment (as opposed to settling transactions with metallic or in species). This further increase the issuing and circulation of informal payment methods. The end result was that the governments of the late 1850s effectively lost their monopoly on issuing paper money.

In what follows, this chapter examines the transition from the informal emission of paper money to the introduction of the General Banking Law (1860), a statute through which the State institutionalized paper money by authorizing banks to issue their own banknotes in a legal manner.

Post-colonial Context, 1811–1840

It is paradoxical that despite the time that has elapsed since its publication, the thesis of Ruggiero Romano (1963) with respect to currency (monetary mass), is still in force with regards to that:

the American economy of the 16th–18th centuries (and beyond) is an essentially natural economy, with a minimum margin of monetary economics, hardly enough to allow the maneuvers of the capitals.¹

¹ Ruggiero Romano (1963), Historia colonial hispanoamericana e historia de los precios, en Tres lecciones inaugurales, Santiago: Centro de Investigaciones de Historia Americana (U. Chile), p. 47.

While this critical statement has been subsequently relativized,² it maintains a great part of its validity.

In this context, the process of independence and emancipation (1808–1818) was critical the development of the Chilean banking industry. The increase vitality of trade and mining during the first half of the 19th century demanded more credit but also more fiat money in circulation. This early post-colonial period also observed economic conditions that strengthen the emergent capitalist business sector. Within this sector began to operate sort-term trade credits, which in a rapid and growing process transformed into financial credits with longer maturities.

On balance this period shows that on the one hand, the Chilean economy's dimension and dynamism were insufficient to make the presence of banks feasible. This was not lack of trying as, on the other hand, there were repeated attempts to create a bank (1811, 1820, 1823 and 1829) which failed to materialize for the broad general reasons that have been outlined above and which have been detailed in another publication.³ Failed attempts to establish a bank also responded to specific developments of the local economy (commercial and mining). In the period of 1837–1839, “informal banking” activities emerged, which were conducted without a regulatory framework sanctioned by the State.

At a commercial level, the port of Valparaíso functioned as the central nervous system of the economic process. The cities of Coquimbo and La Serena, in turn, were the centers for mining production, which was extended to the Region of Atacama. In this period, the vast and rich argentiferous reservoir of Chañarcillo (1832)⁴ was discovered. Also in this decade, the British trade located in the cities and ports along the coast of central and northern Chile was consolidated,⁵ playing a pivotal role in the modernization of Chilean trade practices, and paving the way for

² Ramón Armando and Larraín José (1982), *Orígenes de la Vida Económica Chilena, 1659–1808*, Santiago: Centro de Estudios Públicos, pp. 9–26.

³ Ross César *Orígenes de la Vida Bancaria en Chile*, Revista Libertador O'Higgins, Año VIII, 8, (1991): 24–40.

⁴ Silva Vargas Fernando (1977), *Comerciantes, Habilitadores y Mineros: Una Aproximación al Estudio de la Mentalidad Empresarial en los Primeros Años del Chile Republicano (1817–1840)*, Fernando Durán V. et.al., Empresa privada, Fundación Adolfo Ibáñez, pp. 37–71.

⁵ Cavieres Eduardo (1988), *Comercio Chileno y Comerciantes Ingleses (1820–1880): Un Ciclo de Historia Económica*, Valparaíso: Universidad Católica de Valparaíso.

the development of formal banking. Contradictorily, during this period the resistance of the State and the distrust of the authorities continued, resulting in the government's almost immediate rejection of the autonomous ventures.

In the period 1837–1839 the administrative authorities of the Province of Coquimbo informed the central government that some trading houses that operated in the rich northern districts, "had begun issuing certain values [notes] that were circulating as banknotes convertible into the legal currency [probably 6000 pesos.⁶] These notes are being used to pay workers their wages. Some people have even tried to pay public contributions with these vouchers, such as taxes, under the pretext of lack of [other] currencies."⁷ The institutions referenced above are the trading houses of Samuel G. Haviland in La Serena and Walker Bros in Huasco.⁸

Benjamin Vicuña M., recounted this case as follows:

[a]bout thirty years ago, a miner from the north (Billador or Tamaya) devised a voucher to pay the wages of his workers, in which the sign of a horse or a cow was stamped, along side one could find the sign for the printers of La Serena, [these vouchers] represented various units of our currency at that time: the horse was one *peso*, the cow one *real*, the calf one *cuadrillo*. But the Intendancy of Coquimbo banned those precursors, and the *bank of the mountain* ceased their issuance.⁹

The reaction of the Government was to create a law to prevent any attempt at "free banking" by traders and thus suppress competitors to State-issued currency. In this way, on November 3, 1839 the Government issued a decree which in its most material section stated that:

⁶Silva Vargas Fernando (1977), Comerciantes, Habilitadores y Mineros: Una Aproximación al Estudio de la Mentalidad Empresarial en los Primeros Años del Chile Republicano (1817–1840), Fernando Durán V. y otros, Empresa privada, Fundación Adolfo Ibáñez, p. 64.

⁷Subercaseaux Guillermo (1920), El Sistema Monetario y la Organización Bancaria de Chile, Santiago: Soc. Imp. y Lit. Universo, pp. 101–102.

⁸Ross Agustín (1886), Los Bancos de Chile y la Ley que los Rige, Valparaíso: Imp. Excelsior, pp. 3–10.

⁹Vicuña Benjamín (1872), Miscelánea, Tomo I, Santiago: El Mercurio bookstore, pp. 389–390; Vicuña M, Benjamín (1883), El Libro del Cobre y del Carbón de Piedra en Chile, Santiago: Cervantes Printing, p. 208.

Art. 1. No person may establish banks, nor issue vouchers, notes or tickets of credit without previously requesting a license from the Government and the Municipality.¹⁰

This decree thus became the first legal provision to establish a bank in Chile.

Banks Enter the Game: Innovation in the Payment Methods, 1840–1860

Expansionary Cycles and Demand for Payment Methods

In the same way that the post-independence period was Chile's initial connection with the international economy, the 1840s was the period in which the economy took off, increasing the number and quantity of commercial transactions and, thus, creating favourable conditions for the development of the financial sector, which provided the means of payment that enabled the economy to operate efficiently. The cycle of copper, from 1840 to 1872, led Chile to produce about 50 % of the copper in the world at the beginning of the 1870s. The cycle of wheat and flour, 1848–1861, had a lower volume, but it connected the country with the dynamic economy of the United States and its Gold Rush (California).

Both cycles consolidated Chile's role as an exporter of primary resources, under the scheme of economic liberalism. Also, they developed the economy of the central and northern regions of the country, and accelerated the construction of infrastructure and equipment for exports. These cycles strengthened the role of British entrepreneurship in the cities and ports along the coast of central and northern Chile, and played a vital role in the successful cycle of production and export of copper between 1840 and 1870.

¹⁰ Subercaseaux Guillermo (1920), *El Sistema Monetario y la Organización Bancaria de Chile*, Santiago: Soc. Imp. y Lit. Universo, p. 102.

This very dynamic process had a huge impact on urbanization, rural-urban migration and the demand for more modern financial services. All this also implied a new demand for having payment methods to facilitate both the operations of any company that had to pay salaries, as well as the internal trade that was supposed to negotiate with a growing number of unknown people. The growing intermediation had to be resolved by some form of money other than metallic or paying in species, but the economy of the 1830s did not have money of that quality up and running.¹¹

The Emergence of the Banking Sector

The emergence of the Chilean financial sector was a disarticulated development that covered a whole range of firms of different kinds and implied operations such as: credit, discounts of exchange bills, issuance of letters of credit and promissory notes. The issuance of banknotes as payment methods was explicitly prohibited, as we have stated, since the end of the previous decade. In this way, the first banks emerged in 1845 as complementary to the commercial activity, where their action in the business of financial intermediation was confined to payment methods excluding the fiduciary emission, which the sources of the period referred to as banknotes, circulating money, cash and paper currency.

However, despite the restrictions for banks to issue their own notes or bills, the demand for other means of payment continued to increase and, interestingly, the regulation that was introduced while intended to resolve the problem did exactly the opposite in practice. In fact, the monetary law of 1851 established an incorrect appraisal for the coins minted in silver, because their nominal value was lower than their intrinsic value. Consequently, speculators began to melt coins and sell the bullion on the open market, reducing the monetary mass within the economy and adding tension to the volume of the monetary mass and the speed of movement of capital once again.

¹¹ Cavieres Eduardo (1988), Comercio Chileno y Comerciantes Ingleses (1820–1880): Un Ciclo de Historia Económica, Valparaíso: Universidad Católica de Valparaíso, pp. 116–127.

Towards the end of the 1850s, this shortage became critical. The Annual Report of the Ministry of Finance of 1857, submitted in 1858, explained it in the following way:

The shortage of hard currency [circulating money] in Valparaiso, more than in the other cities of the Republic, created serious difficulties in commercial transactions last year (1857), forcing the authority to find a way to put into circulation any of the funds in cash.¹²

Valparaiso was the economic capital of Chile and one of the most important ports in the South Pacific, which showed the gravity of this matter even more, especially in an era in which the only official payment method was minted or coined bullion (gold, silver, copper and other alloys). This meant that ultimately, the money supply (monetary mass) had an inelastic growth and was limited by the local production of coined metals. This relationship ended in the middle of the nineteenth century, due to the low production of these metals, the decrease of import operations, and the need for growth of the domestic economy. In this context, the only solution to match the supply of money with the general level of commercial transactions, was to artificially dissociate the money supply (monetary mass) and the local production of coined metals.

In 1852, the statutes of the failed Bank of Chile of Arcos and Cía, reacting to the 1851 Act, stated that it would not accept trustworthy payment methods.¹³ In some cases, such as the Bank of Valparaiso, this impediment was formally specified in the claim that these companies did not issue bills, establishing a restriction to a bank in the middle of the main commercial city of Chile and one of the main ports of the South Pacific at that time.

To illustrate this point, I quote the statutes of this bank, corresponding to the year 1860, drawn up prior to the enactment of the General Law of Banks that same year. In two of the articles the following was established:

¹² Ministry of Finance of Chile (1858), Annual Report 1857, Santiago: Imprenta Nacional, p. 3.

¹³ Boletín de Leyes y Decretos (1852), Estatutos Banco de Chile de Arcos y Cía., p. 62.

The Bank has prohibited the issuance of banknotes to the bearer and the circulation of the documents or vouchers that function as paper money

and

If at any time it has the obligation to admit paper currency or bearer banknotes, the Bank shall cease precisely in its operations and it will proceed to its liquidation.¹⁴

The Banking Act of 1860, which considered the possibility of banks issuing banknotes, resolved this tension. Thus, this regulation stipulated that each bank could issue the equivalent to 150 % of its capital. As it has been demonstrated for the period 1860–1900,¹⁵ this law not only solved the problem of the scarcity of payment methods, but—going to the other end—it enabled emission without control, since there were no limits on the number of banking institutions that could exist in Chile.¹⁶

Conclusions

The period 1811–1839 shows that, on the one hand, the Chilean economy had an insufficient dimension and dynamism to develop banks and modernize payment methods. On the other hand, there was sufficient dynamic to make repeated attempts to create a bank (1811, 1820, 1823 and 1829). However, all of these projects failed to materialize.

As indicated, the monetary law of 1851 misevaluated the silver minted coins, which generated an adverse effect: instead of extending the monetary mass, it fell within the economy and as a result, larger focus was placed on the restriction of money supply and on the speed of movement of capital flows.

At the end of the 1850s, this shortage had become critical, but it was resolved with the Banking Act of 1860, which envisaged the possibility of

¹⁴ Boletín de Leyes y Decretos (1860), Estatutos Banco de Valparaíso, p. 39.

¹⁵ Ross César (2003), Poder, Mercado y Estado: Los bancos de Chile en el siglo XIX, Santiago: LOM.

¹⁶ Ibid.

banks issuing banknotes. Thus, this regulation stipulated that each bank could issue the equivalent of 150 % of its capital. This, plus the widespread use of the so-called paper currency, became the most important innovation since Independence (1818).

However, as has been demonstrated for the period between 1860 and 1900,¹⁷ this law not only solved the problem of scarcity of payment methods, but facilitated an expansion without control, since no limits were placed on the number of banking institutions that could exist in Chile.

Further Reading

- Cavieres, E. (1988a). *Comercio Chileno y Comerciantes Ingleses (1820–1880): Un Ciclo de Historia Económica*. Valparaíso: Universidad Católica de Valparaíso.
- Marichal, C. (1992). *Historia de la Deuda Externa de América Latina*. Madrid: Alianza Universidad.
- Ross, C. (2003a). *Poder, Mercado y Estado: Los bancos de Chile en el siglo XIX*. LOM: Santiago.

Bibliography

- Boletín de Leyes y Decretos*. (1852). Estatutos Banco de Chile de Arcos y Cía.
- Boletín de Leyes y Decretos*. (1860). Estatutos Banco de Valparaíso.
- Cavieres, E. (1988b). *Comercio Chileno y Comerciantes Ingleses (1820–1880): Un Ciclo de Historia Económica*. Valparaíso: Universidad Católica de Valparaíso.
- Ministry of Finance of Chile. (1858). *Annual report 1857*. Santiago: Imprenta Naciona.
- Ramón, A., & Larraín, J. (1982). *Orígenes de la Vida Económica Chilena, 1659–1808*. Santiago: Centro de Estudios Públicos.
- Ross, A. (1886). *Los Bancos de Chile y la Ley que los Rige*. Valparaíso: Imp. Excelsior.
- Ross, C. (1991). *Orígenes de la Vida Bancaria en Chile*, Revista Libertador O'Higgins, Año VIII, 8.

¹⁷Ibid.

- Ross, C. (2003b). *Poder, Mercado y Estado: Los bancos de Chile en el siglo XIX*. Santiago: LOM.
- Ruggiero, R. (1963), *Historia colonial hispanoamericana e historia de los precios, en Tres lecciones inaugurales*. Santiago: Centro de Investigaciones de Historia Americana (U. Chile).
- Silva Vargas, F. (1977). *Comerciantes, Habilitadores y Mineros: Una Aproximación al Estudio de la Mentalidad Empresarial en los Primeros Años del Chile Republicano (1817–1840)*. Santiago: Fernando Durán V. et.al., Empresa privada, Fundación Adolfo Ibáñez.
- Subercaseaux, G. (1920). *El Sistema Monetario y la Organización Bancaria de Chile*. Santiago: Soc. Imp. y Lit. Universo.
- Vicuña, B. (1872). *Miscelánea, Tomo I*. Santiago: El Mercurio bookstore.
- Vicuña M, B. (1883). *El Libro del Cobre y del Carbón de Piedra en Chile*. Santiago: Cervantes Printing.

5

The Many Monies of King Cotton: Domestic and Foreign Currencies in New Orleans, 1856–1860

Manuel A. Bautista-González

Introduction

Economists like Robert Mundell have argued in favor of payment systems with only one currency in circulation: their main argument is that exchange rates between several currencies generate efficiency costs in the form of lost output and transaction costs such as exchange commissions and financial uncertainty, resulting in economic backwardness.¹ Following this theoretical insight, economic literature has consistently vilified historical episodes where plurality of currencies was the rule. However, until the advent of the international gold standard during the last quarter of the nineteenth century, most payment systems in the world functioned with several currencies circulating in daily transactions.

¹ Mundell Robert, “A Theory of Optimum Currency Areas.” *The American Economic Review* 51, 4 (1961) :657–665.

M.A. Bautista-González (✉)

Columbia University in the City of New York, New York, NY, USA
e-mail: mab2306@columbia.edu.

The existence of a territorially homogeneous mono-money reuniting the functions of means of payment, storage of value, and unit of account was a novelty of the nineteenth century that came coupled with the development of the modern nation state.²

The historical record attests that monetary plurality had clear benefits, especially in economies with concurrent and multiple money demands and inelastic money supplies. Advantages resulted mainly from two reasons. The first reason is socioeconomic: different currency circuits (the coupling of a currency with a trade and the actors involved in it) might have had differentiated money demands that could not be sufficed by a single, homogeneous, unified money supply.³ The second reason is of a financial nature: economists ranging from Milton Friedman to Paul Krugman have argued that during financial crises, flexible exchange rates between many currencies are better at providing much-needed liquidity for transactions compared to payment systems with a single currency.⁴

On the eve of the Civil War, paper monies comprised the lion's share of the money supply in circulation in the United States. After the demise of the second national Bank of the United States in 1836 and during the era of free banking (1837–63), notes from state-chartered and “free” banks prevailed as means of payment in daily transactions. These banknotes circulated as liabilities on the banks’ assets, and were backed by gold and silver reserves, or federal and state bonds. Foreign metallic currencies were not only used in the course of international trade but doubled also as reserve monies stored in the banks’ vaults, providing a bimetallic anchor to the American payment system. The port of New Orleans is an ideal location to illustrate the American experience with plurality of currencies. New Orleans was a port with many trade and capital flows from elsewhere in the United States, Europe, and Latin America, and as a result, different currencies from the country and abroad circulated in it, lubricating exchanges.

²Helleiner Eric, *The Making of National Money. Territorial Currencies in Historical Perspective*. (Ithaca, NY: Cornell University Press, 2003).

³Kuroda Akinobu, “Review of Thomas J. Sargent and François R. Velde, The Big Problem of Small Change.” *International Journal of Asian Studies* 2, 1 (2004):179–81.

⁴Friedman Milton, “The Case for Flexible Exchange Rates” in *Essays in Positive Economics*, ed Milton Friedman, (Chicago, IL: The University of Chicago Press, 1953), 157–203.

New Orleans: Commercial and Financial Capital of the Cotton Kingdom

New Orleans was the biggest city and the neural center of the Cotton Kingdom, reuniting actors and organizations involved in the shipping, marketing and finance of the staple. Arkansas, Tennessee and Mississippi planters shipped the cotton their slaves cultivated and harvested downstream by flatboats via the Mississippi river.⁵ Once in the city, wholesale traders, brokers, and commission houses bought most of the cotton. Private bankers and factors provided revolving credit to successful planters discounting their bills of exchange.⁶ New Orleans also received Northern industrial commodities, textiles, and other manufactures for further distribution in the Southern states.⁷ New Orleans was a major warehouse of goods and provider of financial services for other coastal and inland states in the South.⁸ Notwithstanding the cost-efficiency of Northern railroads and canals, New Orleans was still a port of exit for agricultural produce from the Ohio and northern Mississippi river valleys.⁹ In the shadow of cotton, merchants in the Crescent City also traded in tobacco, sugar, molasses and other agricultural products.¹⁰

The importance of New Orleans as an international port of trade in the Gulf of Mexico linking the South to the Atlantic economy cannot be underestimated. New Orleans was second only to New York in the Atlantic cotton trade: the port reshipped countless bales of cotton to Liverpool, the main port of entry for the cotton used in the British textile districts of Lancashire.¹¹ New Orleans also remitted cotton to other

⁵ Chew Morris, *History of the Kingdom of Cotton and Cotton Statistics of the World*, (New Orleans, LA: W. B. Stansbury & Co, 1984), 67.

⁶ Buck Norman Sydney, *The Development of the Organization of Anglo-American Trade, 1800–1860*, (New Haven, CT: Yale University Press, 1925), 4–29.

⁷ Sellers Charles, *The Market Revolution. Jacksonian America, 1815–1846*, (New York, NY: Oxford University Press, 1991), 24, 71.

⁸ Fishlow (1965: p. 287).

⁹ Hammond Bray, *Banks and Politics in America. From the Revolution to the Civil War*. (Princeton, NJ: Princeton University Press, 1957), 684.

¹⁰ Fishlow (1965: pp. 273–74).

¹¹ Beckert Sven, *Empire of Cotton: A Global History*, (New York, NY: Alfred A. Knopf, 2014), 199–241.

ports in the British Isles, France, and ports of the Hanseatic League such as Lübeck, Bremen and Hamburg. British and American ships loaded with European imports and American manufactures also departed from New Orleans towards ports in Mexico, the Caribbean, Central and South America. In turn, these ships returned loaded with Mexican silver dollars; Spanish and Spanish American gold doubloons; export products such as Central American precious woods, British Caribbean salts, sugar and molasses from Cuba and Puerto Rico; and Brazilian, Venezuelan and Colombian coffee.¹²

Thus, it comes as no surprise that American banknotes from Northern, Southern, and Midwestern states, British sterling pounds, French francs, Austrian thalers, Mexican dollars, Spanish doubloons, and Spanish American “patriot” doubloons lubricated domestic and foreign exchanges in the Crescent City. Although the quantities of different currencies cannot be known, there is abundant evidence in newspapers and trade journals of the era for the relative prices of these monies. The “money market” section of the weekly publication *New Orleans Price-Current, Commercial Intelligencer and Merchants’ Transcript* listed the discounts and premiums of domestic banknotes, the market value of Treasury bills and American gold and silver coins, and the exchange rates of foreign currencies circulating in the port. The listings in the *Price-Current* speak loudly about the interregional and the international commercial and financial flows of the American economy before the sectional conflict.

According to financial economist Gary Gorton, a banknote’s discount augmented with the distance from the bank of issue; it diminished if the bank had a good reputation; and it increased if the bank was in a newly settled area with a lower level of economic development (the American “frontier”).¹³ Nonetheless, as Gorton and macroeconomist Jay Shambaugh have asserted, local politics also affected discounts, as noteholders, bankers and exchange dealers took into consideration legal and regulatory changes effected at the state level when pricing the banknotes in their pockets.¹⁴

¹² Robert Greenhalgh, *The Rise of New York Port*, (New York, NY: Charles Scribner’s Sons, 1970).

¹³ Gorton Gary, “Reputation Formation in Early Bank Note Markets.” *Journal of Political Economy* 104, 2 (1996): 355.

¹⁴ Shambaugh Jay, “An Experiment with Multiple Currencies: The American Monetary System from 1838–60.” *Explorations in Economic History* 43 (2006): 623.

As a result of monetary plurality, interregional and international trade flows, and the regular course of business, people held on to banknotes of the areas where they conducted most of their transactions and they recycled notes from distant banks into monetary circulation or exchanged them in banks with a discount: banks would collect these notes and send them back to the banks of issue periodically, attempting to minimize actual transfers of specie across states. In times of worsening financial conditions, a “flight to quality” phenomenon occurred, as noteholders liquidated riskier notes and switched to safer and more liquid instruments, such as Northern notes from New York, Pennsylvania and Massachusetts, and U.S. Treasury bills. During financial contagions (such as the panic of 1857), banks all over the country suspended the convertibility of notes into metallic currency: the market for banknotes disappeared, and anxious noteholders demanded American and foreign metallic money for precaution and hoarding, until normality ensued and banks resumed redemption at will.

Louisianan banks, independent exchange dealers, cotton factors and agents, and private bankers such as the local office of the House of Brown were the most important participants in the currency markets of New Orleans. Operations of domestic and foreign exchange had an important seasonal component, influenced by the rhythms of cotton production and marketing. Cotton arrived in the fall; exchange dealers purchased currencies during the winter; exchange rates reached their lowest value between January and April, during the busiest months to export cotton; and dealers sold their currency holdings during the late summer and early fall.

Domestic Banknotes

The *New Orleans Price-Current* grouped banknotes from states in the Mid-Atlantic and the Northeast regions under the category Northern notes. During most of the period, Northern notes suffered median discounts of 0.5 %. The panic of 1857 led to the suspension of payments in New York on 14 October 1857.¹⁵ Once news of the panic reached New

¹⁵ Schweikart Larry, *Banking in the American South from the Age of Jackson to Reconstruction*, (Baton Rouge, LA: Louisiana State University Press, 1997), 277.

Orleans, Northern notes were discounted at 5 %. Between November and December 1857, Northern notes were not priced nor exchanged in New Orleans, in all likelihood due to the suspension of convertibility and the contagion of the financial crisis to London. The spread between the minimum and maximum discounts was at a maximum level between February 1858 and January 1859, after banks in New York and New England resumed payments in metallic.

Banknotes of Southern states rarely received premiums in New Orleans: regularly, Southern banknotes suffered moderate losses of between 1 and 3 % on their nominal value. However, the discounts of all Southern notes rose markedly with the financial panic of September 1857. The average discount for Georgian and South Carolinian notes reached 12 % in September 1857. By July 1858, discounts had nearly reached their pre-crisis values, ranging from 0.5 % for Mobile (Alabama) notes to 2 % for Georgia notes. Whilst Georgian notes suffered the heaviest discounts across the period, the average discounts on Alabaman notes were the lowest. Notes from Mobile might have run near par in New Orleans because of the geographical proximity of both ports: ease of redemption made efficient arbitrage possible.

Some comparisons might help shed light on the joint behavior of Northern and Southern notes in the New Orleans currency market between 1856 and 1860. On average, Northern notes faced lesser discounts than Southern notes before the panic of 1857. The disappearance of a market for Northern notes immediately after the panic is more remarkable as this did not happen with the notes of Southern states. However, after the shock receded, Northern notes faced lower discounts than Southern notes, whereas the notes of South Carolina and Georgia were severely punished. By 1860, discounts for banknotes from Northern states, Alabama and South Carolina converged, but not so much the notes from Georgian banks.

Regarding the banknotes of Midwestern states, Missouri banknotes were accepted in New Orleans without discounts until the panic of 1857, when the market punished them almost as badly as Ohioan and Illinoisan notes. During the financial crisis, notes from Missouri, Ohio and Illinois suffered maximum average losses of 12 % to 15 % on their nominal value. After normality returned, Missourian notes traded at

much lower discounts of between 1 % and 2 % in the New Orleans currency market. Between 1856 and 1860, Illinois notes faced the highest discounts, ranging from nearly 5 % up to 20 %. Throughout most of the period, discounts for Ohioan notes were somewhere in between those from Missouri and Illinois, up until April 1859, when they started trading with a 0.5 % higher discount compared to the loss in value of the Illinois banknotes.

Comparing the behavior of Northern notes to that of Midwestern states' banknotes is also useful to understand how the New Orleans market priced the currencies from both regions. By 1856, Northern and Missourian notes faced very similar discounts, followed by Ohioan banknotes, and even notes from as far away as Illinois. Immediately after the panic of 1857, the notes from Illinois experienced the worst discounts. Banknotes from Missouri and Ohio followed closely, although Ohioan notes recovered more rapidly. Already in 1859, Northern notes and Missourian notes faced lower discounts. The worth of Illinoisan banknotes improved as the value of Ohioan notes worsened. It should be noted that the average discount of Midwestern notes was significantly higher after the panic of 1857.

Foreign Currencies

As established by an act of Congress of 17 July 1842, the official parity value between the British sterling pound and the US dollar was 4.84 dollars per pound. The nominal exchange rate of sterling pounds versus dollars was effectively superior to the official parity value established by the United States Treasury between August 1856 and September 1857, reflecting first the drainage of specie from Europe to China in October 1856, then the war between China and England in May 1857, and finally, the uncertainty about the cotton production in India. After May 1857, and until June 1859, sterling pounds lost value against dollars in New Orleans. Between June and September 1859, sterling pounds were sold with a premium in the Crescent City currency market, coinciding with the end of military conflict in Europe. Between September 1859 and April 1860, sterling pounds depreciated against New Orleans dollars. By

May 1860, sterling pounds were exchanged at a higher value than their official parity, compared to the beginning of the period, reflecting the impact of political uncertainty in Europe.

The appearance of French francs in the *Price-Current* is indicative of the changing geography of cotton exports, as continental Europe became an important market for Southern cotton, and a textile-manufacturing sector in France took off in the third quarter of the nineteenth century. Two types of French francs reached New Orleans: the silver five French-franc pieces (also known as *écus*) and the gold twenty French-franc pieces (also known as *napoléons*). A comparison of the behavior of both denominations of francs exhibits a very interesting pattern: the gold twenty French-franc pieces ran at a premium between August 1856 and October 1857, December 1857 and May 1858, and briefly, between July and September 1859. For most of the period of study (1856–1860), then, the New Orleans currency market preferred low denomination money, as it placed a premium on silver five French-franc pieces.

The case of Mexican *pesos* (also known as dollars) in New Orleans and the United States deserves deeper study. Mexican *pesos* were obtained in payment of British and American merchandise introduced via legal trade or smuggling. The most important export product of Mexico since colonial times, silver, paid for these imports. Both British and American merchants were eager to accept silver as they required it to conduct trade with China and India. From 1856 to 1860, Mexican *pesos* were worth 2 % to 10 % more than dollars in New Orleans. The nominal exchange rate oscillated markedly between longer periods of high volatility and shorter periods of stability. The behavior of the Mexican pesos' exchange rate can be better understood if we partition the series into three cycles: the first, of normality, which lasted from August 1856 to September 1857; the second, of contagion, which reflected the consequences of the panic of 1857, lasting from September 1857 to January 1859, with *pesos* reaching a minimum of 1.0225 dollars; the third, of recovery and rally, ranging from January 1859 to August 1860, when *pesos* reached their highest value at 1.0925 dollars.

Currency holders in New Orleans held Mexican silver *pesos* in higher esteem than American silver dollar coins. The difference between the value of Mexican silver dollar coins and US old silver coins was significantly

high between August 1856 and September 1857. During the financial crisis, the value of Mexican *pesos* and old American silver coins converged. However, during November 1857, when New Orleans received substantial amounts of specie, both types of American coins lost value, whilst the Mexican silver *peso* sustained its value. The spread between Mexican *pesos* and old American silver coins was relatively constant from June 1858 until March 1859, after which the difference between the two grew substantially. US new silver coins went from being traded above par to below parity in October 1857. Old American silver coins would be valued in slightly more than one New Orleans dollar from then on. If an investor wanted to invest his currency holdings in the market with a positive appreciation through the entire period of study (1856–1860), he would have done well with Mexican dollar coins: this sheds light on the role of Mexican *pesos* as a reserve currency with its value almost entirely set by currency markets.

Spanish doubloons were obtained through the commercial traffic between New Orleans and Havana. Spanish American doubloons were gold coins of similar denomination to the Spanish doubloons but with a lower intrinsic content of precious metal. The *Price-Current* named them “patriot” since they came from the independent Latin American republics. The average exchange rates of the Spanish and Spanish American doubloons exhibit roughly the same trends: a declining tendency, from October 1856 to December 1857, and diverging trends from May 1858 to the end of the period. In the first period, the Spanish doubloons reached a maximum value of 17.60 dollars, surpassing the average market value of a gold ounce from California between August 1856 and March 1857; in the second period, their value fluctuated around 16.155 dollars. On their part, the maximum value of Spanish American doubloons was 16.60, in November 1856, and their minimum value was 15.13 in October 1858. As New Orleans not only attracted Mexican silver but also Mexican gold, it is not surprising to see Mexican doubloons listed in the *Price-Current* from October 1859. These Mexican doubloons ended the period with a slightly higher valuation than the Spanish American counterparts, at 15.70 dollars the piece.

Concluding Remarks

This case study has illustrated how a diverse array of domestic and foreign currencies satisfied the money demands of the many interregional and international trade circuits articulated around New Orleans—the most important Southern port of trade—right before the American Civil War. It has also explored how the plurality of currencies provided liquidity when it was the most needed, especially during and after the panic of 1857, through adjustments of currency exchange rates.

Monetary plurality overlapped with a period of increasing, yet limited, national market integration. Discounts and premiums of state banknotes provide information about trade and currency flows, which in turn reflect the patterns of spatial division of labor and imbalanced regional specialization in the American economy right before the Civil War. The plurality of currencies arose from the political conflicts over banking and money between local elites and states on the one hand, and the US federal government on the other. The political economy of money in nineteenth-century America was able to accommodate distinct territorial interests: states with strong commercial sectors were able to pursue conservative monetary policies, whereas states in the Western settlement frontier were able to enact looser monetary policies to finance expansion and development.

Plurality was also indicative of New Orleans's position as a city with a constant inflow of external resources and a favorable regional net balance of payments.¹⁶ The nominal exchange rates of foreign currencies in the Crescent City inform our understanding of the integration of the American slaveholding, staple-exporting South to the world economy of the long nineteenth century. The study of New Orleans performance as a commercial and financial *entrepôt* might shed light on the larger issues affecting the United States economy, which faced a chronically unfavorable balance of trade and was a net debtor to the rest of the world for most of the nineteenth century. The South's surplus of net real resources acquired from the export of slave-grown cotton in the world market via

¹⁶ Greaves Bettina Bien, *Free Market Economics. A Syllabus*, (Auburn, AL: The Ludwig von Mises Institute, 2007).

New Orleans helped finance the deficit of resources of the North and the West to finance their own economic development by means of foreign investment and imports of consumer and capital goods.¹⁷ The acquisition of net balances through trade and finance with Europe and Latin America was crucial for Northern industrialization, Western expansion, and the growth of the American economy before the Civil War.

Further Reading

- Gorton, G. (1999). Pricing free bank notes. *Journal of Monetary Economics*, 44, 33–64.
- James, J. (2016). Payment systems. In C. Diebolt & M. Haupert (Eds.), *Handbook of cliometrics* (pp. 353–373). Berlin: Springer.
- Kuroda, A. (2008). What is the complementarity among monies? An introductory note. *Financial History Review*, 15(1), 7–15.
- Shambaugh, J. (2006). An experiment with multiple currencies: The American monetary system from 1838–60. *Explorations in Economic History*, 43, 609–645.

Bibliography

- Beckert, S. (2014). *Empire of cotton: A global history*. New York: Alfred A. Knopf.
- Buck, N. S. (1925). *The development of the organization of Anglo-American trade, 1800–1860*. New Haven: Yale University Press.
- Chew, M. (1984). *History of the kingdom of cotton and cotton statistics of the world*. New Orleans: W. B. Stansbury& Co..
- Fishlow, A. (1965). *American railroads and the transformation of the antebellum economy*. Cambridge, MA: Harvard University Press.
- Friedman, M. (1953). The case for flexible exchange rates. In M. Friedman (Ed.), *Essays in positive economics*. Chicago: The University of Chicago Press.
- Gorton, G. (1996). Reputation formation in early bank note markets. *Journal of Political Economy*, 104, 2.

¹⁷North Douglass , *The Economic Growth of the United States, 1790–1860*. (Englewood Cliffs, NJ: W. W. Norton, 1961).

- Greaves, B. B. (2007). *Free market economics. A syllabus*. Auburn: The Ludwig von Mises Institute.
- Greenhalgh, R. (1970). *The rise of New York Port*. New York: Charles Scribner's Sons.
- Hammond, B. (1957). *Banks and politics in America. From the Revolution to the Civil War*. Princeton: Princeton University Press.
- Helleiner, E. (2003). *The making of national money. Territorial currencies in historical perspective*. Ithaca: Cornell University Press.
- Kuroda, A. (2004). Review of Thomas J. Sargent and François R. Velde, The big problem of small change. *International Journal of Asian Studies*, 2, 1.
- Mundell, R. (1961). A theory of optimum currency areas. *The American Economic Review*, 51, 4.
- North, D. (1961). *The economic growth of the United States, 1790–1860*. Englewood Cliffs: W. W. Norton.
- Schweikart, L. (1997). *Banking in the American South from the age of Jackson to reconstruction*. Baton Rouge: Louisiana State University Press.
- Sellers, C. (1991). *The market revolution. Jacksonian America, 1815–1846*. New York: Oxford University Press.
- Shambaug, J. (2006), An experiment with multiple currencies: The American monetary system from 1838–60. *Explorations in Economic History* 43.

6

The Art of Lending in the Pampas: Commercial Credit and Financial Intermediation in Argentina, 1900–1930

Andrea Lluch

Introduction

Intermediation-related topics have been largely neglected in Latin American historiography. This study focuses on financial intermediation by rural merchants during Argentina's export boom in the early twentieth century, when Argentina ranked among the world's top cereal exporters. The research is based on major advances in the theoretical understanding of credit markets. These advances have evolved from a paradigm that emphasizes the problems of imperfect information and imperfect enforcement in financial markets. At a micro-level, it concentrates on the history of one of the leading commercial rural houses in an area of the Pampean region: Casa Torroba, which opened its first store in what was then called the National Territory of La Pampa in 1897 and later expanded its activities by setting up branches in the province

A. Lluch (✉)
CONICET-UNLPam, Santa Rosa, Argentina
Los Andes University, Bogotá, Colombia
e-mail: alluch@conicet.gov.ar

of Buenos Aires (in 1903 and 1911) and the city of Buenos Aires (in 1905). A wide range of public and judicial records were also used.

Agricultural Development in La Pampa

Argentina's agrarian expansion fueled the country's economic growth at the beginning of the twentieth century and was part of a broader economic process spanning several rural areas in Latin America that developed forms of commercial agriculture. The incorporation of what was then referred to as the National Territory of La Pampa and as a productive area in the Pampas region was the result of a military campaign to annex new territories to Argentina at the end of the nineteenth century. This was the last period of military conquest and land occupation in Argentina's history, during which the government sought to expand the country's internal frontier west of the province of Buenos Aires. The changes in production during these decades were the result of a general growth in economic activities related to farming and cattle ranching in Argentina. However, in La Pampa territory these changes did not take place synchronically with those occurring throughout the Argentinean pampas. The first stage, associated with the initial productive process in the area at the end of nineteenth century, was dependent on the westward expansion of the frontier from the province of Buenos Aires. During the first years of the twentieth century, the major activity was extensive cattle ranching, involving railway transportation of live cattle, wool, and other by-products. From the 1910s onwards, there was a shift to an agricultural economy, with an emphasis on wheat production. The agrarian expansion occurred mainly between the 1910s and 1920s. This last process was closely linked to factors such as the arrival of migrants, the availability of more and better means of transport, increased division of land, and the introduction of many new farming techniques that diversified farm production. The growth in production was possible thanks to a system of land ownership that combined land-owners and tenants, although the latter was predominant in the Pampas. In the National Territory of La Pampa, the 1914 national census determined that 62.4 % of producers were tenants.

Agricultural expansion was also related to the construction of Argentina's financial system. In Argentina, the conservative politics of banks and the large proportion of tenant farmers shaped a system where

commercial credit played a central role in farming. Since the late nineteenth century, and afterwards, many called for a reform of the banking system and better and cheaper rural credit. The discussion centered on the creation of a specific law and institution to provide agrarian credit. The general feeling concerning the marketing and financing of cereal production was reflected in contemporary opinions published outside the country, such as that of William Pickering Rutter, who argued:

The Argentine small farmer —or “ranchero”—suffers many disadvantages in the selling of his wheat. Frequently, he falls into the clutches of the “almacenero” or general store man. This person is ready to provide all necessary provisions, implements, and so on, on terms profitable to himself, including the financing of the crop when harvested. His store is usually at the railway station.¹

According to Joseph Tulchin,² an exponent of the classic historiographical position, by 1910, there were two credit systems in Argentina. One was the formal, institutional system represented by the nation’s banks. The other was informal, consisting of private commercial companies that used the facilities of the banking system but were independent of it. Only the wealthiest landowners had direct access to bank credit. The overwhelming majority of rural producers—who were responsible for producing the largest proportion of the nation’s agricultural output—had to turn to local merchants for credit, who also acted as *acopiadores* (grain brokers). Despite these general observations, there was a notable absence of any well-rounded or sustained historical research of the merchant sector until a few years ago.

In sum, during the peak of Argentina’s economic expansion farmers faced a bottleneck, namely, a lack of appropriate financing mechanisms. Institutionally, Argentina provided an official rural credit system only until the 1930s. Thus, at the time when the country’s primary sector was experiencing its greatest growth, lending practices were grounded on several commercial mechanisms, with rural merchants playing a dominant role as financial intermediaries in the Pampas.

¹ Rutter William Pickering, *Wheat Growing in Canada, the United States and the Argentine*. (London: A & C Black, 1911):15.

² Tulchin Joseph, “El crédito agrario en la Argentina, 1910–1926”, en *Desarrollo Económico* 18, no. 71 (1978): 381–408.

Local Intermediaries

In Argentina's Pampas, financial intermediaries ran the so-called general stores (*almacenes de ramos generales*). These were characterized by four core features. First, they provided a wide variety of goods to satisfy the demands of a rural population both as consumers and as producers. All of them carried general merchandise, including groceries, alcoholic beverages, cigars and tobacco products, hardware, tableware, clothes, and footwear, as well as farming machinery and supplies. Second, they operated in rural communities. Third, the stores served as “social hubs,” offering several services associated with community life, in that they functioned as mail offices, arranged travel to Buenos Aires for those needing medical attention, and organized social and educational events. Finally, and most importantly, rural stores provided credit to rural producers.

It is difficult to assess how important credit sales were at general stores in Argentina. A contemporary study for the United States by Sherrod de Floy Morehead³ found that, based on 1926 statistics, credit sales at general stores ranged between 47.79 % and 70.55 %. In La Pampa, these percentages may have gone from 42 % to as much as 80 %. For instance, Casa Torroba's credit sales averaged 42 % (in 1898–1930), while at a store in the city of Victorica, they were as high as 66.7 % (in 1906–1927), and reached 70 %–80 % at smaller rural stores. In this chapter, I use a broad definition of the term “credit” to include the acquisition of goods, money, or services in the present based upon the promise to pay for them at some time in the future. In other words, deferred payment is the key feature of credit transactions.

Rural merchants in Argentina interlinked their loans with other transactions; in particular, general merchandise, agricultural equipment sales, and grain brokerage —they later sold the grain on to larger exporter companies. To simplify a more complex picture, it is important to note that commercial credit was not the main source of profit for rural stores; rather, it may have been a tool to boost sales. Specifically, it was their grain brokerage activities (*acopio*) that drove merchants to provide credit so as to guarantee a supply of grain that they could then sell on.

³ Morehead Sherrod De Floyd, *Merchant Credit to Farmers in Louisiana*. (Rousellville, LA, PhD dissertation, Columbia University, 1929).

Furthermore, rural merchants' lending activities were strongly linked to their access to bank and commercial credit. Local consumption implied the setting up of a system where the banks, importers, and wholesalers based in the capital, Buenos Aires, had to grant long-term credit to their clients. Trade-credit linkage created a dense network of market interactions across the region. As such, banks, agricultural machinery importers, insurance companies, and manufacturers rarely made direct transactions with rural producers (62 % of whom, as stated above, were tenants).

Lending Practices

As noted, merchants necessarily took on a number of roles associated with their prominent standing in rural communities. Previous studies limit themselves to describing rural credit as “liquid credit” (*dinero en efectivo por adelantado*),⁴ but I discovered other mechanisms were used to provide credit. As a result of commercial lending dynamics, loans were in fact very rarely liquid. The study of retailers’ ledgers and, in particular, producers’ credit accounts clearly reveals that loans were gradual: “he will need around \$6,000 for wages, lease payments, and a feeder. He will withdraw these funds as he needs them, starting in late January” (Casa Torroba, book no. xx, p. 764, year 1913). Goods would be sold “on credit,” recorded simultaneously in both clients’ notebooks (*libretas*) and merchants’ account books. Credit may have substituted cash, and may have been used for either consumption or investment in production. But even if the boundaries between credit given for consumption or production were not always clear, the majority of credit sales (in absolute terms) were for productive uses, since all the clients—even the smaller farmers—were producing grain for sale on the market.

Credit was extended in a variety of forms and, most importantly, in contrast to bank loans, general store loans became effective “as needed” at different stages in the production process through three main mechanisms:

⁴Tulchin (op. cit.) and Adelman Jeremy, *Frontier Development. Land, Labour and Capital on the Wheatlands of Argentina and Canada, 1890–1914*, (Oxford: Clarendon Press, 1994).

- Overdrafts and advance payments in cash were a regular practice. The most common way of doing this was for the storekeeper to open an account for the client with the subheading “cash in advance” (*dinero efectivo por adelantado*). The entry in the books was simply “cash,” under the written expression “to him” (*a él*).
- Payments to third parties constituted a mechanism largely used for invoices and payments associated with harvest services and labor, though recipients could also include tailors or cobblers. In turn, in some cases, a sum of money would be withdrawn from an individual’s account and deposited in someone else’s current account.
- Vouchers (*vales*) were the most popular mechanism, and were used for many purposes, particularly rural wages and service payments (working capital). Customers would usually issue vouchers for their employees or suppliers to use at the store to buy merchandise or receive cash there.

These instruments ensured greater scrutiny of rural producers by traders and store owners. As noted above, the result of the seasonal cash shortages that characterized agricultural operations and banks’ conservative lending policies was that local merchants played a key role in credit availability. Local agents’ credit practices adjusted to institutional and productive changes and showed great flexibility in their credit technologies. For example, they developed other financial mechanisms by acting as note brokers, discounting bills of exchange, and being active intermediaries in the implementation of official rural credit lines, such as the chattel mortgages (*prenda agraria*) implemented in 1914.

With regard to the length of credit terms, these were generally short-term (one to six months) particularly when involving cash advances (through vouchers or bills of exchange). However, medium-term lending also existed, spanning periods from six months to two years. These loans were associated with agricultural production and the sale of grain or agricultural machinery. In practice, however, clients renewing their credit transformed these short- and medium-term loans into long-term loans. My reconstruction of general store accounts shows that most clients took almost a year to pay off their debts. Although, there were notable variations, of course, these mainly attributable to personal financial situations.

The Art of Lending in the Pampas

As stated by Karla Hoff and Joseph Stiglitz,⁵ in addition to indirect screening mechanisms (interest rates), lenders also used direct screening mechanisms. Rural merchants assessed several factors to shape their lending practices, but their interest in minimizing farming loan risks was overriding. The strategies pursued by local agents might have addressed needs stemming from a market with asymmetrical information, the specific characteristics of commercial lending, and the risks involved in agricultural activities. Rural credit analyses should focus more on these issues than on the differences between these practices and official interest rates. As noted, credit market features compelled merchants to define commercial lending policies, such as credit rationing policies. In other words, they did not lend just for the sake of lending.

A great deal of information is required to extend credit in all its forms. The close geographical and personal proximity between general store owners or merchants and rural community members facilitated information acquisition through direct observation. Merchants' correspondence indicates that many were on close terms with local farmers, sometimes advised them on personal matters, and were actively aware of what was going on in the surrounding areas. Merchants used their social and political influences and contacts to regularly visit local bankers, authorities, and other merchants.

Supervision implied time, resources, and ability, and rural merchants expended significant amounts of these to obtain information and screen loan applicants to reduce the risk of default. For example, in 1912, Casa Torroba classified clients into four categories of creditworthiness: reliable (*de confianza*), good (*bueno*), regular (*regular*), and without credit (*sin crédito*) (Book no. 23, page 959, year 1912). This classification was permanently available on the counter for consultation by store employees. In general, the better categories were for "trustworthy people of moral standing" (*gente de buena moral y cumplidora*), the intermediate cases were: "clients eligible for small amounts of short-term credit" (*clientes*

⁵ Hoff Karla and Stiglitz Joseph (1993), "Imperfect Information and Rural Credit Markets: Puzzles and Policy Perspectives", in Karla Hoff, Avishay Braverman and Joseph Stiglitz, *The Economics of rural organization. Theory, Practice and Policy*, World Bank (Oxford, Oxford University Press, 1993): 33–51.

para poco crédito y de corto plazo esto a nuestro parecer), and at the other extreme were cases referred to as: “a jinx, a bad omen” (*pájaro de mal agüero*). The information obtained by merchants was detailed and varied: it included climate, political and productive conditions, and the characteristics of the inhabitants in terms of their role as both consumers and producers. In the latter cases, there was an additional focus on their level of capital, indebtedness, productivity, the quality of their land, their family structure, willingness to work, and concepts related to honorable behavior and being able to keep their word (*valor de su palabra*).

Overall, credit rationing in the Argentine Pampas in the late nineteenth and early twentieth centuries could take several different forms. However, to summarize the situation, in the rural credit market, financial intermediaries gave loans and, in some cases, merchants declined credit requests on the basis of their knowledge of applicants. These policies were particularly applied during bad harvest periods, when credit might not be available at any price. In that sense, local conditions had a significant impact on the availability of credit.

Conclusions

Rural merchants have been a driving force behind rural-based economic development in the Argentine Pampas. However, previous studies about Argentina did not discuss their role in detail. For the most part, such research describes rural lenders as holding a monopolistic position. Other views described an almost perfect market, ruled by supply and demand, with interest rates as the only cause of explanation for credit policies. Both views—the extremes of which I have summarized here—clash with the evidence found in this study. As can be seen, an analysis based on new theoretical approaches to the so-called imperfect information paradigm has shed light on some features that characterized rural credit markets in this area of Argentina’s Pampas, such as the existence of both formal system (banks) and commercial lenders, the interlinks between credit transactions and other markets (goods and commodities), and finally, the reduced presence of official institutions in areas where tenant farmers prevailed.

As in other rural areas, retail trade in the Pampas entailed selling, buying, reporting, managing, and lending. Why did this diversity continue

to dominate the profiles of rural traders? Rural merchants were more efficient in scarcely populated areas, where they were sources of knowledge and experience, and where the cost of information was lower for them than for other agents due to their geographical proximity. Their ability to control the area through direct observation and closeness strongly influenced the mechanisms they used for collecting payments and processing information. Rural merchants were not like urban lenders, nor were they exclusively devoted to lending, and these traits set them apart from other agents or credit institutions.

Despite colorful contemporary descriptions of rural merchants as being relentlessly usurious, they could not actually afford to lend money carelessly if they were to safeguard their livelihood. Commercial credit practices called for the development of several skills (customer screening, monitoring, and payment collection). Local intermediaries showed greater flexibility in performing lending activities in an area with a higher share of tenant farmers. Collecting information remained a key tool for preventing an increase in bad loans that would jeopardize retailers' ability to pay suppliers and thus cause store bankruptcy.

As an intrinsic part of these reflections, it should be noted that a key factor in understanding merchants' credit practices and their differences with other lending agents rests firmly on the fact that their loans were inter-linked to other kinds of contracts implying the sale of a vast assortment of merchandise and supplies, and also insurance.⁶ As noted, except in rare cases, lending was not a business in itself; rather, it was the fuel for retailers' trade machinery. The links between trade and credit enabled rural storeowners to more effectively navigate the difficulties resulting from asymmetrical information in credit markets. This scenario is also instrumental to explaining why pure lenders were rather rare in rural areas, why banks and manufacturers used merchants to deal with farmers, and, finally, why storeowners took on an increasing number of tasks and business operations.

In short, while other studies attribute the central role played by these agents to their monopolistic position, banks' inefficiencies and limitations, and the Pampas' rigid land ownership structure, my view stresses the influence of information asymmetry among lenders and borrowers, although I agree with prior works on the peculiarities of Argentina's agricultural

⁶Op. cit.

credit conditions, such as the high risk levels involved and the prevailing presence of tenant farmers. Indeed, this study does not intend to paint an idyllic picture but to present the rationales at play at a time of significant transformations in the agrarian capitalism of the Argentine Pampas.

Further Reading

- Gareth, A., & Kaoru, S. (1993). *Local suppliers of credit in the third worlds 1750–1960* (pp. 150–1960). London: McMillan Press & New York: The St Martin's Press.
- Lluch, A. (2006). Comercio y crédito agrario. Un estudio de caso sobre las prácticas y lógicas crediticias de los comerciantes de campaña a comienzos del siglo XX. *Boletín del Instituto de Historia Argentina y Americana Dr. Emilio Ravignani*, 29, 51–83.
- Regalsky, A. (1999). Banca y capitalismo en la Argentina, 1850–1930. Un ensayo crítico. *Revista Ciclos*, 9(18), 33–54.

Bibliography

- Hoff, K., & Stiglitz, J. (1993). Imperfect information and rural credit markets: Puzzles and policy perspectives. In K. Hoff, A. Braverman, & J. Stiglitz (Eds.), *The economics of rural organization. Theory, practice and policy* World Bank. Oxford: Oxford University Press.
- Morehead, S.D.F. (1929). *Merchant credit to farmers in Louisiana*. PhD dissertation, Columbia University, Rousellville.
- Rutter, W. P. (1911). *Wheat growing in Canada, the United States and the Argentine*. London: A & C Black.
- Tulchin, J. (1978). El crédito agrario en la Argentina, 1910–1926. *Desarrollo Económico*, 18(71), 381–408.
- Tulchin, J., & Adelman, J. (1994). *Frontier development. Land, labour and capital on the wheatlands of Argentina and Canada, 1890–1914*. Oxford: Clarendon Press.

7

Matching Cash and Kind: Argentina's Experimentation with Multiple Currencies, 1995–2005

Georgina M. Gómez

Introduction

There are hardly any economic theories to justify that countries should have a single currency and in terms of economic organisation, the institution of one country = one currency is a relative newcomer. A pivotal compilation on the topic considers that the principle of one currency per country is quite an “artificial political instrument”.¹ A widely accepted explanation on why countries should have only one type of money refers to the transaction costs of using different currencies, but such a common-sense argument contradicts real-life data. Historians have described repeatedly how there were different currencies circulating along

¹ Gilbert, Emily and Helleiner Eric, eds., *Nation-States and Money. The past, present and future of national currencies* (London, New York: Routledge, 1999).

G.M. Gómez (✉)

International Institute of Social Studies of Erasmus University Rotterdam,
The Hague, The Netherlands
e-mail: gomez@iss.nl

one another and Kuroda (2008: 7),² for example, describes how in both Asia and Europe “the majority of human beings throughout most of history dealt with concurrent currencies”. One of the factors that differentiated categories of users and currencies was the need to use big and small denominations for big and small expenses. The distinction implied that the well-off had highly valuable means of payment for expensive products while the poor needed small change for cheaper daily necessities. Another factor that separated categories of users and currencies was the payment of local goods and services with local currencies and imported products with internationally accepted currencies. Money changers came into the scene to facilitate economic transactions between the different users and circuits.

A similar organisation of currencies was observed in Argentina during the crisis of the millennium. Economic agents matched currencies with their payment needs, so a division of labour emerged among currencies. Repeated transactions, functionality, habit, and legal restrictions created this division of labour among currencies. This chapter discusses the case of Argentina between 1995 and 2005 to show that economic agents have managed to use different types of currencies without incurring extra costs of using money changers and, as a matter of fact, the availability of several types of paper money had a positive effect on keeping the economy functioning during a severe crisis. How did households deal with different types of money?

Argentine Experiments with Money

Much before the crisis of the millennium, there was an engrained perception in Argentina that money is basically printed paper of variable value, far from an untouchable institution of the state. Since the 1950s, several governments implemented a broad menu of anti-inflationary policies that included changes in the currency and the rules of monetary expansion. Two-digit inflation rates were normal and contributed to the pecu-

² Kuroda Akinobu, “What is the complementarity among monies? An introductory note.” *Financial History Review*, 15(2008): 7–15.

lier understanding of money as a flexible social construction that can be transformed with the stroke of a pen.

A Two-Currency Economy

As a result of high inflation since the 1950s, Argentines sought a harder currency that could preserve the value of their savings and so they adopted the dollar as a second currency. Initially it was only a reserve of value but dollar-denominated prices gradually became institutionalised and the US dollar was commonly used as the unit of account in transfers of goods such as houses and cars, and in long-term contracts. Eventually, the dollar was preferred for actual payment of those goods.

The origin of this dual currency economy is explained as a failure of indexation to adjust quantities properly: price indexes tell a story of past price increases while the US dollar reflects increases currently going on. Uncertainty over the future value of pesos prevented agents from seeing the peso as the natural unit of account (the currency that could effectively guarantee purchasing power in the future) and the dollar then took over that role. When inflation started rising, it became the practice for agents who had fled to more reliable currencies such as the dollar, to protect the value of their payments, goods for sale and savings. The inflationary problem became extremely serious with the hyperinflation period between May 1989 and the end of 1990, a period of less than two years. It became common practice to pay for all goods and services in pesos calculated at the hourly advertised exchange rate of the price in dollars.

It was no wonder that the top policy priority in 1990 was to reconstruct the institutions regulating the relationship between the population and money, the monetary system and monetary-defined property rights. Behind the steering wheel of the Ministry of Economy at that time was Domingo Cavallo, who contested the monetarist view that the source of inflation was the quantity of money in an economy and instead posited that it was the quality of money that determined agents' monetary preferences. Cavallo described the monetarist theory of inflation as incomplete because it did not pay attention to the institutional aspects of money. In

March 1991 the Argentine government implemented the Convertibility Plan, which included a Congress-approved convertibility law that transformed the Central Bank into a currency board. It pegged the peso to the US dollar at a rate of 1:1 and allowed all transactions to be performed in any currency of the public's choice. The law forbade indexation in contracts but protected the option of denominating prices in dollars. This also applied to bank deposits over any term. It gave the Central Bank autonomy and specified the level of foreign currency reserves it would have to maintain, while it determined that the Central Bank would no longer act as lender of last resort to the banking system (no other institution was designated for that function). In practice, this ensured that Argentine official money would be issued strictly aligned with inflows of foreign currency. Instead of fighting it, the Convertibility Plan built upon the practice of using two currencies and regulated the use of the US dollar in order to curb inflation.

A Third Currency for Private Use

Monetary reform was implemented together with one of the most ambitious and swift privatisation programmes in Latin America, involving almost all state-owned enterprises, public utilities, the pension system, much of the health care and the banking sector. Markets were opened to trade, the regulations on foreign investment were relaxed, and several other sectors were deregulated. Part of the middle class bloomed with the opening of markets and the arrival of a myriad of transnational corporations in the service sector. Those employed in the so-called modern sector of the economy were then introduced to a private type of money. These were private vouchers given by employers to their workers as part of or extra to their wages. These vouchers allowed employees to buy meals in restaurants and later on, food in supermarkets and oil in most gas stations. They were not considered part of the salary according to the labour laws, so they became a cheaper option for employers to reward their workers.

In 1995 a major economic crisis hit the modernised Argentina with the neoliberal experiment. At the macroeconomic level the crisis caused

major disruptions in the balance of payments and the peg to the dollar almost collapsed, but was saved at the cost of a recession that skinned 5 % off the national product in 1995. Across several industries, employers reduced wages. Workers who were short of cash adapted and started paying most of their households' daily necessities with the private vouchers, including the rent if the owners accepted them. Private vouchers could be used similarly as pesos for purchasing basic necessities, but rarely overlapped with the uses reserved for US dollars because the vouchers were not perceived as a reserve of value or a suitable currency to pay for larger amounts. Besides, there was no segment of the market for which vouchers were the only currency to make payments, but households still tried to use vouchers instead of pesos because they had a restricted circuit of circulation.

A Fourth Currency at Community Level

The financial crisis of the mid-nineties introduced many Argentines to the traumatic novelty of not having a job. The unemployment rate had risen gradually throughout the nineties because of the changes in the industrial sector, the retreat of the state and the privatisations, but in 1995 Argentina hit a record unemployment rate of 18.8 %. The term 'hyper-unemployment' was then coined. The purchasing power of wages in 1995 fell to 68 % of their 1986 level and 62 % of their 1975 level. The social costs of the structural reforms were beginning to be reported by the media, which revealed pools of poverty that had never been seen before because it affected a large segment of the population and had become visible across the country, age groups and social strata.

An early study of the social consequences of the structural reforms coined the term 'new poor' to describe households that had recently fallen under the poverty line in a country where about 70 % of the population had declared itself to be part of the middle class. The new poor were the shopkeepers, public servants, skilled workers, graduates, blue-collar workers, bank clerks, teachers and small firm owners. Many of the sectors in which the middle class worked were targets of the reform policies

and were thus overwhelmed by their disenfranchisement. Their structural basic needs were covered, but with the drastic reduction in their income they could no longer afford their lifestyle. They understood the world differently from the traditional poor.

Amidst this environment of economic demise, well consolidated collective actors were reorganising social life independently from the state, ensuring representation through new channels and promoting alternative income generation schemes. Among them were circles of trade that printed their own means of payment to denominate prices and facilitate trade. They were called *Redes de Trueque* (Exchange Networks) and were the brainchild of two grassroots groups that organised these local exchange networks. Participants would buy and sell goods and services from each by using a currency they had created themselves. The first group was launched with 25 members in May 1995 and the scheme was so successful that it quickly replicated to other locations across Buenos Aires, at first, and the rest of the country, later on. Each local exchange centre started with its own surrogate currency, but after a while the currencies were accepted in other centres. Eventually, a number of networks using complementary currencies emerged at the local, regional and national levels. Each network used its own abstract means of payment, depersonalised, dematerialised, transferable, and not convertible to goods, pesos or any other types of money. At first sight, it seems a major innovation for civil society groups to print their own currency, but in Argentina it was in line with the peculiar understanding of money as a social construction that civil society groups, too, could make and unmake. The creation of the *crédito*, the name of the community currency, represents a small innovation on the institutionalised practice in Argentina of using several currencies at the same time.

A Fifth Currency at Local Level

The neoliberal state reform of the 1990s was pushed on the provincial governments, some of which historically had high public employment. As the private sector deteriorated under the pressure of the structural reforms, the provinces started witnessing a series of protests and local

riots that worsened and undermined governance by the end of the decade. Under the pressures of social unrest and growing fiscal deficits, the governors asked the central government for help but it was in no position to help them. When the province of Buenos Aires was on the brink of a default in 2000, it sought a loan from a consortium of national banks. These denied the credit but came up with an alternative plan. They would loan one third of the funds, while another third would derive from budget cuts and the last third could be covered with debt bonds. The province accepted the scheme and issued promises to pay in the form of bonds of low denomination which were used to pay part of the wages of public servants. Workers hence became explicit creditors of their employer. The main risk of the policy was that the bonds would not keep at par with the peso and the dollar, but it did not happen, mainly because of the depth of the economic decline—any currency was better than no currency at all. Moreover, the bond paid an attractive 7 % interest rate and could be used to pay provincial taxes.

With squeezed budgets, a dozen other provinces decided to follow and issued their own currency to pay wages instead of further reducing spending, which would increase unemployment. These local currencies started as debt bills and were soon termed quasi-currencies.³ In September 2001, the provincial currencies represented 5 % of the national monetary base. Decreasing tax revenues pushed them up to 25 % in January 2002 and 33 % in October 2002. In fact, the provincial currencies first appeared as debt but then later became currency. The bonds had no intrinsic value and were backed by no specific commodity, as they were circulating debt. The system was so easy that some governors failed to understand soon enough that the acceptance of provincial currency was limited to their capacity to collect taxes and when their amount soared, their attractiveness seriously diminished. So, in some provinces the quasi-currencies became a reactivating success, while in other provinces over-issuance ended in hyperinflation and chaos.

³ Schvarzer Jorge and Finkelstein, Análisis – Bonos, cuasi monedas y política económica. *Revista Realidad Económica, IADE* (Buenos Aires, 193, 2003).

Matching Money and Transactions

For decades, Argentina sustained a two-currency economy in which pesos and dollars circulated along one another. During the 1990s, privately issued means of payment added a third type of currency for those formally employed and then the *créditos* were added to the menu as a new type of currency created by community organization. By the end of the decade, there were also several provincial currencies of geographically restricted circulation. The creation of currencies parallel to the official one would have been illegal or bluntly rejected in other countries, but in Argentina it was within the acceptable options. People were used to living with two or three currencies, so why not four or five?

As discussed by Kuroda, together they fulfilled the three main functions of money but at different levels and in different ways. For savings and larger payments like capital goods and housing, the dollar was the preferred currency, while the peso was the only currency used to pay taxes and debts with the central state. Provincial and municipal taxes could be paid in provincial currencies. Basic necessities were bought with private vouchers, pesos or provincial currencies, which were all accepted by supermarkets and regular shops. Other basic necessities could be paid with *créditos* if the household participated in one of the many Redes de Trueque. All combinations of these currencies were also possible.

In other words, each type of currency did something specific and it took all of them together to satisfy the needs to pay for all types of transactions in the economy. By the turn of the millennium, Argentine households were using up to five currencies—pesos, dollars, provincial quasi-monies, private vouchers and *créditos*. Their preferred currency was the one that could buy the largest diversity of goods and services, but the totality of their needs for means of payment normally required a minimum of two because the money of widest acceptance, the dollar, was not valid to pay for taxes and other transfers to the public sector. The peso was hardly accepted for large payments like houses and other investments, and it was not seen as suitable as a reserve of value. On the other side of the coin,

the currency that was perceived as safest—the US dollar—was also the hardest to obtain so it would hardly be used for small daily necessities. The créditos were the money that low-income households and especially women could access the easiest, but it also had a restricted use because the circulation of créditos was limited to the circulation in the Redes de Trueque.

Households learnt to match the currencies of their incomes with the currencies of their expenses, and to relate them to which was more accessible. Those households that had access to different currencies chose which one to use in order to obtain the goods and services they needed. No evidence was found that users with access to different currencies converted from one to the other to facilitate exchanges. Users normally did not convert between currencies, which was costly. They avoided those costs by keeping multiple currencies and matching them to corresponding payments.

The Argentine experience suggests that the circulation of several currencies supported households' efforts to survive financially through the crisis of the millennium. A large number of households and small businesses were able to get by in the worst crisis in Argentine history precisely because they had access to various currencies, which allowed them to participate in several monetary circuits at the same time.⁴

Further Reading

- Dodd, N. (2014). *The social life of money*. Princeton: Princeton University Press.
- Ingham, G. (2004). *The nature of money*. Cambridge: Polity Press.
- Parry, J., & Maurice, B. (1989). *Money and the morality of exchange*. Cambridge: Cambridge University Press.
- Smithin, J. (Ed.). (2000). *What is money?* London: Routledge.
- Wray, R. (2004). *Credit and state theories of money: The contributions of A. Mitchell Innes*. Cheltenham: Edward Elgar.

⁴Gomez, *Argentina's Parallel Currency: The economy of the poor* (London, Pickering and Chatto, 2009).

Bibliography

- Gilbert, E., & Helleiner, E. (Eds.). (1999). *Nation-states and money. The past, present and future of national currencies*. London/New York: Routledge.
- Gomez, G. (2009). *Argentina's parallel currency: The economy of the poor*. London: Pickering and Chatto.
- Kuroda, A. (2008). What is the complementarity among monies? An introductory note. *Financial History Review*, 15, 7–15.
- Schvarzer, J., & Finkelstein, A. (2003). Bonos, cuasi monedas y política económica. In *Revista Realidad Económica* (p. 193). Buenos Aires: IADE.

8

A South American Experience on Bartering: The Case of Tradaq in Brazil

José E. Rivero García

Introduction

Barter has been present in society for thousands of years. For instance, in the early days of Harvard College in the seventeenth century, tuition fees could be exchanged for lumber, livestock or construction stones.¹ More recently, in 1990, Pepsi entered the former Soviet Union by trading soft drinks in exchange of vodka. In another example, the North Carolina Bar Association permitted attorneys to join organized barter exchanges allow-

¹ Spitznagel, Eric, 'Rise of the Barter Economy'. *Bloomberg Business*. April 26 2012. <http://www.bloomberg.com/bw/articles/2012-04-26/rise-of-the-barter-economy> (accessed December 08, 2015).

This article could not have been written without the valuable contributions of Renata Toledo, to whom I extend my gratitude.

J.E. Rivero García (✉)
Tradaq Ltda, São Paulo, Brasil
e-mail: jose@tradaq.com.br

ing them to swap legal services for credit to expend on a variety of services from computing to web design, auto repairs and advertising.²

In the late 1990s, Brazil was going through a process of renewed democracy and economic liberalization. At the same time, developments in information technologies and communication were spreading out, enabling a new form of globalization in which regardless of their size or location, businesses could offer their products and services to the entire world (Oliver and Mpinganjira 2011). This was a totally new form of conducting business for many business owners in Latin America, who traditionally preferred face-to-face negotiations and physical, on the spot, exchange of value for goods and services.

During the turn of the new millennium, the barter industry was fragmented in Latin America. Two friends from school saw an opportunity in this by harnessing the technology around the emerging Internet to consolidate the barter industry. They decided to invest first in Mexico and then landed in Brazil, bringing the oldest form of business wrapped to be the next promising way of doing business: an electronic barter exchange network.

The idea behind Tradaq was built around developments in the USA in 1983, when the US Congress approved new tax legislation on barter providing a clear legal framework upon which barter companies could operate. The result of this was a new generation of companies that transformed the nature of barter by allowing greater participation, not only of small business owners, but also the formation of barter networks. Tradaq's model was established in Brazil and was inspired by these developments.

The business model behind Tradaq was aimed at articulating an electronic barter network that enabled a fast, tax efficient and reliable exchange between its members. In the early years of the new millennium, more than US\$200 million dollars were raised in venture capital to acquire, build and consolidate barter exchange networks across the USA, Canada, Mexico and Brazil, and were also used for a sophisticated software platform upon which they could all trade.

There were a number of hurdles for an electronic barter network to become a reality. As mentioned, the culture of Brazilian small busi-

² Keys Tracey and Malnight, Thomas "The Exploding Business of Bartering". *Harvard Business Review*, September 12 2012. <https://hbr.org/2012/09/the-exploding-business-of-bart> (accessed December 08, 2015).

nesses was not particularly forward-looking in terms of embracing new technologies and innovative commerce approaches. Other big hurdles included Brazil's legal bureaucracy, inflexible labor markets and punitive tax regime. They all came together to challenge any proposition for an innovative, new business model. So in comparison with similar "dotcom" companies in developed markets, Brazilian technology start-ups had a longer battle to fight in order to initiate activities. Even then many small technology start-ups and "old economy" new businesses in Brazil agonized to stay afloat and get themselves into a viable position.

The Cyclical Movement of the Electronic Barter Network Business Model

According to Eckhaus (2011) an organized barter exchange network builds on the idea of a central organization to act as a broker and clearing house for the exchange of goods and services between its members. This central organization will be the custodian of a portfolio with thousands of members holding distinct business needs. As a result, this central organization acts like a platform for an exchange system that can provide its members with more bartering opportunities thus reducing transaction costs of individual members having to find those bartering opportunities by themselves. Membership of the barter platform also provides additional benefits such as protecting each exchange by clearly defined rules and regulations.

Each member, whether self-employed or a small to medium-sized business, holds an individual barter account that enables managing purchasing and selling operations. In the case of sellers, this account also details the portfolio of goods and services offered. But rather than using local currency units, trade in an organized barter network is registered in barter *credits*.³ A significant benefit of the barter exchange network is forgoing the need for a reciprocal trade exchange. This is because participants can accumulate credits to purchase any other product or service within the network. This purchase can take place at the time of the transaction or in the future. Every time a member sells at an agreed price to the buyer,⁴ credits are debited

³ Each barter exchange network holds its own named credit units.

⁴ Prices are set at the prevailing market rate, based on prices paid in cash.

from the buyer's account and deposited in the seller's account. Once a participant has accumulated sufficient credits, these can be used in the acquisition of any product or service offered by other participants in the network.

Other benefits associated with centralized barter exchange are increased sales volume and improved cash flow. Sales volume increases because barter trade can attract new consumers that otherwise would not be aware of the full catalog of services and products offered by the members. Barter can improve cash flow by helping to create value from assets which may no longer fit in the member's strategy or by disposing of excess inventory. The barter network also increases cash flow by reducing some of the marketing and distribution expenses (Oliver and Mpinganjira 2011).

Benefits of the barter trade network also include allowing its members to enter into new or difficult markets, long-term and trustful relationships with business clients, better use of the sales force, more effective payment of creditors, and an alternative marketing and promotion channel for products and services, as listings reach hundreds of other affiliated members.

Companies most inclined to swap are those with perishable inventories. The category includes service providers like broadcasters, hotels & restaurants whose inventories lose value if not sold by a certain time. Barter allows such companies to sell their inventory without resorting to drastic discounts.

Tradaq's History and Business Model

Barter has shown to be an interesting alternative to maintain business performance during periods of sluggish economic growth.⁵ Given such history in Brazil and particularly the volatile economic performance of the 1980s, the young entrepreneurs behind Tradaq saw an opportunity to profit from using new applications of information technologies to improve barter trade within Brazilian small business sectors.

Tradaq brought the concept of an electronic barter network to Brazil in the year 2000 and was the first company of its kind in the country. The name was based on the idea of combining "Trade" while invoking the

⁵ Strugatch Warren, "Let's Make a Deal: Bartering Gains a Bigger Role". *The New York Times*. September 23, 2001. <http://www.nytimes.com/2001/09/23/nyregion/li-work-let-s-make-a-deal-bartering-gains-a-bigger-role.html> (accessed 08 December 2015).

idea a modern market such as Nasdaq. Specific software was developed to provide services to the company and its clients.

However, a lack of specific regulations for barter companies resulted in difficulties in establishing Tradaq in Brazil. A significant amount of resources were spent to clarify the nature of the business for the fiscal authorities. For instance, in the view of some authorities an electronic barter network should be classified as a financial institution, due to its administration of customer accounts. Banking regulation compliance would be cumbersome and too expensive for such a venture. With the help of legal counsel, a commercial framework was put in place to permit it to operate within the local framework.

After 15 years of existence, Tradaq is the leader of the sector in South America. Operations record turnover of more than US\$8 million dollars in traded goods and services annually amongst 1600 active members. Tradaq is still very small for the markets' potential and will seek to double its size in the next four years.

The substantial and diverse network built by Tradaq with the effort of a committed team allows the client base to be constantly renewed with the entrance of approximately seven companies per month. Their operations are managed by a group of five brokers, including a coordinator, and supported by another eight employees involved in the back office and systems departments along with a director and a general manager, totalling a workforce of 15 persons.

The main office is located in the city of São Paulo. Its operations, however, reach markets in other cities such as Belo Horizonte, Rio de Janeiro and Campinas.

Out of the 800 active members that trade during the year, the segments with more participants within the network are:

- Media: 226 members (28 %)
- Advertising agencies: 87 members (11 %)
- Food and hospitality: 130 members (16 %)
- Print shops: 50 members (6 %)
- Corporate and home furniture: 65 members (8 %)

This variety of clients in fact enables Tradaq's barter network model to work, by providing various products for different needs while focusing

mostly on those goods and services required by most member companies and their owners.

Tradaq's role in the bartering processes include: (i) prospecting potential members; (ii) signing up members who pay an admission fee to enter into the network as well as an annuity and 10 % commission over sales; and (iii) opening and promoting an account in the system (getting them to trade). Regarding the use of the account, it can be mentioned that as soon as sales are processed, virtual credits valid only within the network (called *únicos*⁶) are debited from the buyer and deposited into the seller's account. All transactions can be executed by the client in a virtual platform. There is also online access to the account and to its statement and current market offers.

For those clients with a sufficient credit balance, a line of credit to purchase in the network is available, subject to commercial credit analysis.

Every time a company enters Tradaq's network, the marketing department prepares an advertisement to be included in daily marketing emails, which contain information on products and services available to all members. Bi-monthly events are promoted at members' premises in order to connect entrepreneurs and promote sales.

In Line with Mrs. Groenwald's Comments on the Barter Industry

All tools and procedures that make up Tradaq's business model were built to offer a solid structure and a safe financial environment where members could trade products and services to their business success. Nevertheless, it is necessary to admit that, during 15 years of hard work, some problems have occurred along the way. Most of them are common to barter networks around the world, and have been identified by Susan Groenwald,⁷ a specialist in the commercial trade exchange industry with 23 years of experience. Her thoughts are worth considering in this brief study:

⁶An *único* is the monetary unit adopted by Tradaq: un\$ 1.00 (*único*) equals R\$ 1.00 (Brazilian Real, the currency of Brazil).

⁷Groenwald Susan, 'A Look Back (At The Barter Industry)'. *BarterNews* (2012) Issue 62. p. 16-22.

- Difficulties in getting to the next level of assets after reaching a considerable size due to lack of capital and liquidity. Experience within the barter industry and with Tradaq specifically shows that companies stop growing when the network reaches a certain number of clients.
- The local or regional nature of most exchanges prevent the expansion to national level due to lack of interregional economies of scale. This means that a barter trade network needs to start from scratch when expanded to other locations. There are few synergies between one operation and another.
- Frustrated expectations over the Internet potential to bring businesses to sign up for a barter program unassisted by brokers. A lot of resources have to be engaged to provide intense training of the commercial force since small business owners need a lot of handholding in operating the system.
- High churn rate: A significant number of members leave the system annually. It is necessary to consider at least a 10 % loss of membership and therefore a recruitment of new members is a priority.
- Overpricing: It is very hard to control pricing as an overpriced product or service is sometimes in the best interests of a buyer and seller due to lack of liquidity (i.e. the media, with very low marginal sales costs, can afford to overpay.) This corrupts the system and creates a bad image problem.

Tradaq has struggled over the years to face the obstacles mentioned above. Nonetheless, we have persevered and slogged along.

Thousands of new trades are just around the corner as we create business opportunities for our members. Plans for a franchise program are currently being designed and will be implemented in the near future. On a final note, Tradaq will strive to follow Groenwald's advice: "Offer a simple, convenient, accurate, consistent and user-friendly barter experience through a modern service to buy and sell with convenience."

Further Reading

Eckhaus, E. (2011). Barter trade exchange to the rescue of the tourism and travel industry. *Journal of Shipping and Ocean Engineering*, 1, 133–140.

Oliver, P., & Mpinganjira, M. (2011). Barter trading: An empirical investigation of management practices. *African Journal of Business Management*, 5(31), 12256–12263.

Bibliography

- Groenwald, S. (2012). A look back (At the barter industry). *Barternews*, (62), 16–22.
- Keys, T., & Malnight, T. (2012). The exploding business of bartering. *Harvard Business Review*. <https://hbr.org/2012/09/the-exploding-business-of-bart>. Accessed 8 Dec 2015.
- Spitznagel, E. (2012). Rise of the barter economy. *Bloomberg Business*. <http://www.bloomberg.com/bw/articles/2012-04-26/rise-of-the-barter-economy>. Accessed 8 Dec 2015.
- Strugatch, W. (2001). Let's make a deal: Bartering gains a bigger role. *The New York Times*. <http://www.nytimes.com/2001/09/23/nyregion/li-work-let-s-make-a-deal-bartering-gains-a-bigger-role.html>. Accessed 8 Dec 2015.

Part II

Emergence and Future of Cashless Technologies

9

Dematerialization and the Cashless Society: A Look Backward, a Look Sideward

Patrice Baubéau

Introduction

The idea of a cashless society, as promoted for the last half-century or so, combines two key ideas, namely the disappearance of cash and the role played in this change by a technologically-led move towards the dematerialization of money. As Bernardo Bátiz-Lazo, Thomas Haigh and David Stearns have shown, this project is rooted in the future more than in the past, as it illustrates a shared vision of what ought to be but remains difficult to implement because of contrasting interests and motives, notwithstanding technological issues.¹

¹ Bernardo Bátiz-Lazo, Thomas Haigh and David Stearns, “How the Future Shaped the Past: The Case of the Cashless Society”, Working paper, November 2011, <http://ssrn.com/abstract=1961542> (accessed June 12, 2015).

P. Baubéau (✉)

Université Paris Nanterre, Bât. Max Weber, 200 avenue de la République,
92201 Nanterre Cedex, France
e-mail: patrice.baubreau@orange.fr

Nevertheless, even though a kind of consensus is noticeable upon the progressive disappearance of cash and check payments, as exemplified in a recent comprehensive study on the French payment system,² from a longer-term perspective, the two key ideas of cash and dematerialization appear problematic as the meanings of cash, payment and materiality get blurred. Basically, the cashless society raises two successive questions: (1) What is cash? (2) What is the materiality of money? None of them are easy to answer and whatever answers there are, they depend a lot on the historical context of both cases under study and the people asking the questions. This is precisely the focus of this short chapter: to historicize cash and the materiality of payments and stress the hazards of having a progressive conception of history. To explore these issues is a two-step process. First we will present how cash may be defined in contrasting ways. This will lead us to consider what dematerialization means.

What Is Cash?

As a starting point, the *Oxford Dictionary* provides us with a definition for cash (*noun*):

money in coins or notes, as distinct from cheques, money orders, or credit:
the staff were paid in cash – a discount for cash money in any form: *she was always short of cash*

As for the origin of the word, it states:

Origin: late 16th century (denoting a box for money): from Old French *casse* or Italian *cassa* ‘box’, from Latin *capsa* (see case).³

It can easily be seen that the definition of cash, first based upon a valuable one can store and handle, progressively evolved to a plurality of nuanced

²Georges Pauget and Emmanuel Constans (Rapporteur: Jean-Marc Lherm), *L'avenir des moyens de paiement en France* (rapport au Ministre de l'Économie, des Finances et de l'Industrie), Paris, March 2012, 146.

³“Cash”, Oxford Dictionaries, accessed July 20, 2015, <http://oxforddictionaries.com/definition/english/cash>

meanings. They all are logically associated with the ability for a debtor to settle a debt on the spot. A second key characteristic is a measure of anonymity. Third, such means of payment is essentially manual and, thus, material. As such, the definition of cash does not necessarily coincide with the classical functional definition of money; for example, a means of payments, a means of settlement and a reserve of value.

At the same time, the progressive widening of the meaning of the word “cash”, that came to encompass notes and other means of immediate payment or settlement, bears witness to the quickly changing nature of money over the last centuries. Thus, cash came to encompass some forms of fiat money, that is, money without any material or intrinsic backing of its value, such as modern banknotes⁴ because of their common manual character. Wallace tackled the evolution towards fiat money and the problem raised by “hard money”, that is, a high-powered money whose amount remains capped, either by an authority or by sheer scarcity, and thus limits the capacity to issue subordinate money. To be more realistic, he proposed to “make running the monetary system costly”.⁵

The true novelty of the modern situation is indeed that “hard money” may not mean “cash” anymore, something the natural character of which the very terms still reflect today: gold, shells or copper were hard, when compared to bills of exchange, notes or imaginary money. Cash today is not the higher quality money, but a rather supplementary form of money, whose main quality is its capacity to settle ordinary transactions anonymously and on the spot, at the convenience of the debtor. In the Western World at least, all cash has become “small change”, important transactions being settled without cash.

Building on Smith and Ricardo, John Hicks stated an obvious reason for these evolutions: “The creation of a ‘substitute hard money’ by control over the quantity of some sort (or sorts) of money is continually defeated by human ingenuity in the invention of other sorts”.⁶

⁴To be more specific, banknotes may fall into two categories: certificates (or representative money) that draw their value from a commodity and fiat banknotes that draw their value from the legal provisions and, most of the time, public monopoly.

⁵Neil Wallace, “The overlapping generations model of fiat money.” In *Models of Monetary Economies*, John Kareken and Neil Wallace (eds.) (Minneapolis, Federal Reserve Bank of Minneapolis, 1980).

⁶John Hicks, “Automatists, Hawtreyans, and Keynesians”, *Journal of Money, Credit and Banking*, Vol. 1, No. 3, Aug., 1969, pp. 307–317.

But if the higher costs associated with issuing material means of payments are the key to recent evolutions, one has to understand why cash was material in the first hand. The reason lies in the fight against forgery and the typical wedge between the users and the issuers' valuation of any currency, whether cash or not, that is seigniorage. Seigniorage designates the main winner in partly or fully fiduciary cash issuance and circulation, be it a state, a bank or a merchant. In sum, seigniorage is a fiduciary added-value over the issuing costs and is based on custom or trust and is the very motive behind the first modern issuance of coins in sixth century BC Lydia. But the development of Aegean silver coinage later created competition between city states and reduced the seigniorage wedge to a minimum, the silver drachma enjoying a very high silver content. Only in case of a monopoly—mostly achieved through empires before modern times, like the Roman Empire—could the seigniorage rate increase.

This should lead us to look more minutely at the relationships between coins—supposedly cash—and banknotes—supposedly credit. For example, for most of the nineteenth century, although they were obviously manual means of payment on the spot, banknotes lacked some cash quality. In France, any creditor could refuse to be paid with such notes, at least until 1870, for whatever amount to be paid. On the contrary, even small denomination coins (mainly bronze coins in the French context) had full power of settlement, even though this power was limited in magnitude (50 francs) and in proportion (2.5 %) to the total sum to be paid. In England, the legal tender of silver coins was limited in 1914 to £2 and that of bronze coins to one shilling. A payment in cash, in this context, referred to a payment in full-bodied coins and, within the tolerated limits, small change, only to the extent that banknotes were not legal tender.

The above few examples show that cash, even though it clearly refers to a means of payment on the spot, a means to break indebtedness at the will of the debtor, is not a specific term: coins, shells, nuts, banknotes and even deposits can be, successively or alternatively, considered as such by at least a proportion of the holders. But in discussing these examples, we have somehow reached a definition of cash, both positive and negative.

On the positive side, until the nineteenth century, cash was made of material objects that had a legal conventional value attached. to which was attached a legal or a conventional value. These objects were exchanged manually. They were (or could be) traded anonymously. Whatever their legal value, they had a measure of market value, either because of their content or because of any other convention—Chinese, Indian and European governments had to fight the tendency to hoard copper, silver and gold cash and use it for non-monetary purposes. In sum, cash was a legal or conventional manual means of (eventually) anonymous payment on the spot.

On the negative side, the value of cash was not socially, occupationally or territorially constant: there were huge inequalities in the cost and access to cash. Seigniorage, because it results from monopoly or regulation, was not a necessary, but frequent, feature of cash. What remains is whether an anchor—material or financial—may give an edge to any currency, a “put” in Anthony Hotson terms.⁷

What Does Dematerialization Mean?

In most parts of the world, the materiality of cash has been the rule. The problem remains to know whether cash *was* money or *represented* money. Aristotle had more or less settled the matter when he stated that even though wealth could be hoarded in silver or gold coins, the latter also had a conventional value. In his own terms, “money is a mere scam”.⁸

The only way to disentangle the question rests on the acknowledgement of three elements. First, both cash and money derive their value from a set of properties, such as conventions, norms, fiscal status, legal tender, and value whether intrinsic, religious, transaction-specific, aesthetic, and/or practical. Second, the distinction between cash and money implies a valuation rule often linked to the existence of a general legal system and/or the state, as a way to enforce a general purpose monetary

⁷ Anthony Hotson, “Monetary standards and the value of money: Anglo-British experience from the 12th to the 21st century”, Presentation, King’s College, London, 2012.

⁸ Aristotle, *Politics*, Book 1, Part IX.

unit of account. For very long periods indeed, the link between the unit of account and cash was rather unstable and subject to both market valuation (when cash material had a proper market value) and legal changes, a far cry from the idea of a stable monetary value. Third, anonymity is a key factor in cash: it is not necessarily put to use in a given transaction, but cash should allow for a measure of anonymity towards either the issuer or the state. In turn, this means that the cash may be transformed into a kind of object, that is “encapsulated within itself”—objectified. This does not rule out virtual cash, but constrains the form transfer and exchange operations may take to parallel anonymous transfers in the real world.

For example, banknotes came to be considered as cash in Europe when trust in them grew not only as a result of their permanent usage, but also in the absence of viable cash alternatives, as in Sweden, and, finally, due to legal tender provisions. This was later on reinforced by the vanishing of full-bodied coins in the wake of the two world wars. But in Asia, the story is rather different: no other coins than copper circulated and paper notes were denominated in such coins, fiduciarity upon fiduciarity, until the latter were withdrawn during the seventeenth century. In nineteenth and twentieth century China, small copper tokens were routinely circulated by private merchants to supplement state issuance, as well as “cash” notes, and both played a very important role locally.⁹

But what remains is that even in Western Europe, the term “cash” had evolving and sometimes conflicting meanings, depending not only on macrosocial evolutions, but also on specific behaviours among firms, groups or individuals. Above all, it demonstrates one cannot contrast cash and credit easily.

The picture seems somewhat clearer now: money and cash are not opposed, but rather complementary when a monetary system has been set. As a system, money cannot be dematerialized: it is a principle, almost a concept, and not an item. As an object, most notably as cash, its sheer materiality is subject to maximization behaviours. The dematerialization of cash may be driven by the will to reduce its weight, which may prove unpractical; to increase the seigniorage; adapt to the growing price of

⁹ Akinobu Kuroda, “The Eurasian silver century, 1276–1359: commensurability and multiplicity”, *Journal of Global History*, 4: 2009, 245–269.

raw materials; avoid transaction costs and other expenses (collecting the cash, evading fiscal burden); and more. In some ways, the reduction in the weight to value ratio of most units of account during history bears witness to the almost universal drive for dematerialization. The problem is rather the variety in the forms of dematerialization. But basically, there are three general patterns: collateralization, innovation, inflation.

First, cash can be dematerialized by using it as collateral to a new form of currency. This process can work from ultimate but scarce liquidity to new cash forms or, in the reverse, from illiquid assets to liquid cash. The Bank of Amsterdam, that credited deposit accounts in exchange for silver and gold coins remittances,¹⁰ and the London's goldsmiths, who issued gold certificates, illustrate the ultimate liquidity to cash collateralization. The circulation of cash collateralized by fixed assets is also an old practice, as shown by the Russian Assignation bank, that issued a very large amount of real estate-backed banknotes.¹¹

Second, innovation applies to cash as to any other device: new techniques and new forms will make their way into public pockets, and if necessary by circumventing the state authority. Since minting was a heavily regulated activity, other forms of cash developed without the help of the state, such as Scottish banknotes. The reason for these innovations is that they saved money or pain. Some examples include lighter paper notes in place of heavy copper coins in seventeenth century Sweden, nominal-valued means of payment instead of coins subject to clipping and wearing, and easily transferable currencies. Innovation then appears as a powerful motive for “dematerialization” in a special sense: that of letting go of the drawbacks of material components, subject to wear, forgery, loss, destruction, and so on, in exchange for other drawbacks, such as breakdowns or collapses.

The third pattern is linked to state constraints by legal structures. A state can default on payment but cannot be bankrupted to the point of

¹⁰ Stephen Quinn and William Roberds, “An Economic Explanation of the Early Bank of Amsterdam, Debasement, Bills of Exchange, and the Emergence of the First Central Bank”, Federal Reserve Bank of Atlanta, Working Paper 2006–13.

¹¹ It still had, in the 1830s, the largest banknote circulation in the world. Juha Tarkka, “The North European Model of Early Central Banking: Collateral Policy before the Real Bills Doctrine”, EBHA Working Paper, 2009

being liquidated: it tends to put a veil of continuity and nominal word-keeping over the most dire crises it faces, such as wars and civil strife. Debasement and inflation have thus been extensively practiced by states. And in many cases they ended up altogether with a substitution process within the cash supply: during the 3rd century BC the Roman empire replaced the silver denarius with a billon coin (with a lot of copper and little silver) in the third century BC; the gold coins of July 1914 were soon replaced by banknotes and alloyed coins containing almost no precious metals. During World War II, French nickel coins were withdrawn from circulation, as the metal had become a strategic raw material in aeronautics and replaced by aluminium, which in its turn proved too valuable to circulate. In sum, inflation tends to dematerialize money.

Conclusion: What Is the Materiality in Dematerialized Cash?

We can see today how innovation, the second pattern, plays a key role in the fast-changing world of cash-payments, leading to the idea of a soon to come cashless society. Recently, the main avenue for innovation has been the development of new digitized techniques for registering transactions and debiting accounts. The World Wide Web has transformed transactions, especially in countries with poor financial infrastructures. For Africa's communication companies, this comes as a real opportunity, but to brick and mortar banks and supervision authorities, it is associated with costs and risks. And newcomers can use these new techniques to invent new forms of money, such as bitcoins, electronic miles and more.

But to what extent is the virtual world dematerialised? Indeed, when power is cut, as during Hurricane Sandy in New York City, coins and banknotes do a better job than virtual payment systems. So, what is the material world that supports this virtual world? The virtual does not exist in the ether: it needs thousands of computers, miles upon miles of optic fibre or copper cable, manufacturers of electronic devices and gadgets, and scores of engineers and supervision officers. Here again, the success of dematerialized money rests on strong material factors such as traditional

infrastructures. In this respect, as virtual as money may become, it will ultimately rely and depend upon tangible equipment and costly know-how.

Let's go backwards a last time: What did it take to operate a mint a few centuries ago? A furnace, a crucible, some wood or coal, a little metal, a pair of dies and a hammer, the whole thing operated by two or three (highly qualified) workers. And today, what does it take to operate a "cashless" cell phone payment system? A precise answer cannot be given to such a question since our production and transaction system has intricately grown. The difference, of course, is of scope and scale: today's payment systems operate billions of daily transactions, not thousands.

One may also question whether our virtual monies are actual cash. They indeed seem to lack a basic feature of cash—anonymity—which derives, as we have seen, from the objectified character of cash. Most virtual payments, on the contrary, mean identification of both payer and payee, either direct (name, account number) or indirect (IP address). Nevertheless, the "deep web" allows for anonymous "virtual cash" systems. This also must remind us of the costs of a true cashless society, a society where all payments and transfers may be tracked down, either by the state or by mobsters—a point that recent big data snooping scandals underline.

Further reading

- Bogaert, R., Brion, R., Kurgan-Van Hentenryk, G., Moreau, J.-L., & Van Der Wee, H. (2000). *La Banque en Occident*. Anvers: Fonds Mercator.
- Carl, M. (1892). On the origins of money. *Economic Journal*, 2, 239–255.
- Thomas, S., & François, V. (2002). *The big problem of small change*. Princeton/Oxford: Princeton University Press.

Bibliography

- Bátiz-Lazo, B., Haigh, T., & Stearns, D. (2011). How the future shaped the past: The case of the cashless society. Working paper. <http://ssrn.com/abstract=1961542>. Accessed 12 June 2015.
- "Cash". Oxford Dictionaries. <http://oxforddictionaries.com/definition/english/cash>. Accessed 20 July 2015.

- Hicks, J. (1969). Automatists, Hawtreyans, and Keynesians. *Journal of Money, Credit and Banking*, 1(3), 307–317.
- Hotson, A. (2012). Monetary standards and the value of money: Anglo-British experience from the 12th to the 21st century, Presentation. King's College, London.
- Kuroda, A. (2009). The Eurasian silver century, 1276–1359: Commensurability and multiplicity. *Journal of Global History*, 4, 245–269.
- Pauget, G., & Constans, E. (Rapporteur: Lherm, J.-M.) (2012). L'avenir des moyens de paiement en France, Paris: Rapport au Ministre de l'Economie, des Finances et de l'Industrie.
- Quinn, S., & Roberds, W. (2006). An economic explanation of the early bank of Amsterdam, debasement, bills of exchange, and the emergence of the first central bank. Working Paper, Federal Reserve Bank of Atlanta.
- Tarkka, J. (2009). The North European model of early central banking; Collateral policy before the real bills Doctrine. EBHA Working Paper.
- Wallace, N. (1980). The overlapping generations model of fiat money. In J. Kareken & N. Wallace (Eds.), *Models of monetary economies*. Minneapolis: Federal Reserve Bank of Minneapolis.

10

Origins of the Modern Concept of a Cashless Society, 1950s–1970s

Bernardo Bátiz-Lazo, Thomas Haigh, and
David L. Stearns

Introduction: Go from Your Country to the Land I Will Show You

The discourse of the future has been particularly important in organizational adoption of information technology. From the 1950s onwards technology companies, experts, consultants, and business professors sold new technologies to firms by presenting elaborate visions of a future world transformed by universal adoption of technology. Acceptance of these visions took place not just individually but also

B. Bátiz-Lazo (✉)
Bangor University, Bangor, UK
e-mail: b.batiz-lazo@bangor.ac.uk

T. Haigh
University of Wisconsin–Milwaukee, Milwaukee, WI, USA
Siegen University, Siegen, Germany

D.L. Stearns
University of Washington, Seattle, WA, USA

collectively, by industries and occupations. When technologies failed to perform as expected this could be characterized as a bump in the road to the future, rather than as a challenge to the inevitability of eventually arriving at the agreed destination. Once consensus on the future destination was reached, a variety of specific systems or approaches could be presented as a step toward realizing this future goal, making the future a banner around which a heterogeneous alliance of interests could gather. This, of course, would further strengthen the power of the vision itself. The argument for business adoption of future technology has generally been made in the future tense.

So where do these visions come from? Hunts for earliest speculative depictions of particular technologies often lead us to the world of science fiction. Jules Verne wrote about space travel, air travel, and long-range submarines decades before such things existed. H.G. Wells warned of the dangers of aerial bombardment prior to the First World War. As science fiction emerged as a distinct genre in the 1930s and 1940s its practitioners prided themselves on their scientific knowledge and skillful extrapolation. Arthur C. Clarke claimed to have been the first to conceive of a geosynchronous communications satellite while moon missions, space stations and atomic weapons were fictional commonplaces long before their actual debut.

However, readers and writers of science fiction were perhaps more interested in rockets and physics than they were in banking, economics, or organizational innovation. When a fictional society was cashless it was generally also a moneyless utopia, as with the payment cards used by citizens to spend their standard allocation of “credit” in Edward Bellamy’s highly influential socialist novel *Looking Backward* (1888). Capitalism was the default social organization of American science fiction, but few authors put much attention into imagining its future.¹ By the 1940s many had adopted the term “credit” as the universal name for future currencies, including Isaac Asimov for his two main strands of work (the far future Foundation saga and the near future Robot stories). Usually, however, this functioned as a simple linguistic substitution for “dollar”

¹ Leading in some cases to inconsistencies, such as those of the Star Trek universe. See <http://www.sffchronicles.co.uk/forum/16664-money-in-star-trek.html> (accessed December 7, 2015).

and one reads of credits being slapped onto counters, flung to parking attendants, drawn from pockets, and the like. So for most authors the use of the term did not imply automatic processing of payments. A partial exception can be found in the early work of Robert A. Heinlein, whose interest in economics and the workings of capitalism was unusual among the science fiction writers of his generation. His early utopian novel *Beyond This Horizon* described a communications network spanning North and South America. An automated cash register, which he dubbed the “auto-clerk” would encode every sales transaction onto paper tape. These were aggregated and fed into a “huge integrating accumulator” (i.e. a computer, to use the term that had not yet been standardized) in the Department of Finance.² However the function of this machine was to make macroeconomic corrections to keep the economy running smoothly, rather than to maintain individual accounts.

In contrast, the vision of a “cashless society” appears to have originated within the world of business and moved only later into the realm of fiction. The genesis of the idea associates with the computerization of retail financial intermediaries. Banks on both sides of the Atlantic began to adopt computers and telecommunications starting in the 1950s. As early as 1954, business technology researchers and consultants in the USA started to discuss the possibilities of a “checkless society” where sleek, efficient, and safe electronic messages would replace cumbersome, costly, and easily-forged paper checks. Once the major banks digitized their accounts, they argued, it would be relatively simple to connect their computers over a telecommunications network, and process most routine payments entirely in electronic form. A few of them even predicted that paper notes and coins would eventually be replaced by a nationwide electronic funds transfer system (EFTS), activated by some kind of economic identification card, ushering in a completely “cashless-checkless society.”

Note that the transition to a cashless society was usually understood as also requiring the elimination of checks even though these were the best established alternative to banknotes and coins in the 1960s and 1970s. Indeed, by the mid-1960s both “cashless” and “checkless” are used almost

² Robert A Heinlein, *Beyond This Horizon* (Reading, PA: Fantasy Press, 1948), 3–7. See also the discussion of economics and the role of government on pages 71–72 and 102–3.

as substitutes and often in the same sentence, such as: “Predictions of a cashless and checkless society are becoming widespread.”³ This was also the case in trade press reports whereas central bankers were more concerned with eliminating checks. Some referred to the “checkless society” or “checkless/cashless society” but we believe that these linguistic variations did not correspond to systematic differences in meaning but were different names for the same vision: the point was to remove the circulating paper from the system, whether that paper be personal checks or banknotes.

Figure 10.1 illustrates the variations in the use of the term “cashless society” by searching Google’s library of digitalized books (Google’s Ngram Viewer). This search suggests that the term appeared in use by 1959, peaked around 1980, and has remained more or less constant ever since. According to this database, the term “checkless” appeared at the same time and peaked just before 1975. Since then it dwindled until it became out of use. In comparison, the contemporary term “electronic payments” has become ever more popular in use. One can only speculate the reasons for this behavior but, perhaps, the negative connotations of

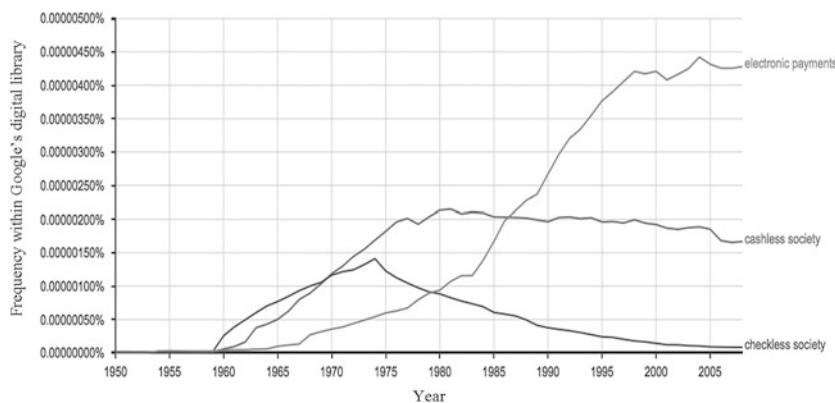


Fig. 10.1 Use of the terms “cashless society”, “checkless society” and “electronic payments”, 1950–2008

³ Diebold Group. “Summary Report of a Survey on the Impact of Electronics on Money and Credit.”

“cashless” has limited its use, personal checks are almost extinct outside of the USA and France, while the term “electronic” has a more modern, forward-looking ring to it. An alternative explanation is that towards the end of the 1960s the rhetoric started to shift to a “less-check and less-cash society” after the initial hype might have been deemed unreasonable.

Although the cashless-checkless society remained mostly a banker’s dream throughout the 1950s and early 1960s, by the mid-1960s its advocates could make a persuasive case for the need to consider electronic replacements to paper checks. Over the decade, the volume of checks processed by the Federal Reserve had risen from 14 billion a year in 1955 to nearly 22 billion (about 60 million *each day*), and the projected rate of growth for the next decade was even higher.⁴ Even with magnetic ink character recognition (MICR) and high-speed check sorters, the Fed was already finding it difficult to keep up with the explosive volume. This increasing volume was also incurring a significant monetary cost. At this time, all paper checks written in the USA had to be physically sorted, routed, and delivered to the issuing branch before the check was settled and final payment made.⁵ This process incurred not only significant handling and transportation costs (estimated at \$3.5 billion per year), but also “float” costs for the depositing institution until settlement was received.⁶ Handling costs are per check, but float costs are per dollar, so any further increases in volume, or delays in clearing, would result in significant cost increases.⁷

⁴ Norris Lee, “Tomorrow’s Checkless, Cashless Society: the Problems, the Solutions, the Benefits,” *Management Review* (September 1967): 58–62. Another contemporary study estimated a similar trend but of different magnitude as it stated that approximately one and a half billion checks were cleared in the USA in 1939, and this volume increased to 6.5 billion in 1950 and to 13 billion in 1960 (Boris Yavitz, *Automation in Commercial Banking*, New York, 1967, p. 11). Both these estimates concur in identifying a spectacular rise in check volume and activity, with no corresponding increase in the value of deposits, thus placing a severe strain on the US banking system.

⁵ This remained true until the passage of the “Check Clearing For The 21st Century Act – Check 21” in 2004.

⁶ While the check passed through the clearing system, which could take several days, the depositing institution had to pay interest on the deposited funds and often make some portion of those funds available to the depositor, even though the depositing bank would not receive payment from the check issuer until the clearing process was complete.

⁷ These costs were also more pronounced in the USA than in other countries due to the sheer number of banks. In 1966, there were 14,000 banks in the nation, so the likelihood that a check needed to go through the national clearing system was higher than in countries with fewer banks per cap-

For Its Memory Is Not Forgotten

Two actors in particular seem to have established the initial framing of the volume crisis in the number of checks to be cleared and promoted the concept of the cashless-checkless society as the appropriate solution. The first was John Diebold, who had early popularized the term “automation.” His consulting firm, The Diebold Group, constructed several networked computer systems for commercial banks in the early 1960s, and began researching the more general impacts of automation in the banking industry as early as 1966.⁸ Diebold himself also wrote articles in leading business journals, warning of an impending “transaction overload” and stating that “the ‘cashless society’ is no longer an option but a necessity....”⁹ Although he acknowledged that there was “considerable vagueness” surrounding the actual details of how such a society might be achieved, he nevertheless argued that “some system must and will develop in which money [and credit] moves quickly and safely” around the world.

This vision won influential support from George Mitchell, a member of the Board of Governors of the Federal Reserve, who began warning bankers in 1966 of the increasing costs of processing paper checks, urging the banking industry to consider how “the computer can drastically change money and its use.”¹⁰ Electronic payments, he argued, would reduce both the handling and float costs, as transfers could be achieved nearly instantaneously. He predicted that the use of checks would disappear within “the discernable future, probably much sooner than most of

ita. At the same time the use of personal checks was much higher in the USA than other countries. In Spain, for instance, their penetration as a means of payment remained negligible even after the introduction of check guarantee cards in 1971.

⁸ Diebold Group (1966) *Summary Report of a Survey on the Impact of Electronics on Money and Credit*, New York.

⁹ John Diebold, “When Money Grows in Computers,” *Columbia Journal of World Business* (Nov-Dec 1967): 39–46.

¹⁰ George Mitchell, “Governor Mitchell Considers Tomorrow’s Banking,” *Banking* (Dec 1966): 33–34. In a parallel development, the narrative of cost reduction to justify capital investments around computer technology was quite common in the early and mid-1960s in several European countries. See further Bernardo Bátiz-Lazo, J. Carles Maixé-Altés and Paul Thomes, *Technological Innovation in Retail Finance: International Historical Perspectives* (New York: Routledge, 2010).

us expect,” and that paper notes and coins would soon after be relegated to increasingly limited uses.¹¹

Despite a lack of concrete details, Diebold, Mitchel and other early social entrepreneurs did help convince the American Bankers Association (ABA) to begin investigating the possibility of a cashless-checkless society in 1967. Dale Reistad, the ABA’s Director of Automation, predicted that it was “nearly inevitable that the banking system...will reverse itself and develop a ‘checkless’ system” by 1980, soon followed by a drastic reduction in the use of cash by businesses and consumers.¹² He also formed a “Checkless Society Committee” to determine “if the American economy can really function without bank checks” and answer the question “What must the banking industry do today to prepare for the eventualities of the future?”¹³ The committee invited equipment vendors to demonstrate their most advanced wares, and encouraged them to develop point-of-sale terminals capable of initiating transactions in electronic form. The committee also asked retailers to parley about strategies for transitioning towards a checkless, and then eventually cashless retailing environment. And most importantly, the committee held a number of workshops on electronic payments for bankers across the nation, establishing a common vision that would guide the actions of many bankers for the next several decades.¹⁴ A computerization movement was well underway.

Inspired by this vision, as well as the potential to leap ahead of their competition, several banks in the late 1960s and early 1970s conducted cashless-checkless “pilot projects” to determine whether such a system would be technically and socially feasible. These types of tests were well-covered in the banking trade press, which helped to legitimize the idea

¹¹ George Mitchell, “Effects of Automation on the Structure and Function of Banking,” *The American Economic Review* (vol. 56, no. 1, Mar 1966): 159–166.

¹² Dale Reistad, “The Coming Cashless Society,” *Business Horizons* (Fall 1967): 23–32. The “reversal” he referred to was a move away from making the processing of paper checks more efficient in favor of completely electronic clearing.

¹³ “Checkless Society Check,” *Banking* (May 1967): 115.

¹⁴ “‘Checkless Society’ Moves Toward the Drawing Board,” *Banking* (August 1967): 93. The chairman of this committee also used the banking and business trade press to sell the vision—vision—for example, see Robert L Kramer and W Putnam Livingston, “Cashing in on the Checkless Society,” *Harvard Business Review* (Sept–Oct 1967): 141–149.

of a cashless-checkless society amongst American bankers. Interestingly, advocacy for the adoption of computers and telecommunications tended to come from the middle levels of management, not the upper levels—a trend that was also evident within European banks.

By the early 1970s bankers on both sides of the Atlantic were also quick to see a potential connection between the machine-readable cards used in these pilot projects and the rapid spread of new bank-issued credit cards. Surveys from the time also indicate that at least 70 % of bankers believed that credit cards were the first step towards the cashless-checkless society, and that they were entering that business in order to be prepared for what they saw as an inevitable future.¹⁵

The vision of a cashless society spread with equal speed beyond the community of banking technology enthusiasts and into broader communities. In his 1968 book *2001: A Space Odyssey*¹⁶ (developed in parallel with the film), Arthur C. Clarke depicted a telephone call placed from space thus: “Floyd, after checking that the Area Code for the United States was still 81, punched his twelve-digit home number, dropped his plastic all-purpose credit card in the pay slot, and was through in thirty seconds.” (p. 51) Two years later the book *Tomorrow’s World*¹⁷ (based on a British television series profiling new inventions) included as an appendix drawn from the emerging field of “futurology” to provide a comprehensive timeline of the near future. Most entries now appear ludicrously optimistic (a Soviet Mars landing in 1987; fusion power in 1996; a polar ice city with a population of 500,000 by 1998). In contrast the entries concerning information technology reflect technological goals that were largely met, even if the authors underestimated the ability of old and new to coexist. Computer terminals were to enter the home by 1980, the last national newspaper would close down in 1990, a “world computer-information bank” was to be established in 1994, and in 2008 the “Bank of England withdraws

¹⁵ David Stearns, *Electronic Value Exchange: Origins of the VISA Electronic Payment System* (London: Springer, 2011); The Diebold Group, “Summary Report of a Survey on the Impact of Electronic on Money and Credit” (1967).

¹⁶ Clarke, A. C. and Kubrick, S. *2001: A Space Odyssey* (New York: New American Library, 1968).

¹⁷ Baxter, R. and Burke, J., *Tomorrow’s World* (London: British Broadcasting Corporation, 1970).

cash and notes in favor of a credit-card economy.”¹⁸ The show itself had featured a lengthy imagined depiction of this cashless future, bolstered with models of an ambitious real-time banking system under development by Barclays bank.

Within a five year period from 1965 to 1970 the checkless-cashless future had passed from a somewhat marginal speculation to a taken for granted part of the industry’s conventional wisdom. No such payment system was in commercial operation, or had been proven in a pilot study of more than trivial scope. In fact the technology to realize the vision did not yet exist, as a series of failed projects in the financial industry during the late 1960s and early 1970s would demonstrate. Nevertheless, trade associations, technology suppliers, leading banks, industry commentators and consultants had all endorsed it as not just desirable but inevitable. In the language of the new institutionalism, a new and in some respects quite different kind of bank (with some core operational activities deleted and others added) had been successfully institutionalized within this organizational field as the future organizational form. Any bank that failed to endorse the new consensus would sacrifice legitimacy and be seen as conservative and marginal. Any ambitious young banker would be well advised to cast his (or occasionally her) lot in with the new order.

Fifty Years Later

The cashless-checkless society vision was still operating as a powerful force for mimetic isomorphism during the 1980s and 1990s, supporting the deployment of inexpensive point-of-sale (POS) terminals that could capture personal identification numbers (PINs) and transaction details, standardized machine-readable cards, and single-message authentication and clearing networks. By the turn of the millennium, the electronic payment services offered by banks in the USA were largely identical. Most every American bank today issues either a MasterCard or Visa-branded,

¹⁸The Tomorrow’s World segment “New Banking” was broadcast on December 9, 1969 and can be seen at <http://www.youtube.com/watch?v=ccqYKoLbT3I> (accessed December 8, 2015).

universally-accepted debit card that could be authenticated with either a PIN or a signature depending on the context of use, and most can access a line of credit if there are insufficient deposits to cover the transaction.

Fifty years after it first emerged, the idea that clumsy and expensive-to-handle coins and notes could be replaced by efficient electronic payments (initiated by various types of plastic cards, chip cards or more recently, mobile phones) is still heralded as a tantalizing prospect for the twenty-first century. The argument remains that the growth in automated payment volumes (direct debits, standing orders and customer credits) together with increasing use of plastic cards (and/or mobile phones) will triumph as the premier payment method(s) and will substitute for checks and cash. The discourse of banking technology is still written in the future tense.

At the same time, the world we live in is similar to, and in many ways created by, the vision of a checkless-cashless society institutionalized within the banking industry during the late 1960s. Middle class Americans still have checkbooks and still carry cash, but they reach for them far less frequently than before. Major purchases are almost invariably charged to debit or credit cards, and to pay with cash is to mark oneself a potential criminal or terrorist (so much so that large transactions must be reported to the government). Small transactions are increasingly processed the same way. Fast food restaurants, parking meters, taxis, and even vending machines will often accept electronic payment. Most grocery stores no longer welcome personal checks.

In some other countries the process is more advanced. The UK will stop clearing checks in 2018. In Hong Kong, major transport operators launched in September 1997 a contactless card primarily for transport ticketing. In 2011, the "Octopus" card had over 11 million daily transactions of which about 40 % were non-transport, small value payments such as vending machines or fast food restaurants. In the European Union there is a clear trend towards a cashless and e-payment-based society among all member countries. Iceland is the most cashless society as measured by purchase value in shops, where only about 9 % of the turnover is paid by cash. Low cash usage is also found in Norway (28 % of all retail transactions), Finland (32 %) and Sweden (37 %). Surveys in Belgium and Holland report cash purchases ranging between 40 and 50

% of total value, while southern countries show levels between 60–80 % or even higher. Austria and Germany are also traditionally cash-based countries. Although all countries there showed increasing numbers of e-payments per inhabitant for the years 2002–2006 the actual variations between countries were very large. Holland and Finland seem to be the leading countries with only 4 % of transactions initiated by paper formats.

These statistics suggest that although there has been a move towards a cashless society in Europe, progress has been quite slow. Indeed, banknotes and coins remain a persistent part of everyday life. In 2015 they represent 9 % of the eurozone's economy and 7 % in the USA, according to the Bank for International Settlements. Even in almost cashless Sweden, banknotes and coins still make up 3 % of the economy. And in the UK, the Bank of England is of the view that cash is "resilient" and unlikely "to die any time soon."¹⁹

Further Reading

- Bátiz-Lazo, B., Haigh, T., & Stearns, D. (2012, March 29). *Visions of a cashless society*. <http://www.bloomberg.com/news/2012-03-29/visions-of-a-cashless-society-echoes.html>. Accessed 22 Apr 2015.
- Bátiz-Lazo, B., Haigh, T., & Stearns, D. (2014a). How the future shaped the past: The case of the cashless society. *Enterprise & Society*, 15(1), 103–131.
- Bátiz-Lazo, B., Karlson, T., & Thodenius, B. (2014b). The origins of the cashless society: Cash dispensers, direct to account payments and the development of on-line, real-time networks, c. 1965–1985. *Essays in Economic and Business History*, 32, 100–137.
- Bell, S. (2001). The role of the state in the hierarchy of money. *Cambridge Journal of Economics*, 25, 149–163.
- Graeber, D. (2011). *Debt: The first 5,000 years*. New York: Melville House Publishing.
- Maurer, B. (2015). *How would you like to pay? How technology is changing the future of money*. Durham: Duke University Press.

¹⁹Tom Fish and Roy Whymark, *How has cash usage evolved in recent decades? What might drive demand in the future?* September 15, 2015, http://www.bankofengland.co.uk/publications/Pages/quarterlybulletin/2015/q3prerelease_1.aspx (accessed October 17, 2015).

Bibliography

- Bátiz-Lazo, B. J., Maixé-Altés, C., & Thomes, P. (2010). *Technological innovation in retail finance: International historical perspectives*. New York: Routledge.
- Bátiz-Lazo, B., & Smith, A. (2016). The changing industrial organization of epistemic communities during Hong Kong's progression towards a cashless society (1960s–2000s). *IEEE Annals in the History of Computing*, 38(2 (Apr-Jun)), 54–65.
- Checkless Society Check. (1967, May). *Banking*, p. 115.
- 'Checkless Society' Moves Toward the Drawing Board. (1967, August). *Banking*, p. 93.
- Diebold, J. (1967, November–December). When money grows in computers. *Columbia Journal of World Business*, 39–46.
- Fish, T., & Whymark, R. (2015). *How has cash usage evolved in recent decades? What might drive demand in the future?* http://www.bankofengland.co.uk/publications/Pages/quarterlybulletin/2015/q3prerelease_1.aspx. Accessed 17 Oct 2015.
- Heinlein, R. A. (1948). *Beyond this horizon*. Reading: Fantasy Press.
- Kramer, R. L., & Putnam Livingston, W. (1967, September–October). Cashing in on the checkless society. *Harvard Business Review*, 141–149.
- Lee, N. (1967, September). Tomorrow's checkless, cashless society: The problems, the solutions, the benefits. *Management Review*, 58–62.
- Mitchell, G. (1966a, December). Governor Mitchell considers tomorrow's banking. *Banking*, 33–34.
- Mitchell, G. (1966b). Effects of automation on the structure and function of banking. *The American Economic Review*, 56(1), 159–166.
- Money in Star Trek. SFF Chronicles. <http://www.sffchronicles.co.uk/forum/16664-money-in-star-trek.html>. Accessed 7 Dec 2015.
- New Banking. (1969). *Tomorrow's World*. <http://www.youtube.com/watch?v=ccqYKoLbT3I>. Accessed 8 Dec 2015.
- Reistad, D. (1967, Fall). The coming cashless society. *Business Horizons*, 23–32.
- Stearns, D. (2011). *Electronic value exchange: Origins of the VISA electronic payment system*. London: Springer.
- The Diebold Group. (1966). *Summary report of a survey on the impact of electronics on money and credit*. Ann Arbor: The University of Michigan.
- The Diebold Group. (1967). *Summary report of a survey on the impact of electronic on money and credit*. Ann Arbor: The University of Michigan.
- Yavitz, B. (1967). *Automation in commercial banking*. New York: Free Press.

11

From Teleprocessing to Cashless Payment Technologies: “La Caixa” 1960–2015

J. Carles Maixé-Altés

Introduction

Sometimes clouded by the advances of the present, we lack perspective when weighing the impact that Information Technology (IT) has had on our lives and on our companies for decades. For this reason, it would seem that perhaps we should research the historical perspective in greater depth, as it may contribute to the study of those banking institutions which have been—and continue to be—technological leaders. The former Catalonian and Balearic Islands Saving Bank, today known as “la Caixa” and CaixaBank (its banking branch), is a good example.

One of the characteristics of the Spanish banking system, affecting both commercial banks and savings banks, is the fact that it had fallen technologically and organizationally behind its European counterparts in the years following World War II. Nevertheless, in the 1950s, some

J.C. Maixé-Altés (✉)
University of La Coruña, La Coruña, Spain
e-mail: maixe@udc.es

banking institutions, such as “la Caixa”, with a strong entrepreneurial tradition and well-rooted in civil society (founded in 1904), were able to introduce a new dynamism to their internal management. The architects of this new direction were amongst the youngest and most dynamic executives of the organization, and they were highly interested in what was occurring in Europe. They were able to involve the management and Board of Directors, who tolerated the new dynamics (we must not forget that this phenomenon occurred in the closed-natured institutional environment of the early Franco years, after the Spanish Civil War).

These were the early steps toward what in the 1970s and 1980s would be a clear commitment to new payment technologies and customer services in this field. This commitment deserves greater attention for having occurred within a society such as that of Spain, which showed a strong predilection for cash payments, as evidenced by the example of the scarce use of checks in those years. As a matter of fact, the normalization and standardization of bank checks within the Spanish banking regulatory body, the High Banking Council (HBC), did not begin until 1973. It was precisely at this time that their use began to increase at a fast pace.¹

The Pioneers of Teleprocessing: The IBM Connection

In 1962, the first computer arrived: an IBM 1410 (a so-called second generation computer, based on the use of transistors). This technology enabled the automation of “la Caixa” to be undertaken, including the off-line automation of a wide range of operations. Perhaps the most strikingly significant aspect of this period, as compared to other banking institutions in Spain and Europe, was the off-line incorporation of branch management (the institution had 241 offices spread throughout Catalonia and the Balearic Islands). The automation of the administrative processes expanded like a wildfire, affecting all services and departments.

A little later, on March 15, 1964, IBM management in Barcelona launched its “latest revolutionary system,” the IBM 360. This new step

¹HBC, *Talón bancario normalizado*, Standardized bank checks, (Madrid, September 1973).

was linked to the appearance of third generation computers, i.e. large central computers (mainframes) with integrated circuits. The 360 series of computers was to the IT industry what the Ford Model T had been to the automotive sector a few decades earlier. This computer created a mass market and made IBM a vertically integrated industrial giant. After initial contact with the new model, executives and technicians of "la Caixa" were invited to visit IBM installations in New York. At the end of summer 1964, they traveled to the USA, where they experienced first-hand the actual operating capacity of the IT applications developed for "la Caixa" on the new model. From then on, they gave their blessing to teleprocessing (communication between computers and teller terminals). Clearly, the visit to IBM headquarters in New York and the manufacturing plant in Poughkeepsie served to strengthen institutional and personal relations with the American multinational.

Over those years, "la Caixa" received an intense transfer of knowledge and was very open to the diffusion of earlier innovations from more developed countries. This was what can be referred to as the period of adapted innovations, which were accompanied by accelerated learning processes. Together, these aspects had a strong impact on productivity. Between 1962 and 1978, a trend began that from a historical perspective can be called the "institution's technological commitment," a characteristic that has remained unchanged to the present day. The foundation for "la Caixa's" technological development had been laid. Its early commitment to teleprocessing made it a benchmark institution for both financial users and IT manufacturers.

Fujitsu and ATMs: The Japanese Connection

In Spain, the arrival of mass retail banking occurred in the early 1980s, with the creation of financial self-service. In this area, Spanish commercial banks and savings banks made up for lost time with regard to self-service in the rest of Europe, thanks to the previously implemented infrastructures. Savings banks especially stand out for having developed common infrastructures (savings bank clearing house systems and savings bank networks) through their collaborative strategies and their industry

association, *Confederación Española de Cajas de Ahorro* (CECA) or the Spanish confederation of savings banks.

At the beginning of the 1970s, the savings banks and the CECA took the first steps towards implementing their payment card as a cheque guarantee card, the *Tarjeta 6000*. The first moves were also being taken to offer new payment services to customers and the market in general. In January 1974, the CECA addressed the issue of cash dispensers for the first time. Initially, the expansion of a dedicated savings bank network was slow, due to different interests that were manifest in the participating organizations. For this reason, some of the leading organizations moved ahead of the rest, developing their own systems. This was the case of "la Caixa", which also devised its own strategy. This institution had been quite successful in developing a savings passbook with a magnetic stripe. Thanks to the teleprocessing network installed in all its branches, this system permitted the fast, streamlined processing of the customer's information during bank visits. Based on this experience, it was decided to request an automated teller machine (ATM) from IBM that included this feature. The North American multinational company imposed a series of conditions that led the management team to consider other options. The most seriously considered alternative was the Japanese multinational company Fujitsu. This company had previously entered the Spanish market through its subsidiary (*Fujitsu España, SA* or FESA) as a partner in *Sociedad Española de Comunicaciones e Informática, SA* (SECOINSA), the leading company in the development of Spanish telecommunications, in which the public telephone services operator CTNE (which became Telefónica in 1984), and the INI (the industrial public holding) were also partners.^{2,3}

At the end of 1980, the general manager of "la Caixa", Josep Vilarasau, and deputy general manager, Jesus Ruiz Kaiser, paid a preliminary visit to the Japanese Post Savings Banks, which used Fujitsu ATMs adapted for use with both cards and passbooks. As a result of these early contacts, in 1981, a company commission visited Japan to work out an agreement with Fujitsu. Contacts were made at the highest level, with the participa-

² La Caixa Archive, Fujitsu Reports, Barcelona, December 14, 1981.

³ Maixé-Altés J Carles, *Innovación y compromiso social. 60 años de informatización y crecimiento, "la Caixa" 1950–2011* (Barcelona: Edicions 62-La Caixa, 2012).

tion of the vice-president of Fujitsu, Mr Makikawa, and the president of Fujitsu Spain (FESA) Mr. Kitazato. Visits were made to Fujitsu's production centers in Minamitama, DKB's (Dai-Ichi Kangyo Bank, Ltd., the leader in the Japanese financial system) bank data processing center and the JBA's (Japanese Bankers' Association) Message Switching and Clearing Center.

This resulted in a collaboration agreement with SECOINSA-Fujitsu, in which the latter became the supplier of the new ATMs. From then on, Fujitsu took on a truly relevant dimension in all of Europe.⁴ In 1983, the first Fujitsu ATM was installed. At this time, there were 78 IBM units in existence, which were gradually replaced until all ATMs offered card and passbook services in 1986 (398 ATMs). Contacts continued to be established in October 1984, and special attention was paid to the new M-series terminals and computers (during the Tatebayashi and Numazu factory tours). In July 1987, the visits resumed to learn about the new Fujitsu products (ATMs, cash dispensers and teller terminals). Fujitsu ATMs were subsequently used by "la Caixa" for a long period of time.

There is little doubt that the policy of "la Caixa" constituted an attempt to break its customers' aversion to using ATMs. In an effort to accomplish this, during the first stage of their implementation, the institution promoted the use of passbooks at the ATMs, as they were an instrument with which the user was already familiar. Along these same lines, it established a marketing policy involving what were referred to as "Customer Clubs," which introduced other self-services, such as free newspapers and magazines, TV and automated drink machines next to the ATMs. This committed policy made it possible to install the first multi-service ATM (ServiCaixa) in 1991, offering a wide range of both banking (beyond simply expending bills and displaying the account balance) and non-banking (ticket sales for the cinema, theater and cultural shows, among others) services. The Spanish banking institutions deployed their ATM networks within the framework of their branch networks, which were already very

⁴ Ichiara, T. and Asami, H. (1986) 'Enfoque japonés del bank office automation' in *Adecuación de las nuevas tecnologías de la información al sector financiero. Primer Encuentro con Entidades Financieras* (Madrid: Fujitsu España SA).

dense. This characteristic was—and continues to be—markedly different from some English-speaking countries, such as the US and the UK.

The Idiosyncrasies of the Spanish Card Market

Starting in the mid-1960s, and with special intensity in the 1970s, “la Caixa” activated pre-authorized payroll deposit services, which were basic to the implementation of electronic transfers and credit cards, and to the transition to the new payment services (see PSI 1971). The first card used by the organization was the aforementioned *Tarjeta 6000* from the CECA, which was first issued by “la Caixa” in 1976. The amount of purchases made by cardholders in affiliated stores was paid by checks guaranteed by the CECA. These were thus considered cash that the merchant could collect instantly at any bank office.

The process of implementing the *Tarjeta 6000* was slow. In 1978, only 110,000 establishments participated in this payment method in all of Spain, and a total of 230,000 cards had been issued, which was not especially impressive six years after they were launched. These circumstances led “la Caixa” to develop its own card policy. By 1980, the Management Committee had already defined the strategy to launch the new VISA card from “la Caixa” with its customers. This decision was made in a context in which the new international brands were being introduced into the Spanish market. One decade earlier, in December 1970, Banco Vizcaya had launched the first credit card, Eurocard (today MasterCard), and in 1971, Banco de Bilbao launched the BankAmericard (which was previously unknown in Europe, outside of the UK). Shortly afterward, in 1974, a new cheque guarantee card—*Tarjeta 4B*—was launched by four banks (Banesto, Banco Central, Banco Hispano Americano and Banco de Santander).

Later, in March 1979, VISA Spain was created as an autonomous institution of VISA International, with the aim of managing the VISA brand name on a national level. Initially, 29 financial institutions were members, a figure which increased to 56 by the end of that same year. Among them was “la Caixa”, along with a series of commercial banks, savings banks and cooperative banks. Some months earlier, the

Sistema 4B society had been founded, which was affiliated with VISA International and promoted by the same banks that had launched *Tarjeta 4B*, institutions that currently belong to the Santander Group.⁵ The emergence of new networks and brands had opened up the card market, and from then on, the most competitive savings banks opted to diversify their products. In 1988, "la Caixa" was the first European bank to issue all card brands: VISA, MasterCard, Amex, Diners and JCB.⁶

The Spanish payment systems market was organized according to its own unique characteristics. In this market, the commercial banks and savings banks were the main issuers and owners of the cards. These characteristics mark a clear difference from many countries, in which private cards are extremely important. The financial institutions, in turn, adopted different types of cards, with brands belonging to large-volume international networks; for example VISA, MasterCard and American Express. Only on rare occasions have Spanish commercial banks and savings banks set up their own networks or payment systems on an individual basis; instead, they have created different societies (normally cooperative) over time that are charged with managing the card brands they own and issue on a national level. The result has been the development of societies like the aforementioned *Sistema 4B*, *EURO 6000* for the savings banks and CECA, and *ServiRed*, which also includes both commercial banks and savings banks. In short, the idiosyncratic aspects of the Spanish case are, on the one hand, the fact that each banking institution owns the cards it issues; and on the other, the three different networks that exist, whose affiliates are the Spanish financial institutions themselves, which administer the management and payment mechanisms of the cards. These mechanisms extend to ATM networks and EFTPOS (electronic funds transfer at point of sale).

Throughout the 1980s, "la Caixa" conducted intense campaigns to attract new stores and new clients for their cards. In 1986, it began the distribution of point of sale (POS) terminals that would permit the

⁵ Maixé-Altés, J. Carles, Innovación y compromiso social. 60 años de informatización y crecimiento, "la Caixa" 1950-2011 (Barcelona: Edicions 62-La Caixa, 2012).

⁶ "la Caixa" Annual Report, 1989.

generalization of electronic payments with cards in stores. From this moment on, the deferred payment processes that the merchant carried out with manual credit card POS imprinters began to gradually disappear. The former devices, called zip-zaps or *bacaladeras* in Spanish, were used to copy the embossed data on the card in triplicate onto a form that was subsequently processed by the merchant's bank. With the new POS terminals, the operation was completed online and authorization occurred in real time.

The EFTPOS were normally offered to the merchant by the acquiring bank (the institution that processed the transactions). The most common transaction model in Spain is the *four-party scheme* used by VISA, MasterCard and JCB.⁷ The development of card payment systems occurred within a context where electronic banking was already growing, and in which telephone marketing campaigns simultaneously started to offer customers the VISA card from "la Caixa". The results were immediate. During the second half of 1987, a total of 20,000 new cards were contracted, and in 1988 the number of affiliated stores doubled to 19,802. In addition, there were nearly a million active cards and the number of POS terminals rose to 6,868.

The first cards were exclusively credit cards. However, the popularization of ATMs and POS terminals favored the development of the debit card, which could be used to debit charges from the holder's account in real time. New products and brands were gradually added in what was an expanding market. The historical trend has been an increase in debit as opposed to credit products. More than two-thirds of the cards in the Spanish market today are debit cards. At the end of the eighties, the private label cards offered by "la Caixa" began to take off, which increased in number from 19,872 to 58,748 between 1990 and 1991. This type of card was offered by the institution in collaboration with other private institutions, and they targeted specific groups, such as supermarket customers, members of sports clubs and cultural institutions.

⁷ Maixé-Altés J Carles, *Innovación y compromiso social. 60 años de informatización y crecimiento, "la Caixa" 1950–2011* (Barcelona: Edicions 62-La Caixa, 2012).

Concluding Remarks: A Multi-channel Strategy for Retail Banks

Access to mass retail banking through self-service schemes occurred later in Spanish financial institutions than it did in those of other nearby countries. Nonetheless, more mature technologies were adopted, such as teleprocessing (first through online networks, and later online, in real time), which favored the leadership of cashless technologies. The multi-channel era began at the end of the twentieth century, and the foundations laid in the 1980s and 1990s made it possible to integrate new methods for communicating with customers, using the Internet, mobile telephones and social networks. The innovative pace maintained by some institutions, such as "la Caixa", has been based on its historic evolution and leadership, resulting from successive adaptations to very diverse scenarios. As a whole, the cases analyzed show the impact that the traditions and practices of each banking system have had on the new payment systems. In a globalized world, different institutional and business environments continue to persist, accounting for the idiosyncrasies typical of payment systems and user behavior.

Acknowledgements The author acknowledges financial support from CaixaBank and "la Caixa", as well as the Ministry of Economy and Competitiveness (Project HAR2013-40760-R).

Further Reading

- Batiz-Lazo, B., Maixé-Altés, J. C., & Thomes, P. (2011). *Technological innovation in retail finance: International historical perspectives*. New York/London: Routledge.
- Payment System Incorporated – PSI (1971). Payment systems perspective, payroll deposits. Reistad Research Report, March, New York.

Bibliography

- HBC. (1973, September). *Talón bancario normalizado*. Standardized bank checks, Madrid.
- Ichiara, T., & Asami, H. (1986). Enfoque japonés del bank office automation. In *Adecuación de las nuevas tecnologías de la información al sector financiero*. Primer Encuentro con Entidades Financieras. Madrid: Fujitsu España SA.
- La Caixa Archive. (1981, December 14). Fujitsu Reports, Barcelona.
- La Caixa Annual Report (1989).
- Maixé-Altés, J. C. (2012). *Innovación y compromiso social. 60 años de informatización y crecimiento, "la Caixa" 1950–2011*. Barcelona: Edicions 62-La Caixa.
- Stearns, D. (2011). *Electronic value exchange. origins of the VISA electronic payment system*. London: Springer-Verlag.

12

Limits to Cashless Payments and the Persistence of Cash. Hypotheses About Mexico

Gustavo A. Del Angel

Introduction

What hinders the adoption of cashless payments instruments? Cashless payments have been linked to financial inclusion. Their use is commonly attributed to higher or lower levels of inclusion; and vice versa, their greater use is considered a factor for increasing inclusion. The understanding of this relationship has defined an important part of the policy debate.¹ Although Mexico is considered an upper middle income developing economy (it is the 15th largest world economy), which also

¹ See Villasenor et al. (2015); and the National Survey on Financial Inclusion (Encuesta Nacional de Inclusión Financiera) by the CNBV (National Banking and Securities Commission).

This research received financial support from the Centro de Estudios Espinosa Yglesias (CEEY). An extended version can be found in Del Angel (2016).

G.A. Del Angel (✉)
CIDE, Mexico City, Mexico

Hoover Institution, Stanford University, Stanford, CA, USA
e-mail: gustavo.delangel@cide.edu

happens to have a sophisticated financial system and well-developed telecommunications sector, the level of financial inclusion is low.

Another important aspect in Mexico is the presence of a large informal economy. Acceptance also depends on the attributes of cashless instruments to function as money. In Mexico, the growth of cashless instruments, combined with the persistent use of cash, presents us with an interesting environment in which to discuss the coexistence of several forms of payment.

The next section provides a brief explanation of the factors which form the payment system in Mexico. This will help us to understand its current set-up. Later it explains how current cashless innovations have been implemented by the market. The main section of the chapter explains the trends in the use of payment instruments, both cash and cashless. Lastly, it discusses some hypotheses concerning the persistent use of cash and the limitations of cashless instruments.

Foundations

This story started with the computerization process of the banks in Mexico, which took off during the seventies.² The introduction of the bank credit card in 1968 proved to be a milestone; its acceptance was rapid, despite its relatively limited scope which, up until the nineties, only reached medium and high income segments.³ The development of private platforms in the financial system paved the way for the necessary infrastructure to distribute financial services; in other words, the “roads and pipelines” that would allow the distribution and use of instruments such as cards.

Compared to other economies, the adoption in Mexico progressed slowly. This was due in part to the somewhat turbulent recent history of the financial system. The government expropriated the banks in 1982 in response to a severe and prolonged financial crisis (the Latin American

²Del Angel (2011).

³Bátiz-Lazo and Del Angel (2016); the debit card was introduced in 1986, although the form we know today did not arrive until 1994.

sovereign debt crisis, which lasted an entire decade). The reprivatization of the banks between 1990 and 1992 led to a process of readaption of the business strategies of intermediaries. Just a couple of years later, towards the end of 1994, a new financial and banking crisis erupted, seriously damaging the banking system. The process to rescue the banks implied bankruptcies, mergers and acquisitions. This altered the strategies of the banks, causing the long-term strategies and adoption of innovation to take longer and move forward at a slower pace than they otherwise would have in more stable times. This process lasted until the start of the 2000s, which heralded the beginning of the reactivation of credit.⁴

As for the financial authorities, during the eighties and nineties, they focused their attention on the problems of macro-finances and the banking system. But in 1994, the Banco de México, the country's central bank, undertook a reform of the system of payments, motivated in part by the reprivatization of the banks and their condition of independence which was new at that time. The objective of the reform was to assess the exposure to risk of the different participants in the system. Under this reform, the central bank focused on high-value payments.

The financial authority maintained an arms-length position in respect to the system of payments for quite some time. The regulatory capacity of the Bank of Mexico on the system of payments was defined with greater precision with the enactment of the System of Payments Law of December 2002. Later, the central bank became more involved in payments. The enactment of the Financial Services Transparency Law in January 2004 changed the regulatory attributes of the central bank on payments. And in August 2004, a new platform of the central bank, the Sistema de Pagos Electrónicos Interbancarios (SPEI) or Interbank Electronic Payments System, started operations, a system designed and operated by the central bank which would be a system for high- and low-value transactions. To date, SPEI is the most important platform for EFTs.

A decade and a half ago, concern arose in different segments of the public sector about the slow adoption of payment methods other than cash and their relationship with financial inclusion, primarily regarding the card fees and interest rates charged by commercial banks. The discussion to identify the reasons for bank prices and rates was probably not

⁴Regarding the structural evolution of Mexican banks, see Castellanos et al. (2016).

well documented. But it did create political pressure, mainly from the Mexican Congress, for the central bank to step in and play a more active role in the regulation of these markets and their prices. The regulatory framework has been modified since 2004 to strengthen the role of the central bank and includes several reforms to promote the dissemination of cashless payment methods. For example, from 2009, development started on regulations for mobile banking. The central interest of the authority has been to limit the growth of the informal economy and promote financial inclusion. As Villasenor et al. (2015) point out, the Mexican authorities—at least up until 2012—showed awareness of the topic with the formation of a Council on Financial Inclusion (in 2011), and the endorsement of the Maya Declaration also that year (a global initiative by several governments to promote financial inclusion as a way to foster development).

Disruption

Besides the banking instruments that are accessed through traditional means (with the opening of an account), multiple initiatives have arisen over the last decade that are transforming our understanding of the market. The initiatives range from small pilot programs to larger platforms involving several channels, including mobile banking. Others include platforms that involve “non-traditional” actors—in other words, from non-financial areas of the government to non-financial companies.

For example, one of the largest platforms is called *Transfer*, which was created in 2011. Transfer is an association between two banks, Banamex and Inbursa, and the main telephone company, which provides multi-channel means. The service allows the transfer of money via mobile telephone, from telephone to telephone and from telephone to bank accounts. The service also incorporates access to correspondent banking with large chains of retailers.

Others are G2P (government-to-person) initiatives used by the government as a means to distribute subsidies and make cash transfers from poverty alleviation programs. These involve bank accounts that include the use of a card. Despite the praise they have received, these projects have taken years to prove their success, with some failed attempts and other relatively successful ones. The first attempts involved a traditional

bank account with a debit card. These projects failed because the product did not suit the needs of the target population. The bank accounts have slowly been tailored; for example, they no longer require minimum activity and the commissions they charge are limited. The more recent G2P channels involve options to transfer money to debit cards or to prepaid cards. Some projects seek to incorporate mobile banking, but they are yet to reach a significant scale.⁵

There are also several initiatives that involve alliances between financial intermediaries and “non-traditional actors”. For example, in 2013, Grupo Bimbo, a dominant corporation in the bread and food market, created an alliance with Visa and Blue Label Telecom Mexico to form a network, primarily to make payments and buy airtime. This network, called Qiubo, is aimed at micro-entrepreneurs that distribute Bimbo food products. Another example is a product by Juntos Global, which was initially adopted by BBVA Bancomer (the Mexican affiliate of the Spanish global bank BBVA) in conjunction with this company. Juntos’ product is a mobile banking application that encourages users to save and helps them manage their personal finance. So far, the initiatives and projects are markedly different from one another, showing an ecosystem far from equilibrium and dominant technology.

Recent Trends in Cashless and Cash Payments in Mexico

Like in other parts of the world, the instrument with the greatest expansion in Mexico has been credit and debit cards. The credit card gained importance in the system of payments since it was introduced in 1968. Nevertheless, the adoption of the debit card thrived much faster. The recent increase in the use of credit and debit cards has been a consequence of a combination of industry strategies and regulatory factors. Fig. 12.1 shows the evolution of the number of credit cards issued in comparison with the number of transactions at point of sale terminals (POS terminals). In both cases, the growth in the number of cards issued has been

⁵This also involved regulatory changes to allow simple, low cost, “basic” transactional bank accounts. See Villasenor et al. (2015).

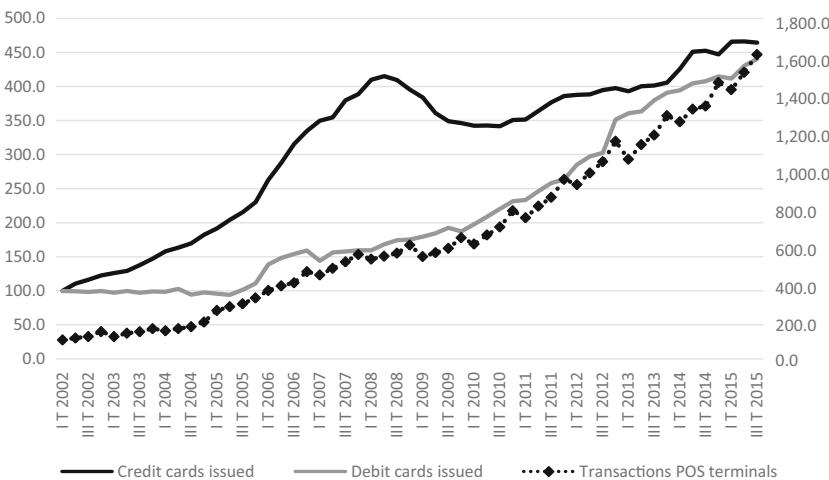


Fig. 12.1 Volume of credit cards and debit cards issued (left axis) and number of transactions in POS terminals (right axis), 2002–2015. Index, first quarter of 2002=100 (Source: Data from Banco de México)

significant. As Fig. 12.2 shows, the increase in the number of transactions at POS terminals has been even greater. This is due in part to the competitive environment in which the number of participants in this market has grown, both in terms of new issuing banks and greater diversification of this product.⁶

The growth rates in the use and issuance of debit cards has continued practically uninterrupted. This reflects the spread of payroll payments through bank accounts. This growth stabilized from 2012 and showed signs of a slowdown in 2013 and 2014. The latter possibly reflects greater association of cards with existing accounts rather than the opening of new accounts.

Transactions at POS terminals on the other hand (with a growth significantly higher than the cards used) show increasing use of cards to make payments; in other words, this means that both credit and debit cards are used more. We might assert that this is one of the greatest changes in the payment habits of Mexicans.

⁶See Castellanos et al. (2016); the conditions of competition increased in response to the creation of new banks from 2004 onwards.

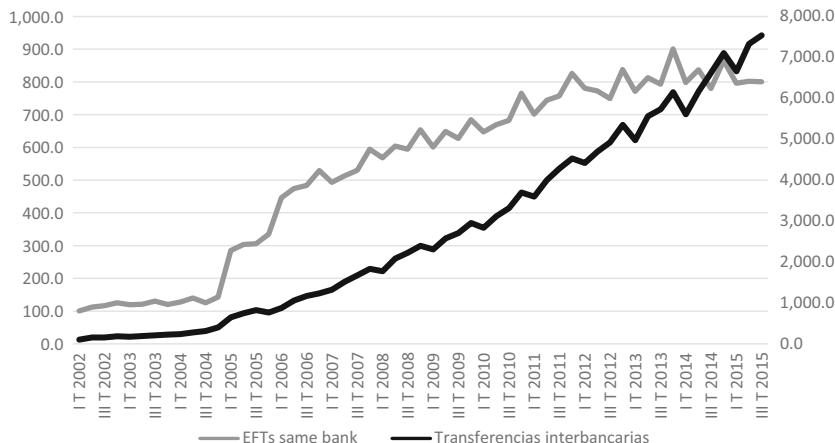


Fig. 12.2 Volume of EFTs same bank (*left axis*) and interbank (*right axis*), 2002–2015. Index, first quarter of 2002=100 (Source: Data from Banco de México)

The use of electronic funds transfers is another method that has enjoyed an upward trajectory. Fig. 12.2 shows electronic funds transfers according to the classifications of the Bank of Mexico: those performed in the same bank and those performed between the accounts of two different banks. The growth in electronic funds transfers reflects a greater use and development of Internet banking. Apparently, the introduction of SPEI of the central bank started operations that year, sparking the use of electronic funds transfers.

Another channel that has developed in Mexico is mobile banking. Although the financial industry instituted several early pilot initiatives, these took some time to mature. Therefore, the statistics are limited. By the end of 2011, there were approximately 247,000 bank accounts associated with mobile telephones. By the end of 2013, this figure had risen to 2.7 million accounts, which represented 2.6 % of the total number of mobile telephone subscribers, and 1.9 % of transactional accounts.⁷ The volume of transactions via mobile banking is still con-

⁷CNBV (2014). “Reporte de Inclusión Financiera”. Comisión Nacional Bancaria y de Valores, México.

sidered low in Mexico, especially taking into account the vast number of mobile telephones in the country. The banks offer this account-associated service with several payment channels (cards, Internet and mobile banking).

Other instruments have emerged in this process of evolution with methods of payment that are different to cash and payment checks. There has been a downward trajectory in the use of checks; the number and value of checks to 2015 represented 55 % and 32 % respectively, compared to those used at the start of 2002. The expectation is for this trend to continue to decline. Regardless, the use of checks is not expected to disappear entirely as the method is still widely used in commercial transactions, high-value contracts and legal procedures.

It is unclear, however, to what extent the increase of cashless instruments is reflected in a reduction in the use of cash. Figs. 12.3 and 12.4 show data on the cash in the economy. The evolution of cash in the hands of the public (in inflation adjusted value), as shown in Fig. 12.3, has grown since 2002. This growth without doubt is lower than the other methods of payment discussed earlier. Furthermore, the amount of cash

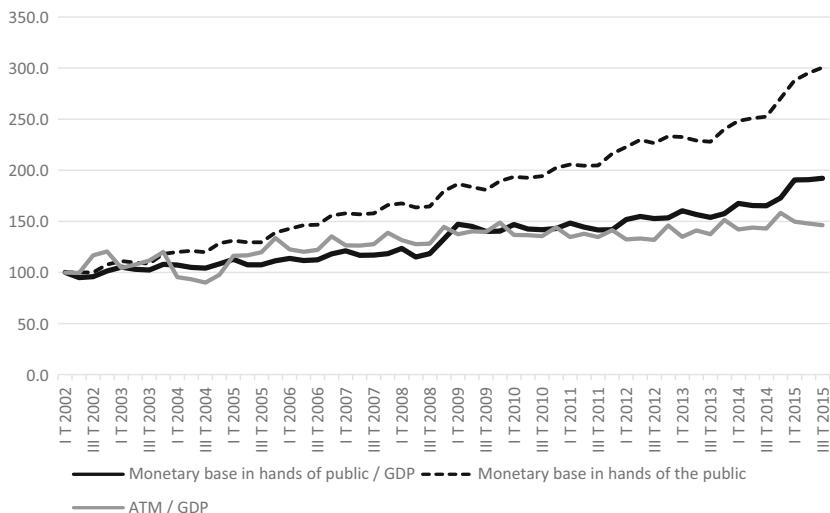


Fig. 12.3 Monetary base in hands of the public (inflation adjusted pesos), monetary base in hands of the public as a ratio of GDP, and value of transactions in ATMs, 2002–2015. Index, first quarter of 2002=100 (Source: Data from Banco de México)

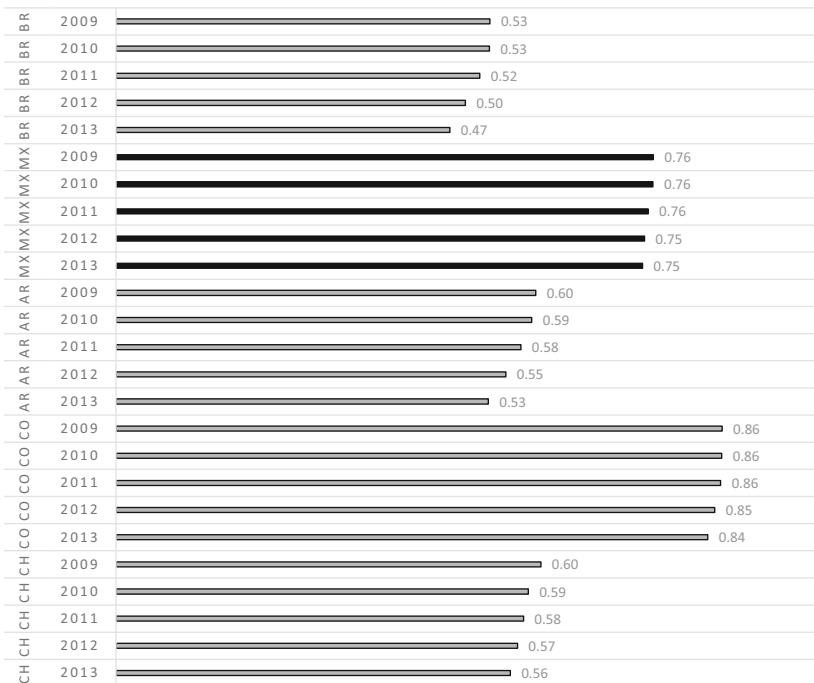


Fig. 12.4 Ratio of cash transactions for consumer payments in retail sales. Brazil, Mexico, Argentina, Colombia and Chile, 2009–2013. Data from estimates by Visa and Euromonitor (Source: Data from Banco de México)

in public's hands as a ratio of GDP is not expected to vary much, as evident in some of the segments of the period; nevertheless, its trend has been growing. The figure also shows cash withdrawals from ATMs as a ratio of GDP which is related to the cycle of cash held by the public; this variable has also shown moderate growth as a %age of GDP. In other words, there has been an increase in the amount of cash held by the public.

Lastly, Fig. 12.4 shows an estimate of the use of cash by consumers to pay small retailers for goods and services in five Latin American economies. This figure allows for comparisons between countries. Among the Latin American economies with the largest payment markets, Mexico and Colombia still show the highest proportion of use of cash for payments; this is particularly high in the case of the latter. The figure reveals that Mexico is the second largest market for payments (the first is Brazil)

and Colombia is fourth, even higher than Chile. Despite their being relatively large markets, the proportion of cash payments is high and has remained stable.

Hypotheses About the Obstacles

One of the recurring arguments on the persistence of cash transactions is the existence of a widespread informal economy in Mexico. This has been construed as a barrier to the use of formal financial services and, consequently, to financial inclusion. The value of the informal economy for the 2005–2013 period is estimated to stand at between 27 and 29 % of GDP. Although transactions in the informal economy can be completed using different methods of payment, cash continues to play an important role in such transactions.

In conjunction with the informal economy, the fact that large groups of the Mexican population do not enjoy an appropriate level of financial inclusion or have little access to formal financial services hinders the use of instruments different to cash. According to the 2012 National Survey on Financial Inclusion, 35.5 % of adults hold formal savings products, and 27.5 % have a formal loan; 56 % of adults make use of some kind of formal financial service. These %ages rose slightly in 2014.⁸

The relationship between low inclusion and informality has been discussed, but a conclusion on the causal relation has not been reached: whether informality contributes to low inclusion or if low inclusion is the cause of informality; is yet to be reached. It is a fact, however, that they are correlated.

A third cause, linked to financial accessibility, is that cash has advantages that other forms of payment do not, and which are important in an environment where accessibility to financial system service points is limited; these include:

- Universal acceptance and unlimited power to discharge debts.
- Feasibility for minor transactions in low income areas.

⁸ Results reported by the National Survey on Financial Inclusion.

- Despite the transaction costs the use of cash can generate, the commissions that banks charge for the use of their payment methods still represent a direct cost for the user.
- The costs of a system failure in the payment methods of the banking system may prove highly burdensome for the user.
- Many low-income users consider that they have better control over their finances with the use of cash than with payment instruments associated with a traditional bank account.

These factors can be considered as direct causes. The widespread use of cash however causes it to become ingrained in the consumption, payment and transaction habits of users. This represents a challenge for the financial industry as it means that there are large segments for which the design of payment services and products is not necessarily the most suitable. Some examples of these limitations in service design include:

- The use of debit and prepaid cards by the government for G2P channels to transfer subsidies aimed for poverty alleviation. In addition to the transfer of funds, the purpose is to promote financial inclusion and the use of cashless instruments. However, the cards have not been widely used by beneficiaries. This is primarily because the ATM network charges commissions for withdrawals from banks, thus creating a high cost for low-income users. There are other barriers too. For instance, users withdraw all the money because of lack of access to ATMs or bank branches in their local areas. These cash withdrawals are necessary because POS terminals are concentrated in urban areas and therefore cards are not widely accepted. The condition of universal acceptance is not met in many areas. In addition, G2P channels, tailored for the distribution of government payments, cannot be easily transformed into a channel for the distribution of financial services.⁹
- Payment service providers, basically the banks, must ensure that the customer experience is consistent thereby ensuring security, as well as easy and

⁹See Zapata (2013). "Corresponsales bancarios en las zonas rurales de México: lecciones de un proyecto de digitalización de pagos gubernamentales e inclusión financiera". Bill & Melinda Gates Foundation. (Agosto, 2013).

timely solutions to problems which may jeopardize the funds of users. This does not necessarily occur, which undermines user confidence.

- Several banks are implementing highly innovative payment solutions; many include mobile banking. Nevertheless, the most innovative solutions have to compete against more traditional and established divisions in order to demonstrate their viability in the business of the bank. Many of these innovations require a certain amount of time to mature and become profitable. As a consequence, many innovations are discarded from the core business of banks for failing to turn a quick profit.
- Up until the 2014 Financial Reform, systems such as those that allowed Electronic Funds Transfers (EFT), as well as connections to credit card operators and card clearing-houses, were restricted to non-bank intermediaries. These barriers have been eliminated from both the legislation and in practice, but there is still a long way to go.
- Despite the removal of regulatory barriers, the regulations on de-risking and preventing money laundering have made the opening and functioning of transactional accounts more complicated, thereby hindering their growth.

All in all, the substitution of the use of cash in transactions for cashless instruments and methods is still a long way off. It is unclear whether there is a direct substitution, as has been proposed, or if it is simply the creation of a basket of alternative payment methods whose use depends on the convenience of each method, according to its attributes. The formation of the current payment ecosystem suggests the second option.

Further Reading

- Castellanos, S., Del Angel, G. A., & Garza-García, J. G. (2016). *Competition and efficiency in the Mexican banking industry. Theory and empirical evidence*. New York, NY: Palgrave Macmillan.
- Del Angel, G. A. (2011). Computerization of commercial banks and the building of an automated payments system in Mexico, 1965–1990. In B. Bátiz-Lazo, J. C. Maixé-Altés, & P. Thomes (Eds.), *Technological innovation in retail finance: International historical perspectives* (pp. 92–117). London: Routledge.

- Del Angel, G. A. (2016) "Cashless Payments and the Persistence of Cash: Open Questions About Mexico" Economics Working Papers 16108, Hoover Institution, Stanford University Stanford, CA.
- Villasenor, J. D., West, D. M. & Lewis, R. J. (2015). *The 2015 Brookings financial and digital inclusion project report. Measuring progress on Financial Access and Usage*. Washington D.C.: Brookings Institution, Center for Technology Innovation.

Bibliography

- Bátiz-Lazo, B., & Del Angel, G. A. (2016). *The dawn of the plastic jungle: Lessons from the first credit card in Europe and North America, 1950–1975*. México: Fundación de Estudios Financieros.
- Castellanos, S., Del Angel, G. A., & Garza-García, J. G. (2016). *Competition and efficiency in the Mexican banking industry. Theory and empirical evidence*. New York, NY: Palgrave Macmillan.
- CNBV. (2014). *Reporte de Inclusión Financiera*. México: Comisión Nacional Bancaria y de Valores.
- Del Angel, G. A. (2011). Computerization of commercial banks and the building of an automated payments system in Mexico, 1965–1990. In B. Bátiz-Lazo, J. C. Maixé-Altés, & P. Thomas (Eds.), *Technological innovation in retail finance: International historical perspectives* (pp. 92–117). London: Routledge.
- Del Angel, G. A. (2016). Cashless payments and the persistence of cash: Open questions about Mexico. Economics working papers 16108, Hoover Institution, Stanford University Stanford, CA.
- Del Angel, G. A. (2016). *The limits to cashless payments and the persistence of cash. Open questions and untested hypotheses about Mexico*. Hoover Institution, Stanford University.
- Mazzota, B. D., & Chakravorti, B. (2014). The cost of cash in Mexico. The Institute for Business in the Global Context, The Fletcher School, Tufts University.
- Villasenor, J. D., West, D. M. & Lewis, R. J. (2015). *The 2015 Brookings financial and digital inclusion project report. Measuring progress on Financial Access and Usage*. Washington, D.C.: Brookings Institution, Center for Technology Innovation.
- Zapata, G. (2013). *Corresponsales bancarios en las zonas rurales de México: lecciones de un proyecto de digitalización de pagos gubernamentales e inclusión financiera*. México: Bill & Melinda Gates Foundation.

13

The Cyprus Cash Crash: A Case of Collective Punishment

Leonidas Efthymiou and Sophia Michael

Introduction: Summer Heat on a Spring Day

16 March 2013: It was an ordinary bright Saturday morning with a fine temperature. The salty mist that had gathered on low hills had dispersed quite quickly by the first sunlight. While driving my car from the city to the village, I was thinking how March in Cyprus is the best time of the year. It is neither hot nor cold, it is continuously sunny, and wildlife and vegetation are in full swing—just about perfect. I extended my hand and turned on the radio. A female presenter sounded serious and authoritative. She was repeating the same message, as if she had jumped out of Orwell's Oceania in *1984*, or as if she could not believe her own words:

L. Efthymiou (✉) • S. Michael
Intercollege Larnaca, Larnaca, Cyprus
e-mail: l.efthymiou@intercollege-larnaca.com;
s.michael@intercollege-larnaca.com

Cyprus is insolvent. The banking system is shut. All accounts are frozen. A one-off levy of 10 % on all savings has been imposed. You can only sustain yourselves through cash withdrawals from ATMs and payment cards.¹

Up to that point, most people knew that excessive fiscal spending had led to a large government deficit. We also knew about the banking sector's overstretch and bailouts in Greece that led to remarkable losses. In addition, it was well known that while the previous president had been dragging his feet for a long time, the new president had promised to put an end to uncertainty. Three weeks after the elections, on Friday 15 March, President Nicos Anastasiades flew to Brussels to attend a Eurogroup summit on Cyprus, together with the top administration of the International Monetary Fund (IMF), the European Central Bank (ECB), and the Eurozone's finance ministers.

What people did not know, however, was the size of the problem. It was on Saturday morning that Cypriots realised that the country was on the verge of uncontrolled bankruptcy. The levy proposal was unexpected and shocking. Fear, confusion and anger overwhelmed the island as residents learned they would be forced to give up on their savings and sovereignty. It was an experience that affected *masses* and generated similar feelings and memories as the war in Cyprus in 1974.

The bailout levy meant that:

- All depositors with fewer than 100,000 Euros deposited would have to pay 6.75 % across the entire banking sector.
- Those with more than 100,000 in their accounts would have to pay 9.9 %.
- Depositors would be compensated with the equivalent amount in shares of the two largest Cypriot banks.
- The levy would be a one-off measure.

Like a collective punishment, this deal doomed all depositors to a levy, regardless of institution (not all banks needed recapitalisation) or the amount of money in their accounts. Shortly after the announcement,

¹ "Breaking News", Radio Proto, Nicosia, CY, March 16, 2013.

long queues began to form at ATMs. The bailout levy had to be approved by parliament members before taking effect. Until then, to avoid a sharp destabilisation of the banking sector, the Cypriot banking system came to a standstill. For the first time in the history of the eurozone, a nationwide banking system shut with the frightening possibility of full bankruptcy.

The trustworthiness invested in the state had evaporated at once and concerns of legitimacy had taken its place. ‘Legitimacy is a generalised perception or assumption that the actions of an entity are desirable, proper, or appropriate within some socially constructed system of norms, values, beliefs, and definitions.’² In addition, legitimacy concerns both how people act towards institutional actions and how they understand them. In this context, we recollect the tragic events experienced by Cypriots in 2013 and evaluate their outcome two and a half years later.

ATMs: An Inside Job

The sunny day of 16 March was followed by more, even warmer days. Frequent Central Bank announcements kept the banking system shut and the society on pins for two weeks thereafter. The banking system could not have opened without knowing how much the levy percentage of the deposits would eventually be. Bank closures, however, can be risky when the extent of the crisis is not fully recognised by the public. For instance, as far back as 1835, the panic that followed the Bank of Maryland closure in the US unleashed a wave of violent riots that overwhelmed security forces and lasted for four days. In 1997 in Indonesia, the government’s intervention in the banking system led to social unrest. By the time the riots had calmed down in May 1998, hundreds had lost their lives and thousands of buildings were destroyed. In 2001, cash withdrawal restrictions in Argentina fuelled public anger and lootings in supermarkets. The Argentinean government announced a state of siege throughout the country and the federal police, the national border guard and the coast guard were brought in to counter the growing violence.

² Suchman C. Mark, “Managing Legitimacy: Strategic and Institutional Approaches”, Academy of Management Journal, Vol. 20, No. 3, (1995) 571–610.

It seems that depriving people from their savings and personal funds is a major breach of established principles and norms. Results can be unpredictable. This is the point, we believe, where ATMs are mobilised for a different purpose. In critical economic situations, where a bank run, bank insolvency, or bail-in are likely to happen, the role of ATMs becomes technocratic, securing peace through controlled circulation of money and transactions with restrictions. During the critical fortnight in Cyprus, people could sustain themselves by queuing in the long lines of ATMs to withdraw cash or use their credit cards. The withdrawal limit varied from 100 to 1000 euro per day, depending on the bank. Apart from some small-scale demonstrations, no major riots were recorded. In this, we detect a direct, decisive connection between ATMs, civil obedience and political preservation.

Similarly, after being tested successfully in Cyprus, this kind of arrangement became prevalent in Greece during the 2015 banking closure. Greece is of course another case and, remarkably, the reaction of Greeks was much different. ATMs became both a means of survival and a site for resistance.³ Greek protesters overwhelmed ATM terminals with graffiti, stickers and posters, inviting people to demonstrate against a third memorandum and resist ATM withdrawals. Looking back to the historical events in Cyprus, what we see was a struggle to keep up with the requirements of daily life rather than a struggle against the EU leaders' and government's plans.

A Daily Struggle

If we had to describe the situation with two words, we would choose 'uncertainty' and 'fear'. Within 24 hours, the Central Bank announced new levy percentages. For deposits up to €100,000 the levy would be 3 %. It would be 10 % for deposits between €100,000 and €500,000. For accounts with €500,000 or more, the levy would be 12.5 %. In the

³ Bátiz-Lazo Bernardo, Efthymiou Leonidas and Michael Sophia, "When Payments Infrastructure Turn Political: The 2015 Greek Financial Crisis Through Social Lenses". October 7, 2015, <http://www.charisma-network.net/finance/when-payments-infrastructure-turns-political-the-2015-greek-financial-crisis-through-social-lenses> (accessed 12/10/2015).

people's eyes, the government's frequent, self-defeating announcements and erratic actions meant one thing: the situation was beyond their control. As far as the people were concerned, the question was: If the state is not in control, who is?

The bank closure triggered a chain reaction. At the beginning, money shortages at ATMs were frequent. Within days, coins became scarce. Taxi drivers were setting fares in five and ten-euro denominations to avoid having to use coins. Salaries and rents could not be paid. People could not buy newspapers. Pharmacy stores were close to facing a shortage of supplies and some businesses postponed their operation until the banks reopened. In the retail sector, small shops and supermarkets could not restock as suppliers were accepting only cash. Petrol was running out, as owners didn't have cash to refill their reserves.

To make matters worse, uncertainty and doubt caused many retailers and traders to start refusing cards. The government intervened immediately, reassuring traders that the use of cards was safe. That was deception by definition: at the same time as the Central Bank and government officials were insisting that receiving payments at Points of Sales (POSs) was risk-free, retailers' revenues were drifting into accounts that were levied a few hours later.

Frightening micro-events throughout the critical fortnight caused additional pandemonium at ATMs. For example, media reports stated that the Popular Bank, the island's second biggest lender, would be closing down, which caused customers to rush to ATMs. Hundreds of bank employees tried to charge through parliament resulting in small-scale scuffles with the police.

The uncertainty reached its peak on Tuesday evening, 19 March. The Cyprus House of Representatives rejected the horizontal levy proposal, putting the whole project of austerity across Europe at risk. A risky rejection, given that the country was, unofficially, bankrupt and limited options were available to save the banks from collapsing. The negotiations turned towards a dead end. The deal was in serious jeopardy and the Emergency Liquidity Assistance (ELA) announced that it could no longer support the Cypriot banking system.

Agreement

On Monday, 25 March, a last minute agreement was reached at the Eurogroup between Cyprus, the heads of the European Commission, the ECB and the IMF. As per the official agreements, the Cyprus Popular Bank automatically became subject to immediate resolution. In addition:

- All insured deposits in all banks (i.e. deposits below €100k) remained fully protected in accordance with the relevant EU legislation.
- All deposits in excess of €100k at the Cyprus Popular Bank were confiscated.
- All deposits in excess of €100k at the Bank of Cyprus (BOC) would go through a levy of 37.5 %.

A few days later (28 March) banks reopened their doors to customers with increased security and capital controls in place, restricting cash withdrawals and controlling cash outflows from the country. Restrictions on free capital movement were necessary to prevent uncontrollable outflow of deposits and complete destabilisation of the financial system.

Crisis of Legitimacy

It is now proved that the fiscal austerity across Europe may hold a very aggressive stance. The events of 2013 left a lifelong mental scar on both Cypriot and international depositors and investors. The widely maintained hypothesis of protected deposits had officially collapsed with the first levy proposal (dated 16 March, 2013). Important institutions, such as the IMF, ECB and the Eurogroup, showed absolute disregard to major stakeholder groups. For example, bank shareholders and depositors were not invited to participate in decision-making. In fact, the deal was discussed and a decision was taken in absentia. Other than legislative quietism, this kind of behaviour raises questions about some of these institutions' legitimate role and mission in a social context.

With the final levy agreement (dated 25 March, 2013) insured depositors would not face losses. Nonetheless, once again, the deal undermined financial stability and corporate legitimacy. The two largest Cypriot banks defaulted over their bonds; uninsured depositors suffered big losses; stockholders were cleaned out; and bondholders were bailed in. Ironically, it was one such bail-in that led to the problems faced by the Cypriot banks, which were big holders of Greek bonds.

As stated by Melvin Aron Eisenberg more than three decades earlier, ‘managers play a critical role in the lives of those who contribute capital to the corporation’.⁴ How legitimate is it to exploit resources, primarily deriving from investors’ and depositors’ money, to chase an aggressive, greedy overseas expansion? Where are the boundaries of bankers’ power, as this is expressed through the actions of boards of directors and senior managers? How are their actions morally and socially justified? The Cypriot banks’ overstretch, far larger than the Cyprus GDP, had been unprecedented and was by no means in line with the corporate principles that should govern political and social institutions embedded in democratic states. Neither should economic objectives stand for a relentless profit maximisation at any cost and on every occasion. Within this context, the banking sector strategies were highly illegitimate, far removed from social imperatives, constraints and established norms.

Waiting for Summer, Two and a Half Years Later

Cyprus has returned to global markets earlier than planned. Also, fiscal imbalances have been addressed. Yet, aside from a few quantified results, we believe the situation is far worse. For instance, more than two years after the violent restructuring of the Cypriot banking sector, banks are still a source of instability. The levels of transparency and supervision are yet to improve. According to a 2015 survey by Transparency International,

⁴Melvin Aron Eisenberg, “Corporate Legitimacy, Conduct, and Governance - Two Models of the Corporation”, 17 *Creighton L. Rev.* 1 (1983), 2.

over 80 % of Cypriots believe corruption is a major problem in the banking sector.

The real economy and unemployment are far worse than they were prior to the bail-in. While unemployment in 2013 was 12.7 %, the latest figures in 2015 show 14.6. This figure would be much higher if thousands of young unemployed people had not migrated abroad. Unemployment and under-employment are not unrelated to the increase of unrecorded economy.

While the GDP is shrinking, the shadow economy (also called informal, dual, grey, hidden, or black economy, among others) is rising. Often, the black economy concerns illegal activities, such as money laundering, trafficking, smuggling and legal market activities that are deliberately kept hidden for reasons such as tax evasion. In other cases, this activity is hardly illegal, such as undeclared work that is defined differently in national legislation, home production or barter, which is an old traditional system of exchanging goods or services for goods or services without using a monetary medium. Since 2013, for example, the increase of barter in Cyprus, undeclared work, and the solicitation of money and food by (registered) poor people have been phenomenal.

Online barter companies have flourished. People are engaging in custom-made barter groups via social media. A number of municipalities have joined together to launch a web-based barter scheme for individuals. The barter program aims to offer a range of goods and services such as electronic goods, professional advice, private tuition lessons and gardening. It aims to be part of a cashless transaction system, which uses a digital form of currency instead of money.

Also, a new phenomenon has appeared where thousands of families are now registered for food parcels. While the welfare department is unable to cope, people queue regularly in designated municipality areas, churches and private charity shops for basic goods such as baby food, rice, pasta, baby napkins, powder milk, coffee and more. Emotions run high in shops throughout the country where free warm meals are served on a daily basis. Incidents were recorded where the food had run out, leaving people desperate for food crying and wailing in the streets. While the increasing number of people committing suicide is meticulously kept hidden, stories of misery and hunger hit the press, revealing the real price of the Cyprus deal. This is an extraordinary transformation for a country

that was by far the most prosperous among the ten countries that joined the EU less than 10 years earlier.

Furthermore, according to the Cyprus Association for the Prevention and Handling of Violence in the family, the increase in domestic violence has been unparalleled. Violence against women (82 % of victims were females) increased by 120 % since the beginning of the recession (this includes physical and psychological violence). Since 2013, the number of manslaughters and murders doubled.⁵ And all this is happening while banks have put down urgent plans for forced mass home repossession; and a new law that allows the sale of non-performing loans to third parties, such as hedge funds. Exactly 50 % of home loans are non-performing, leading banks to seizing and selling people's primary residences.

Conclusion

Almost three years after the house of cards came tumbling down; Cypriot society is crippled by the crisis. The Cypriot public paid a heavy price due to corporate illegitimate actions, insufficient regulations, poor state supervision, excessive government deficit and collateral damage from the Greek bailouts. Limited liquidity, less investment, less growth, higher tax rates, rising unemployment and escalating poverty synthesise today's Cypriot ecosystem. In this context, informal economy will keep getting larger while the GDP will keep shrinking within a parallel system of micro-economy. Finally, we cannot see how Cyprus will avoid a second levy in the near future.

Further Reading

- Clerides, S. (2014). The collapse of the Cypriot banking system: A bird's eye view. *Cyprus Economic Policy Review*, 8(2), 3–35.
- Michaelides, A. (2014). Cyprus: From boom to bail-in. *Economic Policy*, 29(80), 639–689.

⁵ Cyprus Police, "Statistics Data" last modified January 3, 2016, http://www.police.gov.cy/police/police.nsf/dmlstatistical_en/dmlstatistical_en?OpenDocument. (accessed November 20, 2015).

Schneider, F. (2013). Size and development of the shadow economy of 31 European and 5 other OECD countries from 2003 to 2013: A further Decline. http://www.econ.jku.at/members/schneider/files/publications/2013/shadeceurope31_jan2013.pdf. Accessed 22 Dec 2015.

Bibliography

- Breaking News. (2013). *Radio Proto*. CY: Nicosia.
- Bátiz-Lazo, B., Efthymiou, L., & Michael, S. (2015). When payments infrastructure turn political: The 2015 Greek financial crisis through Social lenses. <http://www.charisma-network.net/finance/when-payments-infrastructure-turns-political-the-2015-greek-financial-crisis-through-social-lenses>. Accessed 12 Oct 2015.
- Cyprus Police. (2016). Statistics data. Last modified January 3. http://www.police.gov.cy/police/police.nsf/dmlstatistical_en/dmlstatistical_en?OpenDocument. Accessed 20 Nov 2015.
- Eisenberg, M. A. (1983). *Corporate legitimacy, conduct, and governance – Two models of the corporation*. *Creighton Law Review*, 17, 1.
- Suchman, M. C. (1995). Managing legitimacy: strategic and institutional approaches. *Academy of Management Journal*, 20(3).

14

CajaVecina: The Bancarization of Chile Through Corner Shops

Juan Felipe Espinosa Cristia
and José Ignacio Alarcón Molina

Introduction and Presentation of the Case

The current chapter aims to show a case of technological change that lines up with the phenomenon known as a ‘Cashless Economy’. As Hernandez et al. (2012)¹ have shown in the case of Chile, different actors in the banking and payment industry have sought to set up new payment channels for the unbanked population in Chile. Among the alternatives are BCs such as CajaVecina. Such a BC would have a transaction cost

¹ Hernandez Cesar Araya, Maino Maria Luisa and Martinez Claudio Villar, “Masificación de los medios de pago: Barreras de adopción de la tecnología financiera”. *Documento de Trabajo N°5*. (Facultad de Economía y Negocios Universidad Andrés Bello/BancoEstado de Chile, 2015).

J.F. Espinosa Cristia (✉)
Universidad Andrés Bello, Viña del Mar, Chile
e-mail: juan.felipe.espinosa@gmail.com

J.I. Alarcón Molina
Universidad de Chile, Santiago, Chile
e-mail: j.alarcon@UG.UCHILE.CL

inferior than the bank branches. This cost is even lower than the one involved in the operation of ATMs but higher than alternative channels based on Internet and mobile telephony. CajaVecina is '*a customers and noncustomers service channel of BancoEstado, that operates in stores during their business hours. Through terminals placed in the stores, it allows a series of bank transactions and financial services, making use of the BancoEstado ATM cards or the CuentaRUT debit card*'.²

The Chilean Government report sheds light, moreover, on the fact that CajaVecina is carrying out services such as cash withdrawal, cash deposits, transfers between BancoEstado accounts, balance inquiries, payments of credits and dividends, services payments, cash advances and payments of BancoEstado credit card, and topping up mobile phones, among others. The technology behind the transactions is a POS terminal that is connected with the bank's central system. Regarding the system regulation, it is minimal. It is barely mentioned in the appendix of Chapter 20 of the Compilation of the Superintendency of Banks and Financial Institutions. The BC concept is never mentioned in the body of that law. As a consequence, this is a case of financial inclusion with almost no regulation.

Furthermore, the government has posed that the CajaVecina business model is attractive both for the storekeeper and for BancoEstado. The government assures that the store's customer flow will increase with the offered service. The adoption of the innovation is endorsed by the Banks and Financial Institutions Association, which has quantified the development of BC in Chart No.1. As a matter of fact, the total number of BCs in Chile has shown an explosive growth between 2006 and March 2015. As of 2015, CajaVecina has around 40 % of the BC market in Chile (Fig. 14.1).

CajaVecina's success is based on a related innovation, the so-called RUT account. This sight account, operated by BancoEstado also, has more than seven million cards issued. A RUT account is automatically opened based on each Chilean Social Security Number –RUN/RUT, that is, the document that certifies the personal and tax identity of every person in Chile. In this way, the user has access to the ATM network and to the electronic devices authorised by the regulatory entity of the Chilean banking sector. However, as has been suggested by Bátiz-Lazo

² Gobierno de Chile, "Informe Inclusión Financiera y Medios de Pago Electrónicos" (Ministerios de Desarrollo Social, Economía, Hacienda y Transporte y Telecomunicaciones, 2013).

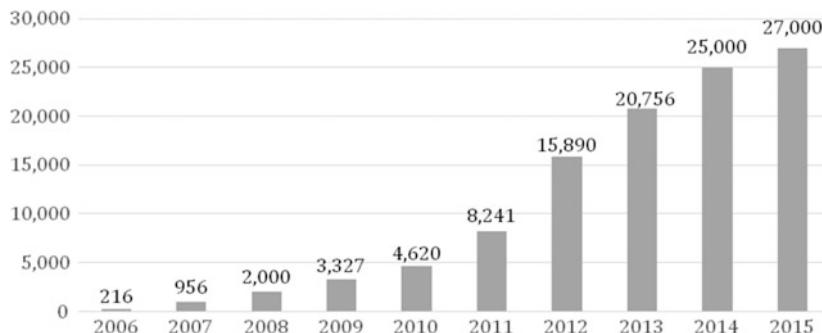


Fig. 14.1 Banks correspondents per year (Source: Chilean Banks Association and SBIF)

and Espinosa (2015),³ although ATMs are decreasing in number, cash still remains very important for low-income Chileans. As a consequence, CB is increasingly important for the low-income population.

To get a closer view of this financial inclusion mechanism it will be necessary to introduce some concepts that come from the sociology of money, credit, and from organisational studies. After that, the analysis of a corpus coming from www.reclamos.cl website is carried out. In this website, different people express the problems they have come across in the use of the CajaVecina system. It is from the categorisation of such complaints that the central aspects of CajaVecina institutionalisation emerges as a mechanism that affects the ecology of payments, and the economic relationships among the users, as well as the storekeeper (BC).

Approximations to the Use of Money and Payment Systems

The Systematic and Culturalist View of Money

Different social theorists have sociologically and anthropologically studied the evolution of the processes of social differentiation. Considering

³ Bátiz-Lazo Bernardo and Espinosa Juan, "Cash remains king in Chile but its days could be numbered". *The Conversation*. <http://theconversation.com/cash-remains-king-in-chile-but-its-days-could-be-numbered-37952> (accessed March 25, 2015).

money as a means of communication symbolically generalised, Luhmann (2012)⁴ unravels what other thinkers had already conceived: the objectivation, socialisation, and universalisation of money to the point of being considered as a social support. In that sense, money increases the probability of communication, where understanding and the process of selection or exclusion between hearer and speaker is facilitated. Along the same lines, CajaVecina is understood as an objectiviser of communication in the economic system.

Money is a reducer of complexity that, in interaction systems, allows for coordinating a great number of economic relationships.⁵ However, by theorising money in that way, Luhmann leaves out the agentic power of it, power that had been already established by authors like Simmel. To overcome this problem, Zelizer (1997)⁶ delves into the embedded meanings of money, developing the social and economic calculability processes that agents establish when they connect because of money and payment methods. In this way, Zelizer brings down the wall imposed between social and economic sciences in order to study this type of payment method.

In fact, Zelizer points out that money, and therefore payment methods, allows users to mark social and economic relationships. As a result, money as a support is not free from social reach and limitations, but through money individuals generate objectivising processes of the coin, but moreover they create, keep, or dissolve social bonds, in addition to control and establish inequalities. Individuals then will mark status, manage uncertainty, and administer their intimacy.

From Zeliner, it will be essential to see CajaVecina as an innovation in which social bonds are created, kept, and controlled and where the economy is merged with these processes, thus enabling a more complex relationship among the actors taking part. This relational dimension the author accounts for, plus the communicative one accounted for by

⁴ Luhmann Niklas, *Theory of Society*, vol. 1, (Stanford University Press, 2012).

⁵ Luhmann Niklas, “La economía de la sociedad como sistema autopoético”, *Revista Mad*, 29, 9 (2013).

⁶ Zelizer Viviana, *The Social Meaning of Money* (Princeton University Press, 1997).

Luhmann, are a necessary but not sufficient condition to understand the CajaVecina phenomenon.

Bancarization of Everyday Life, Two Approximations: Sociology of Credit and Organisational Isomorphism

The bancarization of everyday life⁷ has to do with the historical processes related to credit and payment financial transactions in people's daily lives. From this point of view, Wilkis (2014a)⁸ mentions that Argentinian low-income families see themselves redefined in their capacity as actors by the extension of the market to credit and the world of consumption. This transformation is not based on the vertical logic of a model that seeks to generate the coming of a *homo economicus*.⁹ Rather, it involves the generation of attitudes of inter- and extra-familial reciprocity like the survival of the group, conceiving new empowered actors such as housewives—budgetary matriarchy—who hold the past, present, and future of the *moral capital* in the accounts management, regulating by means of informal agreements who enters, leaves, and remains in the social network. In the same way, Ossandon (2014)¹⁰ had shown that people in Chile lend each other credit cards, or more precisely, they lend the given credit limits. Is in this way that social relations appear to parasitise credit and to complicate the economic relationships related to bancarization and credit.

On the other hand, and from the neo-institutionalism trend of organisational theory, it is called upon the phenomena of redesign, performativity, and assimilation of the expert banking practices. Neo-

⁷ Bancarization, mainly refers to the percentage of population with/without access and use of banking services.

⁸ Wilkis, A. (2014a). A Moral Sociology of Banking Relationships. *Desacatos* (44), 2010–2015.

⁹ Wilkis Ariel, "Sociology of credit and the economy of the popular classes", *Revista mexicana de sociología*, 76, 2 (2014), 225–252.

¹⁰ Ossandón José, *My Story Has No Strings Attached: Credit Cards, Market Devices, and a Stone Guest*. Working Paper 3 (2014) IMTFI.

institutionalism will understand the bancarization processes as developed by banks and assimilated by the stores, creating convergence, conflict, and new rationalities phenomena. In that sense, DiMaggio and Powell (2000)¹¹ emphasise that the organisations generate homogenisation processes in their structures and practices. That is to say, when the organisations have the same field, assimilation and mimetisation processes begin, which can be considered in three different but non-discriminatory ways, that in the banking case are synthesised as follows:

- (a) Coercive: the assimilation of banking practices by an organisation that had not been considered historically in that way.
- (b) Mimetic: either because of novelty or register of use, organisations can be open to incorporate changes in their organization.
- (c) Normative: however, the coercive and mimetic changes arrive at the organisations to socialise with devices and forms of logic characteristic of the banking organisation, such as banking mechanisms and routines.

The imposition of an adaptation of organisations in a continuous way in a context of market expansion and supply of assets and services, the so-called *population ecology*¹² will allow then an environment of banking services according to the adaptation context, where two types can be distinguished:

- (a) General organisations, which in this case, would be the stores that are not part of CajaVecina.
- (b) Specialist organisations, such as the stores willing to change, introducing elements which favour their focus of expertise; in this case, the introduction of new elements that allow themselves to be updated and according to the organisational population.

¹¹ DiMaggio Paul and Powell Walter, "The iron cage revisited institutional isomorphism and collective rationality in organizational fields", *Advances in Strategic Management*, 17 (2000) 143–166.

¹² Hannan Michael and Freeman John, "Where do organizational forms come from?", *Sociological Forum* (Vol. 1, No. 1 (1986) 50–72.

What Kind of Financial Inclusion Mechanism Is CajaVecina?

Methodology and Corpus

The corpus was taken from www.reclamos.cl website. As a strategy, the codification was inductive and emergent. *Atlas.ti* 7.5 facilitated the production of agglutinative codes of an exploratory nature by means of two methodological principles: semantic generalisation and mutual exclusion. In this way, five codes were established according to the information given by the theoretical framework and the actors' discourses.

The unit of analysis was built from the complaints, considered as analytical cases. In the complaints, two types of users are distinguished: a) the regular user of the CajaVecina system, understood as the bancarised subject; b) the intermediary actor between the customer and the bank, characterised by owners and/or managers of the store.

Description and Analysis of Emergent Categories

The bancarised subject compares the store to a bank branch—that is the typical assimilation attempt suggested by DiMaggio and Powell (2000). The code 'payment error' refers to the difficulties presented by the users of the CajaVecina system, who at the moment of paying experience difficulties of synchronisation among the macro—the company providing the services, meso—the use of the CajaVecina system—and micro-distorted and/or conflictive understanding due to the use of intermediaries. Therefore, the users do not achieve their objective of using CajaVecina as a facilitating element, as it is promoted. For example, when opening the CajaVecina service to facilitate the payment of a service, we see that the user complains:

I bought car insurance and they explained I had to download it from the CajaVecina website and the website doesn't work, who gives me my money back?

Complaint No. 16

Although these processes have originated due to a lack of an effective socialisation between the intermediary subject and the customer, BancoEstado derives the complaints generated by the same storekeepers, classifying them as “technical problems in the maintenance of the system of CajaVecina”, associated to the usual processes of communicating system information between BancoEstado and the store. In this category, the complaints associated with the lack of maintenance and coordination processes are synthesised, generating two processes at the ‘mimetic organisational’ level: a) the interruption of the service, establishing troubles for the user of the system and the intermediary; and b) discomfort by the storekeepers for not receiving an accompaniment to look after the correct use of the CajaVecina service, as in the following case:

I think it's disrespectful that for 10 days nobody from CajaVecina or the bank could provide a solution to the problem, or there's no one from the bank who shows up from the bank. It seems that the ones from the bank don't realise the troubles they cause to us with our customers and the people who make transactions in my store.

Complaint No. 22

Nevertheless, not every process alludes to the technical and coordination problems. As Wilkis (2014b) claims, the storekeeper is empowered due to the advance of bancarisation in everyday life. To understand this process, the category ‘storekeeper’s bad service’, which refers to the complaints presented by the customers that highlight an improper and biased treatment on the part of CajaVecina. It is seen here the normative ideal of comparing and assimilating the store with an exclusive bank branch, referring to ways of treating the customers, working hours and availability of the service. Needless to say, this ideal has not materialised, due to the use of criteria that compromise other forms of distinction in the customer service, be it social proximity—degrees of trust and friendship—and its own profitability. The effect of social proximity can be seen in the following case:

You can clearly see that [HE] accepts just some people because my wife made a complaint about this situation. Now that we need to run errands this person doesn't allow it (...)

Complaint No. 12

The store, now empowered, manages the processes of shortage associated with the regular limit of transactions of CajaVecina. This is why a second dilemma in the hands of the customers is observed, who point out the usual ‘insufficient funds in CajaVecina’. A user who wants to relate CajaVecina to a bank branch is observed. Then, the users talk about the inefficiency of the service, which does not keep their promise of representing a bank closer to the customer’s figure. Of course, we could also consider the storekeeper’s action, which favours certain customers with the purpose of strengthening their personal venture, as is presented here:

Every time I try to withdraw money in a CajaVecina in La Florida, they always say they I don’t have enough balance, no matter what the time they always say the same and I’m forced to go to the bank and join endless queues.

Complaint No. 2

Finally, even though the customers see the CajaVecina service as beneficial, they consider the service expensive—0.5 dollars per transaction. These processes are related upon comparing the changes generated when using the traditional bank branches compared to the use of CajaVecina, which establishes an additional cost. This phenomenon underestimates the attempts of bringing the bank to everyday life, at the expense of bigger economic benefits for BancoEstado:

Caja Vecina charges 300 pesos per commission in every transaction made in Caja Vecina, I think it’s abusive.

Complaint No. 13

Conclusions

This short chapter shows how the analysis of a mechanism of financial inclusion, CajaVecina, needs to be analysed more thoroughly and certainly more than the one offered by the data describing diffusion and adoption. Although such data show an important growth of this kind of BC, the analysis and categorisation of the complaints suggested that

CajaVecina is a complex case of isomorphism that has several layers, which have to be carefully exposed to arrive to a systemic understanding of it.

As Rafael Bergoeing (2013)¹³ mentions, we need better ways to measure the success of financial inclusion innovations like CajaVecina. The high cost involved, the socio-technical problems linked to it and above all, the effect of social proximity related to intermediaries between the bank and the user highlight important issues related with today's payment ecosystem for many people—particularly those with lower incomes. As it is shown in the data, the storekeeper will try to carry out their own goals to the detriment of a user looking for a service at least similar to the one obtained at bank branches. It is here where the question arises, what kind of mechanism of inclusion is the one implied in CajaVecina? First of all, it can be hypothesised that it is very different than the one given to those who have access to BancoEstado branches and to those who have the benefit of owning an account different from the RUT account, who are the segment of users that mostly employs the services of CajaVecina.

Further Reading

- Wilkins, A. (2015). The moral performativity of credit and debt in the slums of Buenos Aires. *Cultural Studies*, 29(5–6), 760–780.
- Ossandon, J. (2014). *My story has no strings attached: Credit cards, market devices, and a stone guest*. Working Paper 3 Institute for Money, Technology and Financial Inclusion (IMTFI). http://www.imtfi.uci.edu/files/blog_working_papers/2014-3_Ossandon_Working%20Paper%202.pdf. Accessed 15 Jan 2016.
- Zelizer, V. (2010). *Economic lives: How culture shapes the economy*. Princeton: University Press.

Bibliography

- Araya, C., Maino, M., & Villar, C. (2012). *Masificación de los medios de pago: Barreras de adopción de la tecnología financiera*. Documentos de Trabajo. N° 5. Facultad de Economía y Negocios.

¹³ Bergoeing Rafael, *Mesa Redonda: Banca Corresponsal y Cuentas Simplificadas ASBA - FOMIN/BID*, 26 de julio de 2013, (Washington DC, EE.UU, 2013).

- Bátiz-Lazo, B., & Espinosa, J. (2015). Cash remains king in Chile but its days could be numbered. *The Conversation*, <http://theconversation.com/cash-remains-king-in-chile-but-its-days-could-be-numbered-37952>. Accessed 25 Mar 2015.
- Bergoeing, R. (2013). *Mesa Redonda: Banca Correspondencia y Cuentas Simplificadas ASBA - FOMIN/BID*, 26 de julio de 2013, Washington, DC, EE.UU.
- de Chile, G. (2013). *Informe Inclusión Financiera y Medios de Pago Electrónicos*, Ministerios de Desarrollo Social, Economía, Hacienda y Transporte y Telecomunicaciones.
- DiMaggio, P., & Powell, W. (2000). The iron cage revisited institutional isomorphism and collective rationality in organizational fields. *Advances in Strategic Management*, 17, 41–6.
- Hannan, M., & Freeman, J. (1986). Where do organizational forms come from?. *Sociological Forum*, 1(1), 50–72.
- Hernandez, C A., Maino, M L., & Martinez, C V. (2015). *Masificación de los medios de pago: Barreras de adopción de la tecnología financiera*, Documento de Trabajo N°5. (Facultad de Economía y Negocios Universidad Andrés Bello/ BancoEstado de Chile).
- Luhmann, N. (2012). *Theory of society* (Vol. 1). Stanford: Stanford University Press.
- Luhmann, N. (2013). La economía de la sociedad como sistema autopoietico. *Revista Mad*, 29, 9, 1–25.
- Ossandón, J. (2014). *My story has no strings attached: Credit cards, market devices, and a stone guest*. Working Paper 3 IMTFI.
- “Reclamos cl” Website. (©2016). www.reclamos.cl. Accessed 15 Jan 2016.
- Simmel, G., & Frisby, D. (2004). *The philosophy of money*. London: Psychology Press.
- Wilkins, A. (2014a). A moral sociology of banking relationships. *Desacatos*, 44, 210–215.
- Wilkins, A. (2014a). A moral sociology of banking relationships. *Desacatos*, 44, 2010–2015.
- Wilkins, A. (2014b). Sociology of credit and the economy of the popular classes. *Revista mexicana de sociología*, 76, 2, 225–252.
- Zelizer, V. (1997). *The social meaning of money*. Princeton: Princeton University Press.

Part 3

Paying with Plastic

Entrée: The Rocky Origins of Visa’s Debit Card

David L. Stearns

Introduction

The year 2003 was a watershed for the Visa network. That year, the entire worldwide system processed more debit transactions than credit transactions, both in terms of count and amount.¹ That is to say, the majority of transactions were now clearing against existing deposits rather than credit lines with high rates of interest. This shift received little attention from journalists at the time, and even though this preponderance of debit transactions has continued to the present day, most consumers, politicians, and journalists still think of Visa as a “credit card company”.

But this shift towards debit was a long-awaited milestone for Visa’s founder, Dee Hock, as well as those who built the foundations of the current system. As early as 1973 Hock began talking about a card that would settle against existing deposits or liquid investments, and in 1975

¹ Lee WA, “Visa Debit Card Volume Tops Credit Worldwide.” *American Banker*, 21, 4 (2004):11.

D.L. Stearns (✉)

Information School, University of Washington, Seattle, WA, USA
e-mail: dlsinfo@uw.edu

his fledgling organization released its first debit card product, known as Entrée.² At the time, the member banks were eager to replace cumbersome and costly paper checks with sleek and efficient electronic transactions, and the Entrée card looked like a perfect solution: it would have national recognition and acceptance, as well as electronic authorization and clearing. But only a handful of the member banks chose to issue the card during the 1970s and 80s, thereby keeping it out of the wallets of most consumers for nearly 20 years.

Why did it take so long for the member banks to issue the Visa debit card? The cynical amongst us might be tempted to say that the banks didn't want to jeopardize their highly lucrative credit card portfolios, but I will argue in this chapter that the complete answer was more complicated and nuanced than that. Concerns of the cannibalization of credit card revenues was certainly at play, but focusing solely on those would miss the way the Entrée card clashed with the banks' emerging plans for enabling the electronic transfer of funds. These clashes, which were both technological and strategic, were the primary cause of Visa's debit card not being more widely issued, and why it took until 2003 for debit transactions to outpace credit.

A Brief Explanation of Visa

In order to understand the story of the Entrée card, one must first understand a bit about what Visa is and how it is structured. Some readers may be surprised to learn that Visa doesn't actually issue cards to consumers. Visa also doesn't enroll merchants to accept those cards, nor does it maintain those merchants' accounts. Visa doesn't even build those little point-of-sale (POS) terminals the merchants use to read cards and electronically process transactions. So what exactly is Visa, and what does the organization do?

Visa is essentially a networked organization that enables thousands of competing banks to cooperate, just enough, to provide a worldwide payments service that none could realistically provide alone.³ Visa itself is the hub or the network while the member banks are the spokes. The banks issue the cards and enroll merchants, while the relatively small Visa

² Brooke Phillip. "NBI debit card is named ENTRÉE." *American Banker*, 22, 8 (1975):1.

³ For a detailed explanation of Visa's organization and history, see Stearns David, *Electronic Value Exchange*, (Springer-Verlag, London, 2011).

organization provides three critical system functions: it establishes and enforces the organizational rules that enable cooperation, it builds and operates the computing infrastructure that authorizes and clears transactions, and it designs and conducts the marketing efforts that build brand recognition and awareness.

Prior to becoming a publicly traded corporation in 2008, Visa operated as a for-profit membership association that was owned and governed by the same banks it served. This allowed Visa to avoid being regulated as a bank service corporation, but it also made it subservient to the wishes of the issuing banks. Thus Visa could develop new products like a debit card, but the member banks were not required to adopt and issue them.

Hock's Asset Card

In 1973, the American Bankers Association (ABA) invited Dee Hock to speak at their national Charge Card Conference in Los Angeles. Hock was a natural choice, as he had saved the BankAmericard system from almost certain extinction, and unveiled earlier that same year the first nationwide electronic authorization system. He was even planning a nationwide electronic clearing system to be released the following year. But all of that was simply a warm-up for the thing he cared about most: his new “asset card.”

Hock was not your typical banker.⁴ He was an iconoclast who enjoyed the disruption caused by rethinking things that had long been accepted as normal or even natural. He grew up poor in rural Utah and was mostly self-educated, so he had no particular reverence for the tradition of banking, nor the institutions that controlled it. During his years managing the BankAmericard program at the National Bank of Commerce in Seattle, he had come to realize that money was nothing more than “guaranteed alphanumeric data expressed in the currency symbol of one country or another” and that the organizations most adept at manipulating that data would soon become the new “banks.”⁵ Consumers used banks mostly out of habit, and would be happy to move their money elsewhere if another

⁴ Biographical info on Hock comes from his autobiography. Hock Dee, *One From Many: VISA and the Rise of the Chaordic Organization*, (Berrett-Koehler, 2005), 98.

⁵ Ibid. 95.

type of organization gave them easier access and better protections. Hock felt that if the banks failed to respond by delivering better service through smarter products, they might soon find themselves replaced.

All of this fed into his speech at the ABA Charge Card Conference. He opened with this rather simple but startling observation:

In the context of customer use, “credit card” has always been a misnomer. Certainly from the user viewpoint, a bank card is solely used to create debits. That is, to dispose of value owned by or to be earned by the user. The term “credit card” is a derivative in that deferring the date of credits beyond the date of debits was originally referred to as “extending credits;” thus, the birth of “credit cards,” a classic example of naming and marketing the product from the perspective of the supplier rather than the user, thus making it unacceptable to a large number of prospective customers.⁶

Hock was concerned that the language used to talk about his core business was restricting the way bankers thought about what it was and what it could become. He was also troubled by the way banks treated credit lines and deposit accounts as two separate things. In his mind, there was no natural distinction:

Bank card accounts, savings accounts and checking accounts have only two substantive differences: First, the time at which the bank requires the customer to make credits—deposits or payments—to balance the ledger, and second, the party to receive interest and at what rate depending on the balance struck.⁷

Both were simply “accounts” and those accounts could fluctuate between holding funds loaned by the customer to the bank, or funds loaned by the bank to the customer. Furthermore, the mechanisms consumers use to access those accounts are also essentially the same:

Checks, like bank cards, are simply mechanical devices for exchanging value by debiting accounts. It is only by custom that credits are required in advance, that third-party acceptance carries no assurance of payment and

⁶ Hock Dee, “Speech before the 1973 ABA Charge Card Conference”. Reprinted in the *American Banker*, 3, 10 (1973), 4.

⁷ Ibid.

that MICR encoding on paper governs the mechanics of clearings. In short, those checking accounts are designed more for the convenience of banks in acquiring funds than for customer convenience in the market place.⁸

Hock argued that increasingly mobile consumers were the future of banking, but the paper checks given to them by their banks were not honored outside the local area because those checks were not guaranteed like bank card transactions were. Furthermore, the checks were unnecessarily inflexible because they required consumers to make deposits in advance via a branch (direct deposit of paychecks was not yet common practice). If the banks were willing to extend those same customers ample credit on their BankAmericards, why not link that credit line to their demand deposit accounts? He suggested:

Bank card accounts could quickly be converted to banking accounts by revising software to carry either credit or debit balances, and marketing the service as a value exchange device with an optional credit feature.⁹

This new service, Hock noted, could be accessed by a new kind of card, an “asset card,” which would enjoy the same nationwide acceptance as the existing BankAmericard. Transactions would be electronically authorized and cleared through Visa’s nationwide systems, but they would be settled against existing deposits or liquid investments before tapping a credit line. The service would be available at any time of day and from any place in the developed world. It would quickly become the future of banking, and not surprisingly, sitting right at the heart of it would be Visa.

Existing Electronic Funds Transfer Plans

Hock was not the only banker thinking about electronic payments at this time. The entire industry was abuzz with the possibility of “electronic funds transfer” or EFT for short. Every major commercial bank was adopting ATMs to provide more convenient access to cash, as well

⁸ Ibid.

⁹ Ibid.

as POS terminals that could read those same ATM cards and initiate electronic purchases. Unfortunately for Hock, the bankers working on those plans tended to come from the deposit side of the house, and therefore held great disdain for the credit card programs and their associated networks.

Tom Cleveland, Visa's long-time Treasurer and CFO, described this deep cultural divide:

In bad economic times, the Visa portfolio could deliver 70–80 % of a bank's bottom-line profits, 10–15 % was normal, but the card operations were never given the respect they deserved. They were not viewed as banking. They were the new stepchildren in the family of banking that everyone wished would stay quiet and unseen, but would keep working harder than ever.¹⁰

The deposit side of most banks considered the card programs to be rather risky ventures that were really nothing more than a new form of unsecured lending. The banks' EFT plans, in contrast, were core to the banks' identity and survival, and thus should never be put into the hands of the card programs or their associated networks.

Those in control of the EFT plans were also understandably conservative in their approach, and patient in their timeframes. They were willing to wait for their desired technological infrastructure to become available, while Visa was eager to release a card that worked in the current context.

The Entrée Card

Visa issued their first version of the asset card in 1975, calling it Entrée.¹¹ It was a separate card from their existing BankAmericard, so that banks could issue either one or both to a given customer. Although it bore a different name, Visa required merchants to accept any card bearing the blue-white-and-gold bands design, so it could be used anywhere a

¹⁰ Cleveland, Tom. Personal stories written in 1999, given to the author during our interviews. p. 21.

¹¹ Information on Entrée comes from several American Banker articles, and interviews with Tom Honey, who managed the project. See chapter 8 of Stearns, *Electronic Value Exchange*, for detailed citations.

BankAmericard could be used. Transactions were authorized and cleared using Visa's computerized network, but they were settled against the customer's demand deposit account. If there were insufficient funds by the time the transaction cleared, the bank was free to extend credit and charge an overdraft fee, just as they would with a check.

It seemed like a great product, but as I noted earlier, only a handful of banks chose to adopt it—less than 1 % of the Visa membership at the time. There were many reasons for this, but they boil down to a few key ways in which the Entrée card clashed with the banks' existing EFT plans.

First, the Entrée card was designed to work wherever existing BankAmericards were accepted, and most of those locations still used card imprinters and multi-part sales drafts. Electronic POS terminals were available in 1975, but they were still very expensive, so they were not yet widely adopted. Transactions could still be electronically authorized by telephoning an authorization center, but this was required only if the amount was above a "floor limit" that varied between merchant types. The floor limit was a trade-off that accepted a small amount of risk to reduce the load on the authorization centers, but it also meant that not all transactions were authorized. This created the possibility of overdrafts on Entrée transactions, as there might not be sufficient funds when the transaction cleared later that night. Although these overdrafts were very profitable for the bank, those in charge of the EFT plans tended to assume that EFT meant no more overdrafts, and thus any solution that still allowed them was unacceptable.

Second, transactions in these paper-based environments were authorized with a simple signature, just as the BankAmericard transactions were. This was generally unacceptable to those controlling the banks' EFT plans, as they were patterning their EFT systems after their burgeoning ATM networks, which used a PIN instead. PIN entry pads were a reasonable proposition for ATMs, as the bank purchased relatively few of those, but it was a prohibitively expensive proposition for all the various merchant points of sale. Inexpensive merchant POS terminals with PIN entry were still several years away, but the banks were willing to wait to gain the added security.

Third, the Entrée card carried with it a different set of assumptions about how the banks would cooperate with each other. The large commercial banks considered EFT to be a competitive weapon that they

could use to capture market share from smaller, less technologically-savvy banks. They wanted to prohibit their direct competitors from using their merchant POS network, or perhaps charge them steep fees for accessing it. These banks thought of the merchant point of sale as a special kind of ATM, and ATMs (like branches) were not shared with competitors.

But the Entrée card was subject to the same acceptance rules as the BankAmericard. Every BankAmericard merchant was obliged to accept any and all BankAmericards (and now Entrée cards), regardless of which bank issued it. The POS infrastructure was thus developed and shared cooperatively, and no bank was allowed to lock out their competitors. There was a fee for interchanging transactions between banks, but the fee was relatively small and established uniformly at the system level. Adopting the Entrée card meant adopting a cooperative model that clashed with the EFT plans of the large issuing banks.

In addition to these technological and strategic clashes, the Entrée card also clashed with the culture of the member banks. As noted earlier, the credit card programs were typically seen as a risky and disreputable venture, so adopting a debit card that was defined and managed by a national credit card organization was anathema. Ken Larkin, a long-time executive at Bank of America, put it bluntly:

As long as [Hock] kept to credit cards, banks were willing to give him leeway. The moment you get into the debit card, you're talking about more than \$1 trillion [in deposits]. You're hitting bankers where they live. They weren't going to let anybody, especially Dee Hock, tell them how to manage their deposit stream.¹²

Eventual Adoption

Although the Entrée card was not widely adopted, Visa continued to develop and offer its debit card product, renaming it to “Visa Debit” in the late 1970s. The issuance remained low throughout the 1980s, but in the early 1990s it started to increase. The turnaround was due to several factors.

¹² Larkin Kenneth. cited in Nocera Joe, *A Piece of the Action*, (New York, Simon & Schuster Paperbacks, 1994), 308.

First, Visa developed the PIN-based transaction infrastructure that the banks had always wanted, and incentivized several manufacturers to develop inexpensive POS terminals with PIN entry pads.

Second, Visa worked out deals with the major supermarkets so that they would accept both Visa debit and credit cards. Supermarkets had traditionally resisted accepting bank cards, as the merchant discount fees often erased the little margins they made on their products. In the late 1980s, they started accepting ATM cards, as those charged only a small flat fee, and Visa responded by offering a special merchant discount that was close to what the ATM networks were charging.

Third, in the early 1990s Visa convinced a few of the large money-center banks to convert their proprietary ATM cards over to Visa-branded debit cards, which instantly increased their issuance rate by significant amounts. By the 1990s a new generation of bank management had taken over, and they more readily saw the benefits of linking the card programs and the deposit accounts.

Lastly, Visa renamed their card once again to “Visa Check” and embarked on a large marketing campaign to build consumer awareness and demand. The name change was intended to communicate the purpose of the card as a replacement for checks, and to distance the card from the word “debit,” which many consumers associated too closely with the word “debt.”

As the banks began to issue the debit card, debit volumes rose. By 2002, the number of debit transactions exceeded credit transactions in the USA, and by 2003, worldwide debit transactions surpassed credit transactions by count and amount.

Conclusion

Why did it take nearly 30 years for debit volume to surpass credit volume? As I've argued, the reasons are more complicated than fears over losing revenues from lucrative credit cards. The banks and Visa disagreed over the necessary technological infrastructure, but they also disagreed over the balance of competition and cooperation, and which part of the bank should own the plans for an eventual EFT system.

One can also view the Visa debit card as the locus of a power struggle between the central Visa organization and its member banks. When Visa was formed, it was given a clear mandate by the member banks: fix the BankAmericard system. Everything the new organization did for its first five years could easily be seen as steps toward achieving that goal, but in Hock's mind, those were only the first steps towards creating a much broader electronic value exchange system. The debit card was the next logical innovation, but the membership saw it as a break from the organization's mission. This power struggle continued throughout the 1970s and 80s, eventually leading to a showdown between Hock and the member banks. But that is another story...¹³

Further Reading

- Brooke, P. (1975). NBI debit card is named ENTRÉE. *American Banker*, 22(8), 1.
- Hock, D. (2005). *One from many: VISA and the rise of the chaordic organization* (p. 8). San Francisco: Berrett-Koehler.
- Larkin, K. (1994). cited in Nocera Joe *A Piece of the Action* (p. 308). New York: Simon & Schuster Paperbacks.
- Lee, W. A. (2004). Visa debit card volume tops credit worldwide. *American Banker*, 21(4), 11.
- Stearns, D. (2011). *Electronic value exchange: Origins of the VISA electronic payment system*. London: Springer.

Bibliography

- Bátiz-Lazo, B., & Smith, A. (2016). The changing industrial organization of epistemic communities during Hong Kong's progression towards a cashless society (1960s–2000s). *IEEE Annals in the History of Computing*, 38(2 (Apr-Jun)), 54–65.
- Brooke, P. (1975). NBI debit card is named ENTRÉE. *American Banker*, 22(8), 1.

¹³To find out what happened, see Stearns David, *Electronic Value Exchange*, (Springer-Verlag, London, 2011), Chapter 9.

- Hock, D. (1973). Speech before the 1973 ABA Charge Card Conference.
Reprinted in the *American Banker*, 3, 10.
- Hock, D. (2005). *One from many: VISA and the rise of the chaordic organization*.
San Francisco: Berrett-Koehler.
- Larkin, K. (1994). cited in Nocera Joe, *A Piece of the Action*. New York: Simon & Schuster Paperbacks.
- Lee, W. A. (2004). Visa debit card volume tops credit worldwide. *American Banker*, 21(4), 11.
- Stearns, D. (2011). *Electronic value exchange*. London: Springer-Verlag.

16

Protecting Plastic: Credit Card Fraud in Historical Perspective

Sean H. Vanatta

Introduction

If the credit card and credit card fraud were not born simultaneously, they must have emerged within minutes of each other. This idea was suggested to me by an astute archivist after I briefly explained the thrust of this research, and it struck me as a useful observation—but one which, as a historical matter, is not strictly accurate. On the contrary, payment card systems flourished in the USA for decades before card fraud became a serious problem for card issuers and for society more broadly. In America’s bustling department stores, payment cards were embedded within cultural and institutional systems that made fraud difficult to perpetrate and seldom profitable. It was when cards moved out of department stores and into wider circulation that they became targets for widespread criminal consumption.

This chapter, then, will be concerned with explaining why credit card fraud became prevalent in the USA beginning in the late 1950s and

S.H. Vanatta (✉)
Princeton University, Princeton, NJ, USA
e-mail: svanatta@princeton.edu

showing how card issuers tried to prevent it. In doing so, it will consider three interrelated frameworks for thinking about early card fraud—as a *network* problem, a *cultural* problem, and a *legal* problem—and briefly trace the solutions card issuers pursued to combat them. By the 1970s, travel firms and banks were largely successful at overcoming early fraud challenges, but ironically (for us, tragically for them) fraud only increased as enterprising criminals found new ways to profit from pilfered plastic.

From Department Stores to the Diners Club

Starting in the 1910s, and accelerating through the mid-twentieth century, Americans learned to use payment cards in department stores. These early cards were part of mechanized account management technologies: Cards identified customers who had been granted access to credit and efficiently organized their credit purchases through integrated accounting and billing systems. But department store card systems were not merely mechanical; they were also cultural, *embedded* in interpersonal relationships that emphasized appropriate credit use.¹ Credit managers rigorously interviewed card applicants, a ritual that made obtaining a card difficult and, as importantly, reified cultural expectations of debt repayment. Retail management and control practices, such as low credit ceilings and floor limits, further curtailed the amount of credit at the disposal of card users—and potential misusers. Retail card systems were designed to minimize the opportunities for fraud, and it happened infrequently.

In the 1950s, a second type of payment card emerged alongside closed department store systems: the universal credit card. Entrepreneurs imagined new card networks that would allow users to access credit, either while traveling and dining for business or while shopping at a variety of individual merchants rather than a single department store. These innovations took the form of travel cards offered by firms like Diners Club (1950) and American Express (1958), and as credit cards

¹Granovetter, Mark. "Economic Action and Social Structure: The Problem of Embeddedness." *American Journal of Sociology* 91, no. 3 (November 1985): 481–510.

offered in California by Bank of America (1958) and in New York City by Chase Manhattan Bank (1958). Instead of being confined to a single retailer, these card networks included thousands of merchant participants and quickly spanned the nation and the globe. They also inspired a sense of wonder, wrapped up in American postwar ideals of technological progress, consumer abundance, and boundless prosperity.

Yet universal payment cards were also vulnerable, and criminals quickly learned how to manipulate card systems to get what they didn't pay for. Few early statistics are available, and card issuers were eager to downplay fraud concerns that might undermine the trust necessary to undergird far-flung payment systems. Yet fraud posed a serious threat to universal card issuers. Much early innovation was aimed at fraud prevention, directed both at improving system oversight and shaping the habits of merchants and consumers. As firms became more sophisticated in their fraud prevention methods, however, criminals invented new ways of taking illicit profits from card networks. To protect their cards, firms eventually concluded they would need government help. In the 1960s, travel firms took the lead in mobilizing politically to secure criminal laws that would deter and punish fraud. Yet these efforts to shift fraud risk to the state also brought closer regulatory scrutiny, especially when banks, caught between dueling imperatives to make credit convenient and make credit safe, disregarded consumer protections in their efforts to rapidly grow their card businesses in the late 1960s.

Credit Card Fraud: A Network Problem

To build their card networks, travel firms and banks had to recruit sufficient merchant-participants and consumer-cardholders to make participation worthwhile for each group. Economists now call this the "two-sided market problem," but in the late 1950s, card issuers were confronting this chicken-and-egg dilemma for the first time. Issuers framed the solution as one of rapidly growing network size, so that the volume of transactions would offset the high fixed costs of building card networks. To generate volume, firms focused on aggressively recruiting

consumers, hoping that once consumers had cards and wanted to use them, retailers would feel compelled to join the network for fear of losing customers.

Rapid recruiting, though, exposed card firms to the risk that they might inadvertently issue cards to consumers who would not pay promptly and to fraudsters who never intended to pay at all. Travel firms aggressively solicited applications through newspaper advertising and with application forms distributed by their merchant partners. By relying on paper applications sent through the mail, these firms eliminated face-to-face interaction from the credit granting process, *disembedding* credit from the interpersonal encounters that had sustained rituals of repayment in department store systems. Instead, card firms relied on credit bureaus to screen applicants. But these firms were a far cry from the nationally integrated information brokers we know today. In one embarrassing example featured in *Time* magazine, 19-year-old Joseph Miraglia, a middling office clerk, convinced several travel firms to issue him cards in the fall of 1959, which he then used to fund a 5-week, \$10,000, international adventure. In their network building efforts, banks took the disembedding process one step further. In the 1960s, banks created lists of potential cardholders and then mailed millions of unsolicited credit cards directly to these consumers. Unsolicited mailing eliminated even the pretense of sober reflection required in filling out an application, while mailing cards in bulk made them easier to steal.

Not only were card issuers exposed to danger when building their networks through consumer solicitations, they also had to rely on merchant partners of varying trustworthiness. Card issuers wanted their merchant partners to serve as the front line of fraud defense, and incorporated system control procedures, like floor limits, into merchant contracts. But compelling merchants to adopt rigorous cardholder screening at the checkout counter was difficult, because it made card use inconvenient, annoying consumers. Honest merchants violated their agreements to do favors for trusted customers; dishonest merchants colluded with criminals to rip off card systems. Issuers had little recourse: they might quietly discontinue a merchant's contract whose store was the site of frequent fraud, but they were reluctant to hold merchants legally accountable because the negative publicity would hurt network growth.

Credit Cards Fraud: A Cultural Problem

As their networks expanded in the 1950s, card issuers, especially travel firms, confronted a disparity between the value their cards represented as powerful financial instruments and the values the public associated with them, specifically carefree luxury and irresponsible indulgence (fueled, in no small measure, by the firms' own advertising). By making credit convenient these cards upended notions of economic value based on time spent working and saving, while issuers' rush to distribute cards suggested that the objects themselves were not specifically valuable. As a practical matter, insouciant adventure invited carelessness. "The card-carrying public has made the frauds easier by not treating their cards as valuable property," New York's *Herald Tribune* reported in March 1961. "Many are mislaid by inebriated celebrants in night clubs, bars, beach clubs, and restaurants."

Indeed, the press often portrayed card fraud as a symptom of the unsettled and mutable social world credit cards were creating. Americans consumed tales of high profile card criminals in articles like *Life* magazine's "The Great Credit Card Spree," which placed the illicit practices of "a veteran forger" next to other new and legal—if incredible—lifestyles that cards made possible. A chic divorcee enjoying decadent meals with a mere dollar in her pocket, a tycoon no longer bothering with cash, a publicist carrying cards from 87 different issuers: in this company the card thief was just a darker shade in the grey spaces of the newly-anonymous credit card economy. In these portrayals, larcenous card users trounced purveyors of indulgence at their own game. Their antics did not seem to endanger the daily financial lives of ordinary citizens; instead, they confirmed the perils of impersonal credit.

But of course, while card company executives wanted the public to associate their products with fun and adventure, they could not afford rising incidents of theft and fraud. Card issuers adopted two strategies to impress responsibility on their customers. First, they included and began to emphasize liability provisions in their contracts that made cardholders responsible for charges made on lost or stolen cards. Hypothetically such liability was unlimited, providing good reason for consumers to keep a tight hold on their cards; but liability was also mostly hypothetical, since card

issuers did not actively enforce these clauses for fear of alienating customers. In a sense, liability clauses began as cultural admonitions, not binding legal contracts. Card issuers also sought to change the narrative about card crime, shifting the media's emphasis from jaunty swindlers to more menacing portraits of professional criminals. To do so, they recast the locus of victimization. In cases where a scammer obtained a card from the firm—perhaps through a false application—and then used it extravagantly, the firm seemed to suffer from its own profligate product. But when criminals began stealing cards from legitimate card users, and thereby threatening to incur liabilities on their behalf, they presented a danger to society at large.

Credit Card Fraud: A Legal Problem

Card firms used the narrative of professional criminals to confront a third problem: In the 1950s, credit card "fraud" was not, technically, a crime. Within the states, most law dealing with property crimes derived from English common law, and was fractioned into separate offenses: obtaining by false pretenses, larceny, and embezzlement—that were distinguished by specific categorical elements—like taking title (false pretenses), possession by trespass (larceny), or converting proper custody (embezzlement). These categorical distinctions left considerable gaps for criminal actions involving credit to fall through. An example will illustrate: to commit larceny, a criminal had to deceive A, and through deception harm A. But with universal cards, a criminal using a stolen card deceived the merchant (A)—by pretending to be a legitimate user—but harmed the card issuer (B)—who would ultimately pay for the merchandise. In the absence of specific statutes demarcating credit card crime, it was difficult for prosecutors to indict criminals and for firms to deter fraud.

Card issuers thus sought to harness the power of the state to protect their card networks by securing increasingly rigorous laws against credit card fraud. In the early 1960s, state legislatures began to pass fraud laws that made the unauthorized use of a credit card a crime. But as criminals' schemes became more sophisticated, these early laws proved insufficient. As a result, in 1965 American Express commissioned a comprehensive model state law that sought to criminalize every harmful practice its

authors could think of. The firm's attorneys then mobilized a nationwide lobbying network of banks, gasoline companies, and other travel firms, which aimed to "have the model act in every state within two years."

For a time it seemed like cards would be well protected and in 1967, the law was enacted in California, North Carolina, and Florida. But travel firm efforts to make their systems safe were complicated by bankers' efforts to make credit convenient. As American Express worked to enact strong card fraud legislation in the late 1960s, banks' unsolicited card mailings reached a fever pitch. Hundreds of banks entered the credit card field and mailed tens of millions of cards to unsuspecting consumers. Card firms, which lawmakers could not readily distinguish, seemed to be endangering consumers, since unsolicited mailing invited card theft and enticed consumers into unsustainable debts. In several states, lawmakers who had been pursuing card fraud legislation pivoted away from protecting card issuers from criminals, toward protecting consumers from card issuers.

Making Credit Convenient Versus Making Credit Safe

Taking a closer look at how this moment played out in New York might be helpful, as it illustrates a critical tension between making credit convenient and making credit safe that still plagues card issuers. America's capital of commerce was also the capital of credit card fraud, and New York was a critical state in American Express's campaign to enact comprehensive fraud legislation. The legislation was shepherded by State Senator John R. Dunne, who had become concerned about card fraud after reading a series of articles documenting mafia involvement in widespread card abuse. "As the war on narcotics and gambling is intensified," he explained, "trafficking in lost or stolen cards becomes a growing source of income for the underworld."² For several years Dunne was rebuffed by state administration officials who argued that the Amex law would help the card indus-

²John R. Dunne, quoted in Tom Renner, "Credit Cards: A Tighter Lid; Drive Seeking 'Laws with Teeth,'" *Newsday*, 15 Feb. 1967.

try, not consumers. Nevertheless, in March 1969 the legislature enacted a modified version of the law. According to American Express vice president Milton Lipson, the new law “without question will be an effective weapon against professional criminals.”³

Yet, as Dunne would later testify at a congressional hearing, “During the course of our study an avalanche of new credit cards—the bank credit card, in particular—appeared throughout the state, bringing new problems for the consumer as well as an intensification of prior problems faced by law enforcement officials.”⁴ Unsolicited mailing was a bonanza for New York criminals. In February 1968, for instance, 18 unsolicited Citibank credit cards were responsible for \$80,000 worth of fraudulent charges in Bronx County alone, numbers that rose to 60 and \$125,000 two months later. Banks’ aggressive mailing campaigns shifted the political narrative, changing the focus of state policymakers from protecting card issuers from criminals, to protecting the consuming public from unsafe credit. Dunne turned his attention immediately to unsolicited mailing. At state hearings focused on card fraud, he upbraided executives for not taking greater precautions with their card marketing and introduced legislation restricting unsolicited mailing and limiting cardholder liability for lost or stolen cards.

New York influenced a concurrent legislative effort at the federal level, where consumer concerns about unsolicited mailing were paramount. Policymakers were suspicious that card firms accepted fraud as a cost of doing business—a cost of establishing and maintaining large card networks—which firms hoped to shift to the government. In a congressional hearing, the Bronx Assistant District Attorney who oversaw the Citibank fraud investigation argued that “it appears that from a business standpoint the firms may be willing to sustain losses to some extent through illegal use which may be less than the necessary expense to cut these losses.” If card issuers wanted a policing partner in the state, policymakers insisted, they would need to place the security of their systems above their marketing efforts, and proactively protect consumers using their card products.

³ Milton Lipson, quoted in “Tough Credit-Card Bill Signed,” *Newsday*, 27 Mar. 1969.

⁴ *The Plastic Jungle: Hearings Before the Subcommittee on Postal Operations, United States House of Representatives*, 91st Cong. 233 (1969 and 1970) (Statement of John R. Dunne, New York State senator).

Looking Forward

In November 1970, Congress banned unsolicited credit card mailing and limited consumer liability for lost and stolen cards to \$50, shifting the risk of fraud from consumers to card issuers. Over the next decade, card issuers overcame the problems that challenged the industry in the 1950s and 1960s. As their networks became more robust, and cards became widely-used forms of payment, firms could more readily enforce merchant and cardholder agreements designed to combat fraud without jeopardizing the system as a whole. Such enforcement meant that card users and merchants began to take their responsibilities to the system more seriously. And with consumers protected by federal law, card issuers succeeded in securing strong criminal laws at the state level.

But over the same period—and into the present—card fraud expanded rather than contracted. As a representative for the American Bankers Association explained to a congressional panel in 1983, the combined fraud losses for the Visa and MasterCard systems grew from \$11.7 million in 1972 to \$125.8 million in 1982 (not adjusted). It may be that card networks—at least in the USA—suffer some fundamental flaw. Criminals, the hidden entrepreneurs in this story, have continued to innovate. Fragmented competition might still pressure firms to place marketing above security. Fragmented networks now composed of consumers, merchants, issuing banks, acquiring banks, network operators, and other intermediaries, may present too many weak links in the age of the global Internet. Perhaps other contributors to this volume will have insights.

Whatever the reason, if the credit card and credit card fraud were not born together, they certainly seem inseparable now.

Further Reading

- Balleisen, E. (forthcoming). *Business fraud: An American History*. Princeton: Princeton University Press.
- Hyman, L. (2011). *Debtor nation: A History of America in red ink*. Princeton: Princeton University Press.

Macaulay, S. (1966). Private legislation and the duty to read—Business run by IBM machine, the law of contracts and credit cards. *Vanderbilt Law Review*, 19(4), 1051–1122.

Bibliography

- Dunne, J. R. (1967, February 15). quoted in Tom Renner, Credit cards: A tighter lid; drive seeking 'laws with teeth'. *Newsday*.
- Granovetter, M. (1985, November). Economic action and social structure: The problem of embeddedness. *American Journal of Sociology*, 91(3): 481–510.
- Lipson, M. (1969, March 27). quoted in Tough credit-card bill signed. *Newsday*.
- Statement of John R. Dunne, New York State Senator. (1969 and 1970). The plastic jungle: Hearings before the subcommittee on postal operations, United States house of representatives. 91st Cong. 233.

17

Mondex and VisaCash: A First (Failed) Attempt at an Electronic Purse

Bernardo Bátiz-Lazo and Tony Moretta

Caution: Hard Lessons Ahead!

Mondex and Visa Cash were launched some 20 years ago, based on the latest technology, backed by global banks and payment schemes such as MasterCard and Visa. They even worked with mobile phones, could be used on buses, had digital identity applications and even enabled micropayments over the Internet. However, despite successful public trials on a global basis they never moved beyond that stage and the world carried on with credit cards, debit cards, cash and cheques.

Today the world is awash with new companies and technologies trying to move consumers away from their traditional forms of payment to new digital, and mostly mobile formats, but despite some big backers such as Google and the global mobile phone operators, these haven't yet taken

B. Bátiz-Lazo
Bangor University, Bangor, UK

T. Moretta (✉)
Digital Jersey, St Clement, Jersey
e-mail: tony@moretta.co.uk

off in the developed world beyond the trial stage. This chapter looks back at the experiences of Mondex and Visa Cash to elucidate lessons the new mobile payment providers learn from their failure.

This chapter looks at questions such as: why didn't electronic cash take off 20 years ago? Why were Mondex and Visa Cash so ahead of their time? Which came first—the issuer or the acquirer? What happens when you put technology first? Why are new forms of payment so difficult to get right? Why does the industry keep making the same mistakes again and again? What lessons can mobile payments learn from the failures of the past? Will the new entrants to the payments world defeat the incumbents?

The First Electronic Purse

The idea of embedding a microprocessor into a plastic card as a new form to store value and solve on the spot payment was born in 1989. At the time Tim Jones and Graham Higgins worked for NatWest (a bank now part of the RBS Group) and had been commissioned to study the retail payment market on the back of the fiasco to create an electronic funds transfer network.¹ In further consultation with David Everett, NatWest technical experts, Jones and Higgins believed smart chip² technology was the way to deliver the first generation of electronic cash. That is, allowing two cards to exchange information offline securely thanks to “sophisticated” cryptography. The aim thus was to create an electronic purse, that is, a device for storing value securely and paying for small-scale transactions in single or multiple denominations.

¹ During the 1980s British retail banking was dominated by four institutions: Barclays, NatWest, Midland and Lloyds. In collaboration with the Bank of England they tried but failed to establish an electronic fund transfer at point-of-sale network. Whereas the banks had successfully worked together in a number of projects to automate retail banking in the 1960s and 1970s, this was a bruising experience as the banks fell out with each other. Out of this “fiasco” emerged the first debit cards: Switch and Barclays Connect (later on Maestro and Visa Debit respectively).

² The smart chip technology is credited to the design of Roland Moreno in 1973. Then in 1985 a French phone company adopted it as a way to eliminate coins in public telephones. The NatWest team proposed using a 512 bit RSA entity with asymmetric cryptography which yielded very high resistance to tampering.

The concept was presented to and gained the long-term support of Derek Wanless, who would become the bank's chief executive.³ The challenge for Mondex (and later on Visa Cash) was that other than in public telephones in France, at the time there was no chip-based accepting infrastructure at all within retail payments anywhere in the world.

Consultants and technology firms (especially Japanese) were invited to collaborate in the design. These firms contributed not only in determining the characteristics of the microprocessor chip and supporting system but also the physical infrastructure, such as point-of-sale (POS) terminals at merchants, converting ATMs (to allow checking balances and recharging) and pay phones, as well as devices that enabled monetary exchange between individuals.

In early 1991 prototypes underwent substantial consumer research (including trials at staff canteens). Among other things, market research suggested some preconditions of widespread acceptance, namely the "need" for universal coverage (i.e. card reading technology everywhere), the desire that it emulated cash in every way (including no central record of transactions) and the ability to lock the card (so that if lost, no one could steal the money on it). Realising the need for more resources, in 1992 NatWest attracted investments from British Telecom (BT), which alongside its telephone network brought technical expertise in transmission technology; and Midland Bank, which contributed with experience in payments but more importantly a large customer base and ATM network.⁴

As NatWest gained confidence with the research and development of its electronic purse, it opened talks with banks in several countries while looking to establish Mondex as the worldwide standard for cash cards.⁵ HSBC quickly signed off a franchise for Southeast Asia (including China and India). There was also interest from banks in France and Germany.

³ Derek Wanless (1947–2012) joined NatWest in 1967 and moved up through the ranks to be appointed General Manager for UK Branch Business in 1988. In 1992 he took on the role of Group Chief Executive (until 1999 when he was ousted).

⁴ In 1992 HSBC acquired the Midland Bank. This gave HSBC a substantial market presence in the United Kingdom. As part of the takeover conditions for the acquisition, HSBC was required to relocate its world headquarters from Hong Kong to London in 1993.

⁵ As part of the process of gaining regulatory approval, the Mondex team made the case to the Bank of England that it would be uneconomical to tamper with the device.

By 1995 over £50 million had been invested in developing Mondex and the technology was deemed mature enough to launch a major two-year pilot project in the city of Swindon, in the South West England. This was the very first public trial of Mondex. Card accepting devices were placed in some 700 shops, restaurants and large retailers, as well as Swindon's buses and car parks. But deployment only took place within the main commercial area of the city; that is, there were none to be found in shops and other establishments on the outskirts. Retailers also found that the Mondex reader was a stand-alone special terminal, and cash registers had to be converted to make direct purchases. The number of cards issued reached 14,000 cards. But these individuals were banking with NatWest and Midland cards, leaving between half or more of the customer base without it. Alongside the card, individuals had to carry a small "reader" to learn the balance or purchase a "wallet" to provide transfer between cards, recall previous transactions or "lock" the card. Other devices enabled the card to be incorporated into a telephone (for loading or balance enquiry, personal computer or computer network).

In spite of the apparent shortcomings, MasterCard was encouraged by developments around electronic purses and in 1997, purchased the controlling rights for Mondex International from NatWest. MasterCard paid about the same amount that the bank had spent in research and development. MasterCard hoped the investment would open opportunities for cross-selling and cross-packaging with its existing product portfolio, as well as automatic licencing agreements with its existing merchandisers. Indeed, by 1998 the drive to make Mondex the world's leading electronic wallet resulted in franchise in 53 countries across all five continents. Trial projects in other parts of the world continued in cities such as Hong Kong, New York as well as in Canada and the UK. To a large extent all of them replicated Swindon's model (and results).

In 1998, three years after it had begun the Swindon trial it began to wind down. The take up rate had been about 25 per cent of the customer base, which was high for an experiment of this type but not enough to secure a "critical mass" of customers and retailers. The way Mondex had been deployed made it very hard for the retailer to eliminate cash as well as the costs and hassle that came with it, which was the main sales proposition of Mondex. At the same time, consumers who actually had a

Mondex card, continued using cash as not every retailer, parking, vending machine or the like would accept it (in many instances as the Mondex team had not specifically targeted them).

The one big exception and where Mondex was indeed successful had been the six British university campuses using the electronic wallet and in particular that of Exeter, which is very much self-contained and the card was really universal as, regardless of their choice of bank, every single student and staff member was issued with a NatWest Mondex card. It then became not only their debit card but also their student union card, ID card, and card for the photocopier, library, bars inside and outside campus, payphones, buses, etc., at the point of replacing every other card the student had. The result was the card was used significantly to the extent of displacing cash in most of the shops and other businesses in and around the university. NatWest also observed a significant rise in the number of account holders as individuals switched bank. In short, in the Exeter trial, Mondex did achieve universality in both the issuing and the acceptance.

The case of Exeter suggested that there was not a problem with the concept in many ways but the big problem was how to make it universal. And this was not achieved. To little surprise for the most part Mondex failed to deliver. Moreover, a contemporary study found eight out of ten adults using cash for payments of £10 or less whereas other studies expected cash to increase in importance, in spite of developments in payment technologies (such as debit cards and electronic purses).⁶ By 2005 all Mondex trials had ended and the businesses quietly wound down.

Visa Enters the Race for the Electronic Cash Card

The race to establish a global standard for small value payments heated up when Visa launched its electronic purse in 1997. As it is well known, Visa was (and is) MasterCard's long-term rival and perhaps the only other significant force in retail payments. The contest fast became international as

⁶Brown-Humes, Christopher. "Mondex to Wind Down 'Electronic Purse' Trial". *Financial Times*, July 6, 1998, p. 8.

Visa issued 50,000 of its cards in Hong Kong within a month of starting its trial. Although Visa Cash worked very similar to Mondex, Visa Cash would not offer person-to-person payment.

As had been the case for Mondex, Visa Cash would trial its device in several small towns in Europe and North America. Then it scaled up to test its concept in the northern city of Leeds in 1998. But interestingly, the banks behind the scheme (which almost by definition had not been part of Mondex such as Lloyds and Barclays) were planning to follow the same format of deployment as Mondex had done in Swindon: placing terminals only in retailers, issuing cards only to their own customers, and running a very similar marketing campaign, and so on. Unsurprisingly, Leeds had exactly the same initial results as Mondex had in Swindon.

This led to an initiative within the VisaCash team to change acceptance mid-trial by incorporating Visa Cash into the buses, all the car parks and pay & display and other small value transactions. Then they observed an increase in usage and acceptance as consumers could now use it in places where paying with cash was difficult. Car park and bus operators really liked it as it made significant economies in managing banknotes and coins.

But retailers and shops were still dealing with cash. The banks behind the trial then assessed what it would take to reach universal use. However, none of them were ready to assume the cost of replacing the accepted infrastructure that would secure nationwide universality. The decision was then taken not to roll out VisaCash throughout the United Kingdom.

Visa continued with trials elsewhere. At the same time, Mondex was losing steam, given that it was much more expensive to implement.

Then in 1998, it linked up with American Express and ERG, an Australian smartcard group, in purchasing a majority stake on a device developed by Belgian banks (a consortium called Banksys). Thus was born Proton Worldwide International with the specific aim of contesting Mondex in developing the standard and infrastructure for cards carrying chips that replaced cash. At the time, Proton had 30 million customers and 20,000 terminals in 15 countries.⁷ However, Mike Keegan (chief executive of Mondex International) stated that unlike Mondex, Proton

⁷ Buckley, Neil. "AmexCo and Visa join Smartcard Group". *Financial Times*, July 30, 1998, p. 34.

cards were not interoperable from one country to another.⁸ However, Visa's strategy was different to MasterCard in that Visa was trying to have its members agree on a common international specification for interoperability (while allowing each country to decide on its own specification) rather than impose a standard as was the approach by MasterCard.

But in spite of Visa's initial success, the truth of the matter was that no one saw the case for electronic cash or electronic purse ahead of introducing chip-based credit and debit. Electronic purse schemes thus faded as debit cards overtook credit card payments and became quite popular in e-commerce. At the same time, the focus of the banks was for Visa and MasterCard to work towards a common, global, chip-based, security standard for credit and debit transactions (i.e. Europay, MasterCard, Visa or EMV) to ensure security and global acceptance so that MasterCard and Visa cards can continue to be used everywhere.

Teaching Points

This chapter has summarised what Mondex and VisaCash could do and where they could be used. To some extent they both were victims of the hype about the start of the cashless society. Mondex originated in a British bank. It grew across borders thanks to the backing of large domestic players and later on, by MasterCard, one of the two dominant international payments platforms. VisaCash was born as a competitive response to Mondex while backed by another dominant international player (in collaboration by American Express). Given that they were technologically advanced and had the support of significant players, we must ask why they failed and what we can learn from them. Moreover, and to the extent that many make the same mistakes, we must ask why companies forget (at their peril).

To be fair, no one in the early to mid-1990s could foresee the emergence and commercial success of the Internet, let alone PayPal. The former turned obsolete Mondex's large investment to develop secure, offline transfer of value, while it was the latter that effectively ended a big

⁸ Idem.

part of the space the early electronic purses could occupy at the dawn of e-commerce. So what has changed over the past 20 years to make electronic cash work today? Key ideas we can rescue from the experience of Mondex and VisaCash include:

1. Consumers don't always know what they want. So be wary of consumer research.
2. Mondex was placed in all those places where one would typically use coins and banknotes but without a business proposition to merchants or customers to abandon cash. It has to allow both to do something new and that can't be done with another form of payment. Otherwise you can't make a case to add another layer to small value payments.
3. The long-term success of the Octopus card in Hong Kong would suggest that specific, large volume, low tipping point applications offer stronger platforms for growth than universal coverage within a defined area. However, this has to be taken with some care given the replacement of Oyster cards by Visa and MasterCard Marquee cards in London's Underground as well as Mondex's success in university campuses.
4. The challenge for Mondex (and later on Visa Cash) was a lack of chip-based accepting infrastructure. There is a similar problem for mobile payments today, as issuing the app or solution is quite easy in terms that you can control as the issuer. Acceptance is much harder particularly when infrastructure is not in place to support your payment solution.
5. Financial institutions seem more motivated by fear than opportunity. It was certainly the case of Visa and American Express entering electronic purses in the same way, perhaps, that banks have joined Apple Pay today, given that it has not really taken off and very few of their account holders actually have iPhone 6 or above, a smaller percentage have set up Apple Pay on their phones and even a smaller number actually use it regularly. Yet many banks have spent large amounts on marketing on a very niche product. This would suggest many bankers fear being left out or seen as not taking advantage of the latest technology. Yet at the same time, they are helping Apple to become an accepted mark within retail payments.

Further Reading

- Jones, T. (2015, August 8). 20 years from the launch of Mondex. *Tomorrow's Transactions Podcast.* <http://www.chyp.com/podcasts/tim-jones-tibado/>. Accessed 22 Dec 2015.
- Tomkin, N., & Baden-Fuller C. (2000). *The mondex case study: The development of an electronic purse*, Ref 200–003-1. (London: City University).

Bibliography

- Brown-Humes, C. (1998, July 6). Mondex to wind down 'electronic purse' trial. *Financial Times*.
- Buckley, N. (1998, July 30). AmexCo and Visa join Smartcard Group. *Financial Times*.

18

The Matter of Payment

Joe Deville

Introduction

On a recent visit to Paris, I was struck by a subtle but significant shift in an age-old French institution: the purchase of freshly baked goods at the local *boulangerie*. Having proffered cash for my croissants, the server corrected me: ‘ah no, the machine’ (I paraphrase), gesturing towards a rather boxy interruption at one end of the pastry-filled vitrine. It was an automatic till, with a slot for inbound coins and notes and a small tray for change (see Fig. 18.1).

These devices are now a common feature of French towns and cities: already in 2012, roughly one in six of the around 2600 bakeries in Paris had installed the technology.¹ Manufacturers claim a number of benefits

¹ Dora Courbon and Elandaloussi, “Ma Boulangère, à La Caisse, Est Honnête, Propre, et Automatique - Rue89,” *L'Obs*, November 24, 2012, <http://rue89.nouvelobs.com/rue89-eco/2012/11/24/ma-boulangere-la-caisse-est-honnete-propre-et-automatique-237282>

J. Deville (✉)
Lancaster University, Lancaster, UK
e-mail: j.deville@lancaster.ac.uk



Fig. 18.1 Automatic till, Paris, 2016 (Source: Author's own photograph)

for merchants, including increased levels of control and efficiencies when dealing with cash—speeding up transactions (even if not in my case!), reducing errors, preventing theft, detecting counterfeit currency, and so on. They also highlight a crucial further benefit, that of hygiene: ‘vendors no longer have to handle often “dirty” coins or notes in a hygienic environment alongside foodstuffs’.² I suspect that it is this quality that has led to their specific adoption in bakeries, where the server’s hand otherwise has to routinely move between cash and a range of unwrapped food.

These devices provide a way into the proposition that I want to make in this chapter: that the *matter* of money—the tangible qualities of sets of transactional objects and how they are handled and move around—matters. In this example, we see it in the attempt to solve the problem of

²Crisalid, “Caisse Automatique et Monnayeur Pour Caisse Enregistreuse: Gestion Automatique Des Espèces (self Check-Out),” *Crisalid*, 2016, <http://www.crisalid.com/materiel-caisse-enregistreuse/caisse-automatique-especes>; author’s translation.

microscopic unwanted guests that become attached to cash as it is passed from hand to hand. My particular focus will not be on contamination, however, but on two other forces: adaptation and calculation. The first concerns changes over time in the stuff of money itself, the transformations payment devices have had to undergo to function successfully as money. The second relates to how exactly the material properties of money, once settled, might shape the financial decisions we make. My primary attention will also not be on cash but the payment card, including the most archetypical payment card of them all: the credit card.

The Matter of Money

The question of the materiality of money is a subject that has largely been bypassed in social scientific discussions. In theories of money, when questions of the relationship between money and the material properties of objects are addressed, it is almost exclusively in discussions about the role played (or not) by the valuable materials that have at different places and times been assumed to underpin monetary value (whether gold, cowrie shells, or, with Bitcoin, processing power). In the meantime, the role of the objects that do the work of *transferring* value has largely passed unremarked. This extends from classical monetary analysts—Georg Simmel³ and Karl Marx⁴ for instance—to more recent attempts to update monetary theory, which has ranged from seeking to affirm core tenets of Marx's monetary theory,⁵ to providing money's indelible relationship to social and financial debt,⁶ to describing the socially constructed and symbolic meanings that become attached to monies.⁷

³ *The Philosophy of Money* (London and New York: Routledge, 2004).

⁴ e.g. *Economic and Philosophic Manuscripts of 1844*, trans. Martin Milligan (Moscow: Progress Publishers, 1974), 118–124; *Capital*, vol. I (Harmondsworth: Penguin, 1976).

⁵ e.g. Costas Lapavitsas, *Social Foundations of Markets, Money and Credit* (London: Routledge, 2003).

⁶ e.g. Geoffrey Ingham, *The Nature of Money* (Cambridge: Polity Press, 2004).

⁷ e.g. Chris A. Gregory, *Savage Money: The Anthropology and Politics of Commodity Exchange* (Amsterdam: Harwood Academic Publications, 1997); Viviana Zelizer, *The Social Meaning of*

If we were to stop a minute, however, to take the briefest look around at the evolving landscape of payment technologies, this absence would seem peculiar. It is clear that the issuers of payment cards recognise the significance of the materiality of monetary objects, being ever-keener to convince us of the benefits of making considered decisions, not just about what to buy but how to buy. Take the following fairly standard sales pitch to consumers about the benefits of contactless payment:

It's fast: Touch your contactless card or device against the reader to pay in seconds. It's easy: There is no need to find cash and you can easily track your purchases on your statement or your banking app. It's secure: [...] They have the same protection as chip & PIN payments, making them safer than cash.⁸

As so often in the story of the proliferation of new payment devices,⁹ this is not just about making customers' lives easier. There are not only the apparent benefits for merchants (again, being about reducing the costs of handling and protecting cash), but also the benefits that extend jointly to merchants and issuers: adopting contactless may lead to fewer so-called 'abandoned sales'—faster transactions means shorter/quicker queues and less customers deciding they don't have time to wait—and markedly higher average transaction values than cash, with a report by a UK payments trade body noting that customers may otherwise be 'constrained' by the amount of cash they have on them.¹⁰ So, if these claims were to be borne out, a conceivable outcome of the widespread adoption of contactless might be more money

Money: Pin Money, Paychecks, Poor Relief, and Other Currencies (Princeton, NJ: Princeton University Press, 1994).

⁸The UK Cards Association, "The Benefits of Contactless," *The UK Cards Association*, accessed January 12, 2016, http://www.theukcardsassociation.org.uk/contactless_consumer/the_benefits_of_contactless.asp

⁹See: Joe Deville, *Lived Economies of Default: Consumer Credit, Debt Collection and the Capture of Affect* (London: Routledge, 2015).

¹⁰The UK Cards Association, "Guide for Retailers: Accepting Contactless and Higher Value Contactless Payments" (London: The UK Cards Association, 2015), 12, http://www.theukcardsassociation.org.uk/wm_documents/UK%20Cards%20Guide%20for%20Retailers%20Contactless%20FINAL.pdf

flowing into merchants' coffers. In the long run it should also mean more transaction fees being paid from merchants to issuers (capped in the EU at 0.2 % and 0.3 % for debt and credit cards respectively) for the millions of additional payment card transactions that will take place, although for now many issuers are discounting these fees for contactless transactions, to incentivise merchants to help get the network established.¹¹

When it comes to the materiality of contactless payment devices, we can detect at least two intersecting dynamics. The first is what might be called *adaptation*: contactless payment devices have had to adapt to fit into the worlds of both users and merchants. This speaks on the one hand to questions of design: contactless payment devices come at the end of a long process of experimentation, both with technologies of contactless information exchange (including the Near Field Communication (NFC) technology contactless depends on) and with varied forms of contactless payment, from transport payment cards to the 'Speedpass' offered to US gas station users in the late-1990s.¹² On the other, it is about convincing merchants and users to respectively facilitate and learn the new tapping/waving 'gestural system'¹³ that the often inappropriately named 'contactless' implies. The second dynamic is *calculation*: when assertions are made about the uptake in contactless increasing average transaction value, this is a claim about how different payment devices impact on users' calculative practices. The suggestion is that the payment device's precise sociotechnical, material arrangement can affect economic decision-making.

These two dynamics are not restricted to contactless payment. They have a history. In what follows, I will give a brief insight into how some of this has played out, while also introducing further contemporary examples.

¹¹ HM Treasury, "Interchange Fee Regulation: Consultation Response" (London: HM Treasury, 2015), 6, https://www.gov.uk/government/uploads/system/uploads/attachment_data/file/466783/Interchange_fee_regulation_response.pdf

¹² Barclaycard, "Hands off: A Short History of Contactless Technology," December 6, 2014, <http://my.barcapint.com/news/contactless-timeline>

¹³ Bill Maurer, "Extinct by 2020: The Swipe," *Visa: Tech Matters*, April 28, 2015, <http://visatech-matters.tumblr.com/post/117620133955/extinct-by-2020-the-swipe-bill-maurer-director>

Adaptation

As David Stearns¹⁴ has documented in his comprehensive history of the Visa card, the conventional swipe-based payment card that is so familiar today was an accomplishment that required the interaction of myriad forces. A number of commercial organisations began to experiment with non-cash forms of payment provision in the early to mid-twentieth centuries, ranging from credit-providing department stores, to experiments with petrol payment devices by the oil industry, to the airline industry's introduction of charge cards, to the development of travel and entertainment cards, notably by Diners Club in the 1950s and later in the decade by American Express. These variously developed the expertise that would be necessary in the development of the infrastructures of payment that now dominate. In the progression to credit cards as we know them today, individuals also played a crucial role—Stearns, for instance, documents the huge impact on the credit card industry made by Dee Hock, Visa's founder and first CEO, who was crucial to the success of first the BankAmericard and then Visa more generally. This relates notably to his ideas about how organisations should function—in this case informed by a version of systems theory—and about money itself, in which he made what was then the rather radical observation that the future of money lay ever less in the hands of states, imagining a future in which the money system could well 'fall to those who were most adept at handling and guaranteeing alphanumeric value data in the form of arranged particles of energy'.¹⁵ In the context of the rise of Bitcoin, this prediction seems uncannily accurate.

Cutting through all this are issues of material adaptation. Indeed, even in Hock's futurology, in which he effectively postulates a takeover by forms of digital money, materiality resurfaces in the mention of how the specific arrangements of particulate matter will be important as related to how they transfer energy (read: information). And when it comes to the gradual accumulation of organisational expertise about payments, much

¹⁴ *Electronic Value Exchange: Origins of the VISA Electronic Payment System* (London; New York: Springer, 2011).

¹⁵ Ibid., 45.

of this concerned how to manage the material problem of payment. This is about how to get devices in the hands of users, in the shops of merchants, and about how to make sure these devices reliably transfer value and obligations to and from all the parties concerns. Much of Stearns' book, then, is about the iterative processes of material adaptation that were required to shift from a situation where the overwhelmingly dominant transactional medium for the everyday consumer was cash, to the present day where digital payment devices are gaining evermore ground.

This is partly about the materials that have at different times lent the payment device their tactility and shape. One of the contemporary payment card's ancestor's was the 'charge-a-plate'. These involved metal plates, often stored in leather holders, onto which customer information was embossed which, when combined with a suitable imprinter, loaded with a form of carbon paper, could (relatively) reliably transfer a customer's information to a sales draft.¹⁶ The original Diners Club card, meanwhile, was made of simple cardstock, which American Express eventually superseded in the late 1950s with one of the first of the now ubiquitous plastic cards.¹⁷ Another earlier variant was the SimPlan system, developed by IBM for oil companies and launched in 1955, which involved another type of plastic credit card on which information was stored and transferred to a reader via sets of punched holes.

It also relates to the technologies that these different devices have variously hosted, in which battles have been fought around which technology will dominate. As a glance at your own payment cards will tell you, embossing was successfully transferred to the new world of plastic cards and has remained ever-present (even if the carbon copy transfer method is increasingly rare). SimPlan's particular hole punching approach, by contrast, never caught on. There is also the near ubiquitous black stripe on the reverse of payment cards: the 'magstripe'. These allow the card to store information encoded onto magnetic tape, a function that is now of course being increasingly taken over by the embedded microchip. It itself overcame competition from the so-called 'Magic Middle'—the idea was

¹⁶ Ibid., 8.

¹⁷ Ibid., 13, 16; see also: Joe Deville, "Paying with Plastic: The Enduring Presence of the Credit Card," in *Accumulation: The Material Politics of Plastic*, ed. Jennifer Gabrys, Gay Hawkins, and Mike Michael (London: Routledge, 2013), 87–104.

very similar to the SimPlan system: information was encoded in small holes that were punched in a layer that was sandwiched between the separate outer plastic layers. They were thus hidden from view, but the reader into which the card was inserted would be able to detect them via infrared.¹⁸

Such technological struggles are partly stories about competition and organisational strategy. The Magic Middle, for instance, failed amongst other reasons because its creator, Citibank, could not convince enough banks to pay a licensing fee for its proprietary technology, which the American Banker's Association, which controlled the magstripe, did not (*ibid.*). But these are also stories of material adequacy: the Magic Middle, which Citibank asserted was securer than the magstripe, was, however, more expensive to produce. The magstripe at that time was, then, an adequate enough material solution to a key problem of data storage and transfer.

It is around such intersecting dynamics of organisational competition, struggles over material adequacy, as well as the inevitable capacity for certain technologies to after a time achieve certain hard to shift forms of 'lock-in',¹⁹ that transformations in the material stuff of payment have historically turned, and continue to do so. Along the way, we can observe the sometimes gradual, sometimes rapid process of material adaptation that have allowed payment devices of various sorts to fit evermore snugly into both our purses and wallets and the networks of value transfer they dip in and out of.

However, the material significance of payment devices extends further: to their impact on acts of economic calculation.

Calculation

The proposition that monetary devices can shape calculative practices is counter-intuitive. It is likely that for most of us, our practical engagement with monetary objects relates most of all to their ability to transfer value

¹⁸ Stearns, *Electronic Value Exchange: Origins of the VISA Electronic Payment System*, 145–146.

¹⁹ see: Michel Callon, "Techno-Economic Networks and Irreversibility," *The Sociological Review* 38, no. S1 (May 1, 1990): 132–61, doi:10.1111/j.1467-954X.1990.tb03351.x.

sufficiently effectively from one place or person to another. This might relate to sheer material presence or absence: having the cash to satisfy an obligation (or not), having access to the borrowing facility that a credit card brings with it (or not), and so on. Or it might be about sociotechnical dependability—very much connected to the kinds of issues payment providers have continually worked on, as already described—our attention being drawn to the payment device when it fails to transfer value as we would like: when an embedded chip stops functioning, when valid coins are rejected by a vending machine, when a server refuses a large denomination note.

And yet, once again, if we look around us, it is clear that in subtle ways attempts *are* being made to connect decisions about what to spend money on to *how* this money is to be spent.

One dimension of this concerns choices over who to spend with in the first place. This can be detected in the advertising that routinely surrounds modes of payment. Late 1950s press adverts for American Express's new credit card explicitly highlighted its plastic composition as an attractive product feature.²⁰ More generally, payment card issuers have in their advertising repeatedly sought to draw customers towards them by positioning payment card transactions as fast, modern and efficient in contrast to cumbersome cash.²¹ Or, half a century after the launch of the Amex card, as contactless started to come on stream in 2008, we find the leading UK credit card provider Barclaycard again focusing its customers' attention on the mechanism of payment, in this case in a TV ad. Set to the tune of 'Let Your Love Flow' by the Bellamy Brothers, the ad follows an office worker apparently incongruously stripping off to his underwear in a bland looking workplace, before exiting the building via a waterslide tucked away at the back of the stationary cupboard. As he travels through the city (never leaving the seemingly endless slide), he effortlessly pays for some shopping and the subway. The advert in fact ended up as a minor viral hit, having to date garnered over 2 mil-

²⁰ Deville, "Paying with Plastic: The Enduring Presence of the Credit Card."

²¹ Deville, *Lived Economies of Default: Consumer Credit, Debt Collection and the Capture of Affect*; Felix Stalder, "Making Money: Notes on Technology as Environment" (University of Toronto, 2001).

lion views online.²² The central message is clearly that contactless is easy and that, when combined with a credit facility, it allows life to proceed utterly unimpeded.

In such examples, it is in part the distinctiveness of new payment media that offers an opportunity for marketing work. There seems to be a general assumption within the industry that people do in fact care about how they spend, that the use of particular transactional media is an embodied and emotional experience, and that if a particular issuer addresses these registers of daily life through its payment systems better than its rivals, they can gain a competitive advantage.

There is also evidence that simply giving individuals access to specific forms of payment can affect their spending habits. We have already seen hints of this, in the claims being made about contactless to merchants: to put it bluntly, that giving customers more opportunities to spend contactlessly will encourage them to spend more. A number of studies within behavioural psychology, meanwhile, are showing evidence that payment cards encourage greater spending than cash alone: the suggestion, in part, is that cash puts an inherent brake on spending by simple virtue of the user having to handle it and count it out.²³ And there are also rare snippets of experimental evidence from within the credit industry itself, which have revealed radically different outcomes from sending an individual a credit application form, as compared to a credit card direct. In one late 1960s experiment, before the unsolicited mailing of credit cards was outlawed, card recipients were asserted to be over 25 times more likely to be active users of credit than those who received application forms alone.²⁴ While more research on these effects are needed, we should by no means assume that money is the transparent medium it is often considered to be.

²² See: <https://www.youtube.com/watch?v=1WlRcXIO5ik>. View count 2,199,764 on 22nd January, 2016.

²³ Jashim Kahn, "Cash or Card: Consumer Perceptions of Payment Modes" (Auckland University of Technology, 2011); Jeffrey Lapuz and Mark D. Griffiths, "The Role of Chips in Poker Gambling: An Empirical Pilot Study," *Gambling Research: Journal of the National Association for Gambling Studies (Australia)* 22, no. 1 (June 2010): 34; Dilip Soman, "The Effect of Payment Transparency on Consumption: Quasi-Experiments from the Field," *Marketing Letters* 14, no. 3 (October 1, 2003): 173–83, doi:10.1023/A:1027444717586.

²⁴ See: Deville, *Lived Economies of Default: Consumer Credit, Debt Collection and the Capture of Affect*.

Conclusion

As I have sought to show in this brief chapter, we should pay the material stuff of payment closer attention. Monetary objects are carefully calibrated sociotechnical assemblages—or *agencements*, as a certain branch of economic sociology would have it²⁵—that have sought to adapt to the intertwined needs and desires of users and merchants, and whose sophistication is increasing rapidly (and I haven't even been able to talk about the likes of Apple Pay, Google Wallet, and Square). This alone should draw our attention. And yet it becomes all the more significant when combined with the fact that payment devices might be shaping our calculative actions. It is beyond trite to observe that money matters to life. What is less well understood is how matter matters to money. By delving beneath the surface of payment cards and by looking at their effects on our behaviour, this chapter has tried to give a sense of just how important the stuff of money may be.

Further Reading

- Dodd, N. (2014). *The social life of money*. Princeton: Princeton University Press.
Maurer, B. (2015). *How would you like to pay? How technology is changing the future of money*. Durham: Duke University Press.

Bibliography

- Barclay Card Advert: Waterslide 2008. (2016). <https://www.youtube.com/watch?v=1WlRcXIO5ik>. View count 2,199,764 on 22nd January.
Barclaycard. (2014, December 6). *Hands off: A short history of contactless technology*. <http://my.barcapint.com/news/contactless-timeline>.

²⁵ Michel Callon, “An Essay on the Growing Contribution of Economic Markets to the Proliferation of the Social,” *Theory, Culture & Society* 24, no. 7–8 (December 1, 2007): 139–63, doi:10.1177/0263276407084701; Ian Hardie and Donald MacKenzie, “Assembling an Economic Actor: The Agencement of a Hedge Fund,” *The Sociological Review* 55, no. 1 (2007): 57–80; Liz McFall, “The Agencement of Industrial Branch Life Assurance,” *Journal of Cultural Economy* 2, no. 1 (2009): 49–65.

- Callon, M. (1990). Techno-economic networks and irreversibility. *The Sociological Review*, 38(S1), 132–161. doi:[10.1111/j.1467-954X.1990.tb03351.x](https://doi.org/10.1111/j.1467-954X.1990.tb03351.x).
- Callon, M. (2007). An essay on the growing contribution of economic markets to the proliferation of the social. *Theory, Culture & Society*, 24(7–8). doi:[10.1177/0263276407084701](https://doi.org/10.1177/0263276407084701).
- Courbon, D., & Elandaloussi, N. (2012). Ma Boulangère, à La Caisse, Est Honnête, Propre, et Automatique – Rue89, *L'Obs*, <http://rue89.nouvelobs.com/rue89-eco/2012/11/24/ma-boulangere-la-caisse-est-honnete-propre-et-automatique-237282>.
- Crisalid. (2016). Caisse Automatique et Monnayeur Pour Caisse Enregistreuse: Gestion Automatique Des Espèces (self check-out). *Crisalid*. <http://www.crisalid.com/materiel-caisse-enregistreuse/caisse-automatique-especes>; author's translation.
- Deville, J. (2001). *Lived economies of default: consumer credit, debt collection and the capture of affect*; Felix Stalder, "Making money: Notes on technology as environment". University of Toronto.
- Deville, J. (2013). Paying with plastic: The enduring presence of the credit card. In J. Gabrys, G. Hawkins, & M. Michael (Eds.), *Accumulation: The material politics of plastic*. London: Routledge.
- Deville, J. (2015). *Lived economies of default: Consumer credit, debt collection and the capture of affect*. London: Routledge.
- Gregory, C. A. (1997). *Savage money: The anthropology and politics of commodity exchange*. Amsterdam: Harwood Academic Publications.
- Hardie, I., & MacKenzie, D. (2007). Assembling an economic actor: The agencement of a hedge fund. *The Sociological Review* 55(1), 57–80.
- HM Treasury. (2015). *Interchange fee regulation: Consultation response*. London: HM Treasury, https://www.gov.uk/government/uploads/system/uploads/attachment_data/file/466783/Interchange_fee_regulation_response.pdf.
- Ingham, G. (2004). *The nature of money*. Cambridge: Polity Press.
- Kahn, J. (2011). *Cash or card: Consumer perceptions of payment modes*. Auckland: University of Technology.
- Lapuz, J., & Griffiths, M. D. (2010). The role of chips in poker gambling: An empirical pilot study. *Gambling Research: Journal of the National Association for Gambling Studies (Australia)*, 22(1), 34.
- Marx, K. (1974). *Economic and philosophic manuscripts of 1844*. (trans: Milligan M.). Moscow: Progress Publishers.
- Marx, K. (1976). *Capital* (Vol. I). Harmondsworth: Penguin.

- Maurer, B. (2015, April 28). Extinct by 2020: The swipe. *Visa: Tech Matters*. <http://visatechmatters.tumblr.com/post/117620133955/extinct-by-2020-the-swipe-bill-maurer-director>.
- McFall, L. (2009). The agencement of industrial branch life assurance. *Journal of Cultural Economy*, 2(1), 49–65.
- Simmel, G. (2004). *The philosophy of money*. London/New York: Routledge.
- Soman, D. (2003). The effect of payment transparency on consumption: Quasi-experiments from the field. *Marketing Letters*, 14(3), 1. doi:[10.1023/A:1027444717586](https://doi.org/10.1023/A:1027444717586).
- Stearns, D. L. (2011). *Electronic value exchange: Origins of the VISA electronic payment system*. London/New York: Springer.
- The UK Cards Association. (2015). *Guide for retailers: Accepting contactless and higher value contactless payments*. London: The UK Cards Association. http://www.theukcardsassociation.org.uk/wm_documents/UK%20Cards%20Guide%20for%20Retailers%20Contactless%20FINAL.pdf
- The UK Cards Association. (2016). *The benefits of contactless*. The UK Cards Association. http://www.theukcardsassociation.org.uk/contactless_consumer/the_benefits_of_contactless.asp. Accessed 12 Jan 2016
- Zelizer, V. (1994). *The social meaning of money: Pin money, paychecks, poor relief, and other currencies*. Princeton: Princeton University Press.

19

The Russian Payments Scheme: Politics, Innovation and the Cash Problem

Daniel Gusev

One Day That Changed It All

The morning of the March 21, 2014, was particularly chilly in Moscow, Russia, a country where temperatures vary widely and change unpredictably. The country's political decision-making reflects the same weather fluctuations as years of indecision being cast aside by rapid and lavish nation-building, be it the Sochi Olympics, the G20 Summit in Saint-Petersburg, Skolkovo innovation hub or many other vanity elements that manifested an era of high commodity prices.

That day in March of 2014 saw some of the same spell of political weather, followed by a storm that people living in a particular building at Gashek Street in Moscow felt. They were no weathermen, but office workers at the Moscow office of Visa International, the credit card company. They were trying to acclimatize their business to the ramifications

D. Gusev (✉)

Partner, Digital Space Ventures, Berlin, Germany
e-mail: daniel@digital.space

of the recent political storm. They had only recently participated in a big marketing partnership with Qiwi,¹ the ‘cash-meets-digital payments’ platform, and had lobbied hard for the National Payments Bill not to come into effect and dismantle their vital interests in a promising market, where the number of Visa cards issued surpassed 100 million (as of the second quarter of 2013).

Yet, the damage was done and there was little they could do. That morning of the 21st of March, they received notice from San Francisco, California that Visa HQ would suspend its links with several of Russian Visa-issuing banks (all members of the VisaNet network). The decision, they were told, was pursuant to the US Department of the Treasury’s Office of Foreign Assets Control (OFAC) placing VisaNet on the list of entities under sanctions. This was a direct response by the US government to the deteriorating situation in East Ukraine and its Crimean region.²

The response to official US sanctions in Russia was to throw the nationalism-driven rhetoric into “overdrive”. It also brought to an end to talks between the international players and regulators in the payment space. The local payment industry was then tasked to build a local structure that would permit:

- Uninterrupted retail payments for Russian users in case of external *force majeure*;
- A retail payments system that was untraced and otherwise out of the control of any international bodies (particularly those governed by US law);
- To capture greater financial inclusion as its great potential had been missed out by the intrinsic motivation of card usage in Russia.

¹ Qiwi is a publicly traded Russian payment service provider headquartered in Nicosia that operates electronic online payment systems primarily in Russia, Kazakhstan, Moldova, Belarus, Romania, the United States, and the United Arab Emirates.

² A quick referendum was going to take place that would result in the region to be annexed by Russia the following week.

A Short Historical Background of Retail Digital Payments in Russia

Card as a Cash Carrying Token

The surge in card payments in Russia largely coincided with the consumption boom of the early 2000s. At the time, retail banks began to issue customers with revolving credit as attached to a card, and encouraged the adoption of ATMs for cash withdrawals (earning them considerable fees—a practice which still brings key profit for some banks, despite their adoption of digital payment instruments). Payment cards were previously accessible to a minority of high net worth individuals. This made their entrance rather piecemeal. Payment cards were then offered as part of the so-called ‘salary projects’, where banks pushed employers to pay through direct account deposit while issuing debit cards to employees. Banks hoped people would start using cards instead of cash. But customers were generally unsatisfied—they preferred cash and were also unhappy with having to pay withdrawal fees at ATMs to access their cash.

With the benefit of hindsight, the latter may have contributed to the slow uptake of other digital means of payment. This, according to a study by McKinsey, implied that the geographical proximity of an ATM strongly correlated with the amount people kept in their accounts.

Cash Meets Online Bill Payments

As people formed a habit of pressing on the buttons of ATMs, they began to require services (such as paying utility bills) that banks were initially unready to meet. This was to change with the introduction of a new agent—a cash kiosk: a simple ‘reverse ATM-machine’ where people would (pre)pay for utility bills and purchase mobile airtime. It could be said that the payment revolution in Russia started with the roll out of the prepaid kiosk. As the latter proved an effective and convenient alternative to queuing at bank branches, the size of this network grew quickly and by

2009 it surpassed 100,000 machines. This was significantly bigger than the ATM network. Prepaid kiosks not only helped to mould user behaviour but also their expectations as banks later had to face users demanding greater simplicity in the user-interface of the ATMs.

The prepaid kiosks network was scalable and sustained the growing demand for the payment services as its installation was managed by retailers and not banks - and the former knew best where to place them to monetise the footfall. As the network grew in size several players competed for domination. Eventually, Qiwi came to be the only operator. Launched in 2007 through the merger of two large players, Qiwi grew to launch an initial public offering (IPO) in NASDAQ, the US-based electronic market, in the early summer of 2013. The business model of Qiwi was to install kiosks amongst shop owners and other places of large "footfall" to charge end-user-fees (later changed for service discount fee, which was split between payment network operator and the agent).

Later on the kiosks started offering wallet functionality by enabling people to store monetary balances without payment of interest for later use, while Qiwi increased its revenues by using those balances to finance trading in the money market. However, due to the fact that deposits were largely unidentified, they opened up the network to allow money laundering but that is a completely different story. The point is that the prepay network was critical in the formation of an online purchase culture in Russia.

A Russian National Payments Scheme then started to emerge and formed gradually thanks to, first, a consumption boom and greater availability of credit, which together demanded new and swift payment methods. Second, newly formed habits of consumption in terms of user experience and simplicity put pressure on financial institutions to match or even offer better services. Specifically, prepaid payment tokens by a non-bank were well received by the majority of people and attracted substantial new users. These paved way for online banking distribution. Interestingly, this was a realization of McLuhan's promise of 'medium being the message', hence people changed their behaviour around the objects they acquired. As banks responded, demographics started to dictate the terms of engagement, or rather disengagement from classical branch-banking.

Made in Russia: The Background and Prospects of MIR Card as Part of Russian Payments Scheme Play

Fast forward to early 2010s. This can be characterized as the time when mobile communication largely paved the road for online-led consumption and the multiplicity of platforms people could use, simultaneously requiring the development of an identity service (both for the purpose around know-your-customer and to fulfil plain purchases). This period also saw the emergence of e-wallets (as supported by their bill payment expertise) and acquired loan provision by third parties. In some instances, they also offered a person-to-person (P2P) money transfer.

The multiplicity of tasks for any scheme is hard to fathom, but the story behind the national payment scheme in Russia started a bit differently.

The Early Perturbations

The variations around creating a local scheme started largely out of the idea of launching a national identity scheme. This involved the services rendered by municipalities, medical insurance and federal services identifiers, which would all be written on a plastic card's chip. One secure domain of this chip could potentially be dedicated to a national payment protocol for these governmental services.

The idea of a digital payment service took hold amongst state authorities as people continued to pay in cash for government services at the same time that a substantial volume of taxpayers' money went unaccounted for due to corruption and the dire state of the services. Although some people talked about the availability of services through "the cloud" via a mobile phone, the idea of plastic was easier to grasp mentally as most politicians would prefer holding one card in their hand when inaugurating the scheme.

The announcement of a national scheme was made in October 2005. Initially, the favourite to launch the native-Russian system was Sbercard, which was established in the mid-1990s as a proprietary processor of

Sberbank. In September 2007 and through Sbercard, Sberbank started connecting state-owned enterprises and banks. Efforts continued even under the change of management at Sberbank—which tried to promote the mandatory adoption of the card. For instance, the mandatory medical insurance could be covered by the state through these cards while also functioning as a form of identification.

Hence payment was not the main selling point amongst the population but would come as a value-added service. The aim was to slowly educate the population to pay for goods with a card. This card could also be used in ATMs. This gave Sbercard a further advantage given that by early 2010 Sberbank had the largest number of ATMs in the country as its fleet stood at 23,000 machines or approximately 50 % of all such devices installed in Russia.

Meanwhile other players like the Agricultural Bank or a state-owned VEB banking corporation (which had taken over the Russian Post's Svyaz Bank in late 2008) competed for government attention to launch a local scheme. However, Sberbank had the technology and processing experience. Not surprisingly, Sberbank gained the upper hand (although heavy lobbying also played a part).

Part of the logic to support the existing scheme (and thus benefiting Sberbank) was due to the government's desire develop a “universal credit” scheme link to a special account while aiming to gain greater efficiency in distributing discounts, exemptions and subsidies to the “base of the pyramid” (i.e. the most socially insecure segments of the population).

Politicking

The projection of one million cards issued in the first years sounded promising. However, implementation of this bold strategy soon met with some key obstacles such as card production and lack of end-user acceptance, while estimates of the cost of implementation skyrocketed (with estimates varying between USD 5 and 15 billion according to the source).

The need to protect the national payment infrastructure from a sudden cut-off from abroad again became top of the agenda following WikiLeaks revelations pointing to an alleged spying by US agencies using Russian

payments metadata. The liberal wing of the government started to oppose the scheme as it still struggled to see the whole picture.

The state, however, did not lose its vigour to promote payment nationalism and pushed harder to limit the liberties of international payment systems sending payment data to their international centres. But they were cautious about alienating banks who would have surely sent the local switch costs over to customers and impeded the otherwise notable digital payment promotion.

Then came the passing of the much ambitious National Payment Bill, finally adopted in June of 2011. At first this bill stipulated that Visa, MasterCard and other international payment operators should create reserves as collateral for any eventuality. These reserves had to be on a par with revenues they made from sales in Russia. The international payment schemes challenged these proposals on the argument that they were following the long chain of switches, where the initial call to close a correspondent bank abroad 'kills' all international transfers between an acquiring bank and an originating bank. Ultimately the move to develop a national payment scheme that coupled with an identification scheme resulted in the watering down of the bill. As a result it only served to define prepaid and e-money transaction requirements. It was also important to frame the emerging financial inclusion initiatives as well as the proliferation of e-commerce services.

March 21, 2014: After the Bang

In 2013 some 707 million rubles in losses had been accumulated after five years of trying to turn the Sbercard into a Universal Electronic Card (UEC). A renewed attempt to launch a national scheme took place in early April 2014. Learning from years of mistakes, bloated costs and unmet expectations, the government chose an independent operator while building the scheme from scratch. This time the government chose a veteran payment industry person to lead the project, specifically the former CEO of the large processing company UCS. The project was then funded to the tune of 4.5 billion rubles to cover telecommunication, data centres and R&D costs.

The first trial of local transactions was announced to have taken place in April 2015. The new company had concentrated on approving the technical specifications of the card, named MIR and announced to the public in November 2015. However, the first estimates on the issuance cost were estimated to be 1.5 times higher than those for Visa and MasterCard issued cards.

Looking into the Future of Russian Retail Payments

The government made a right choice at a wrong time—launching a commercially independent operator to free it from the pressures of special interests but making it at a time when consumption was driven down by currency depreciation, economic instability and social insecurity.

The coverage of basic infrastructural needs for “card present” will take time to develop. At the same time, existing players are already building up loyalty around mobile-based payments, pushing innovation further into “the cloud” and away from hardware. This will challenge plans by the government to build a national scheme based on technology such as plastic cards, which has remained roughly unchanged for two or more decades.

New payment solutions require new thinking and a new approach to tackle the payment needs of an emerging economy in the twenty-first century rather than just cater to the business-to-business (B2B) segment. The scheme has to create a solid end-user proposition. Otherwise it will remain a pure infrastructural back-up player. This redundancy will only be necessary if the adversarial nature of international relations requires Russia to find alternative solutions to keep its payments systems going independently from the rest of the world. Doing so seems difficult amid the limitations of a budget squeeze. Instead it requires opening up the innovation funnel by incentivizing outward-in innovation, working alongside indigenous technology start-ups to add value to the token of payment that is yet to become a favourite token of trust.

Bibliography

- Daniel, G. (2015a, July 16). A story about ID-scheme in Russia. *Personal Blog*. <http://blog.danielgusev.com/2011/07/story-about-id-scheme-in-russia.html>
- Daniel, G. (2015b, December 24). Social card and national payment card processes in Russia are stuck. Too many questions. *Personal Blog*. <http://blog.danielgusev.com/2009/12/social-card-and-national-payment-card.html>
- Daniel, G. (2015c, December 18). Visa recently got itself a new global m-payment platform: QIWI" *Personal Blog*. <http://blog.danielgusev.com/2012/12/visa-recently-got-itself-new-global-m.html>
- Daniel, G. (2015d, June 26). Prepaid business in Russian is much more than just payment—It's access. *Personal Blog*. <http://blog.danielgusev.com/2013/06/prepaid-business-is-much-more-than-just.html>
- Ostroukh, A. (2015, December 15). Russia launches local electronic payment system. *Wall Street Journal*. <http://www.wsj.com/articles/russia-launches-local-electronic-payment-system-1450195940>

20

Who Holds Credit Cards and Bank Accounts in Uruguay? Evidence from Survey of Uruguayan Households Finances

Graciela Sanroman and Guillermo Santos

Introduction

Uruguay, a small Latin American open economy shows a very heterogeneous access to basic financial services. The proportion of households outside the financial system remains high and firms and households rely heavily on cash and informal services to perform economic transactions. Access to financial services remains unequal despite Uruguay being quite homogeneous in terms of cultural characteristics such as language, ethnic origins and religious beliefs.

Until recently, Uruguay lacked a database with household financial information that could reveal which households are financially excluded/included and the reasons behind financial exclusion/inclusion. A recent survey conducted by INE (*Instituto Nacional de Estadística*) and Departamento de Economía Universidad de la República de Uruguay (DECON-UDELAR),

G. Sanroman • G. Santos (✉)

Departamento de Economía Universidad de la República de Uruguay
(DECON-UDELAR)

e-mail: guillermo.santos@cienciassociales.edu.uy

titled “Survey of Uruguayan Household Finances” (SUHF), constitutes a reliable and representative database with financial, sociodemographic and economic data.

The goal of this chapter is to study financial exclusion/inclusion in Uruguay by analyzing which household characteristics determine the probability of holding credit cards and banks accounts. Our study is close to that of Caskey (1981)¹ for US card holders and Tan et al. (2011)² for credit card holders in Malaysia.

Firstly, we estimate univariate probit models for credit cards and bank accounts and analyze which household characteristics explicitly determine the probability of holding these financial instruments. Afterwards, we estimate a bivariate probit, which tackles the presence of endogeneity by explicitly taking into account the correlation between the unobservable components of the two equations.

Results show that households with a higher income are more likely to hold credit cards and bank accounts. Education and working status are the other main determinants. A key result of the model is that households whose head receives their wage through bank accounts are more likely to hold credit cards. Taking into account the last result, we perform an exercise to assess the effectiveness on financial inclusion of a recent government measure to make it compulsory for employers to pay wages through bank accounts. Results indicate that both probabilities of holding a credit card and a bank account increase under that scenario.

Data

We use data from the first stage of the *Survey of Uruguayan Household Finances (SUHF1)* collected by the official *Instituto Nacional de Estadística (INE)* and DECON.

Table 20.1 shows descriptive statistics about households’ bank account holdings (checking or savings account). The proportion of households holding bank accounts is 49 %, and around 77 % of those also hold credit cards.

¹ Caskey Jean, “Determinants of credit card accounts: an application of Tobit Analysis”, *Journal of Consumer Research*, 8, 2 (1981): 172–182.

² Tan Andrew, Yen Steven and Loke Yiing, “Credit card Holders, Convenience Users and Revolvers: a Tobit Model With Binary Selection and Ordinal Treatment”, *Journal of Applied Economics*, Vol XIV, 2 (2011): 225–255.

Also the proportion of households holding a bank account is higher for those households whose head is an employee. The proportion of households accounting for credit cards is higher than the proportion of households owning a bank account, suggesting a deeper penetration of credit cards. The last result is not surprising because in Uruguay there are other financial institutions apart from banks that supply credit cards but not bank accounts. According to data, 62 % of households hold a credit card while around 60 % of those also have bank accounts. Like bank account holdings, the proportion of households holding credit cards increases with income. A life cycle pattern is observed for both bank accounts and credit cards.

Table 20.1 also shows some household statistic measures. Monthly household income is around 2500 US dollars on average, having the mean fifth quintile income around six times the income of the average of the first quintile. Data shows that the proportion of households whose head achieved a secondary school degree is 39 %, while the proportion of those who have a college degree is 8 %. Around 57 % of employees receive their salaries through bank deposits.

Background

At first, the researchers studied credit card holdings because of the quick spread of the instrument and the unequal access among population. Using data from a survey in Minnesota, Caskey (1981)³ estimated a Tobit model for the number of credit cards held by households and found that income, age, working status and holding a bank account significantly determine the number of credit cards. A similar approach was used by Tan, Yen and Loke (2011)⁴ to search for the determinants of credit card holdings in Malaysia. Their results were similar to those of Caskey.

More recently, other studies used probit models to analyze the determinants of credit cards and bank accounts holdings. Hogarth and O'Donnell (2000)⁵ analyzed bank account holdings using data from the 1995 wave of Survey of Consumer Finances. They concluded that

³Ibid.

⁴Ibid.

⁵Hogarth Jeanne and O'Donnell Kevin, "If you build it, will they come? A Simulation of Financial Product Holdings Among Low-to-Moderate Income Households". *Journal of Consumer Policy*, 23 (2000): 409–444.

Table 20.1 Sample statistics

	Descriptive statistics	Bank account holders	Credit card holders
Percentage of holders	% of households		
Also credit cards	49.38	62.73	
Also bank accounts	76.80		60.50
Income level (US dollars, annual figs. 2012 prices)	Mean		
Quintile 1	10,062.0	20.43	31.90
Quintile 2	17,481.0	35.07	52.31
Quintile 3	24,611.9	48.47	65.88
Quintile 4	34,534.5	64.96	75.09
Quintile 5	62,780.3	78.00	88.51
	% of	% of	% of
Age	households	households	households
Less than 20 years	0.32	11.55	21.77
20 < years old < 35	20.37	48.68	63.44
35 < years old < 50	31.07	49.61	65.41
50 < years old < 65	26.58	51.36	66.32
65 < years old < 80	16.64	47.80	58.55
More than 80 years old	5.03	47.96	40.87
Working status			
Inactive (students, unemployed, housekeepers, etc.)	7.16	28.87	46.02
Private employee	37.74	46.50	68.28
Public employee	13.32	78.94	76.94
Retired	20.95	46.87	56.92
Self-employed	20.82	45.26	55.19
Education level			
Elementary school achieved	100.00	49.38	62.73
High school degree not achieved	72.56	55.45	69.41
High school degree achieved	40.06	64.29	76.11
Tertiary education degree achieved (not university)	5.31	77.89	83.56
University degree achieved	8.44	79.84	87.01
Female	40.46	46.68	61.92
Location			
Montevideo	46.31	50.32	71.19
Rest of the country	53.69	48.57	55.44
Afro-descendant	3.96	30.78	49.50

(continued)

Table 20.1 (continued)

	Descriptive statistics	Bank account holders	Credit card holders
Informal	16.09	24.35	37.95
Female one person household	16.56	44.90	58.91
Employee and receiving salary through bank deposit	29.61	77.14	80.70
House owner	64.16	51.58	64.97

Source: ECH and SUHF1 (2012)

income, education, housing tenure and ethnic origins were significant for holding a bank account. Later on, Rhine, Greene and Toussaint-Comeau (2006)⁶ estimated a bivariate probit for the joint probability of being unbanked and using check-cashing services in the USA. Bivariate probit allow the authors to take into account unrestricted correlation between unobservables of these two equations.

Empirical Model

We estimate limited dependent variable models in which “holding a credit card” and “holding a bank account” are the dependent binary variables. Let y_1^* and y_2^* be latent variables, and define $y_2 = 1(y_2^* > 0)$ a relevant variable for y_1^* . It is possible to write down the latent model as:

$$y_1^* = z_i \delta_1 + \alpha_1 y_2 + u_1 \quad (20.1)$$

$$y_2^* = z \delta_2 + v_2 \quad (20.2)$$

Where (u_1, v_2) are independent of z , follow a bivariate normal distribution with zero mean and unit variance and $\rho_1 = \text{corr}(u_1, v_2)$,

⁶Rhine Sherrie, Greene William, Toussaint-Comeau Maude, “The Importance of Check-Cashing Business to the Unbanked: Racial/Ethnic Differences”. *The Review of Economics and Statistics*, 88 (2006): 146–157.

$$\begin{pmatrix} u_1 \\ v_2 \end{pmatrix} \sim N\left(\begin{pmatrix} 0 \\ 0 \end{pmatrix}; \begin{pmatrix} 1 & \rho_1 \\ \rho_1 & 1 \end{pmatrix}\right)$$

We observe $y_1 = 1[y_1^* > 0]$ and y_2 as previously defined. Notice that if ρ_1 is different from 0 (u_1 and v_2 are correlated), estimates of δ_1 and α_1 using a univariate probit for y_1 in (20.1) will be inconsistent due to y_2 being endogenous. Endogeneity could arise because of the presence of unobservable components that simultaneously influence the likelihood of bank account and credit card holdings. Firstly, we assume that ρ_1 equals 0 and estimate two unrelated probit models. Afterwards, we address the issue of endogeneity by estimating a bivariate probit model for the probability of holding at least one credit card and a bank account. The model is estimated by maximizing the joint likelihood. In this context the indicator variable of whether the household head receives his salary through a bank deposit is the instrument, and acts as the exclusion restriction. Thus, this variable belongs to z but not to z_I .

Results

We estimate the models using data from the *SUFH1*, which allow us to include a wide set of covariates, such as families' income, age, gender, education level and working status of the households' heads. Household size, housing tenure and regional covariates for residence and size of the city are also included. Moreover, an indicator variable of whether the household head is afro-descendant is included. We use an indicator of whether the household head receives his salary through a bank deposit.

The univariate probit estimations show that the household income, age, education level, gender and working status, significantly influence the likelihood of holding credit cards. Table 20.3 shows the marginal effects evaluated at the average sample values of covariates. Education influences the probability of credit card holdings: it increases by 7.0 percentage points if the household head has at least some secondary education with respect to those who only graduated from elementary school.

Table 20.2 Probit estimations

Dependent variable: credit card holding	1	2	3
Household income (log)	0.852*** [0.0382]	0.831*** [0.0384]	0.747*** [0.0397]
High school degree not achieved	0.195*** [0.0443]	0.198*** [0.0444]	0.189*** [0.0446]
High school degree achieved	0.00909 [0.0454]	-0.0016 [0.0455]	-0.0151 [0.0457]
Tertiary education degree achieved (not university)	0.131 [0.0899]	0.129 [0.0902]	0.12 [0.0907]
University degree achieved	0.0829 [0.0835]	0.0657 [0.0838]	0.0464 [0.0839]
Less than 20 years	-0.518** [0.255]	-0.532** [0.255]	-0.488* [0.255]
20 < years old < 35	0.0777 [0.0524]	0.0696 [0.0526]	0.0595 [0.0528]
50 < years old < 65	0.027 [0.0480]	0.0334 [0.0482]	0.0305 [0.0483]
65 < years old < 80	0.0324 [0.0697]	0.0418 [0.0697]	0.0251 [0.0700]
More than 80 years old	-0.560*** [0.0982]	-0.544*** [0.0981]	-0.552*** [0.0987]
Female	0.116*** [0.0439]	0.122*** [0.0440]	0.127*** [0.0441]
Household size	-0.0508*** [0.0138]	-0.0470*** [0.0139]	-0.0386*** [0.0140]
Rural, town or village (less than 5000 inhabitants)	-0.132** [0.0551]	-0.116** [0.0552]	-0.116** [0.0555]
Informal	-0.415*** [0.0579]	-0.374*** [0.0584]	-0.358*** [0.0587]
Afro-descendant	-0.226** [0.0884]	-0.208** [0.0886]	-0.205** [0.0888]
Single female with children	-0.0942* [0.0538]	-0.0911* [0.0539]	-0.100* [0.0541]
Inactive (students, unemployed, house keepers, etc.)	-0.424*** [0.0743]	-0.321*** [0.0769]	-0.357*** [0.0774]
Public employee	0.0618 [0.0599]	-0.101 [0.0686]	-0.122* [0.0688]
Retired	-0.215*** [0.0666]	-0.11 [0.0697]	-0.162** [0.0703]

(continued)

Table 20.2 (continued)

Dependent variable: credit card holding	1	2	3
Self-employed	-0.0575 [0.0543]	0.0242 [0.0566]	-0.0242 [0.0571]
House owner	0.041 [0.0382]	0.0455 [0.0382]	0.05 [0.0384]
Employee and receiving salary through bank deposit		0.296*** [0.0592]	0.179*** [0.0611]
Bank account			0.323*** [0.0392]
Constant	-8.341*** [0.382]	-8.258*** [0.383]	-7.458*** [0.395]
Regional dummies	Included	Included	Included
Mc Fadden Pseudo R^2	0.2027	0.2055	0.2128
Correctly classified	0.7368	0.737	0.7393
Observations	6882	6882	6882

Standard errors in brackets. *** $p<0.01$, ** $p<0.05$, * $p<0.1$

Dependent variable takes value 1 if the household own at least a credit card and 0 otherwise

Omitted variables: 35 <years old <50; private employee

However, the results show that the probability of holding a credit card does not significantly change among those who have had at least some secondary schooling.

A hump-shaped “life cycle” pattern is observed: those households whose head is younger than 20 years or older than 80 are less likely to hold credit cards. Results also indicate that the probability of owning a credit card increases by 4.5 percentage points if the household head is a woman, irrespective of whether she is a single mother. The household size effect is significant and negative. That could be rationalized by the fact that in Uruguay numerous families are more likely to be among the poorest. Households living in rural areas, small towns or villages are less likely to hold credit cards. The probability of holding a credit card decreases around 8.0 percentage points for afro-descendants.

Households whose head is formally employed are more likely to hold a credit card; formal workers easily fulfill requirements to hold a credit card. Households whose head is inactive or retired are less likely to hold

Table 20.3 Marginal effects after probit estimation

Dependent variables: credit
card holdings

	Model 2		Model 3	
	Marginal effects	Standard error	Marginal effects	Standard error
Household income (log)	0.310	0.014	0.278	0.015
High school degree not achieved	0.075	0.017	0.071	0.017
High school degree achieved	-0.001	0.017	-0.006	0.017
Tertiary education degree achieved (not university)	0.047	0.032	0.044	0.032
University degree achieved	0.024	0.031	0.017	0.031
Less than 20 years	-0.208	0.101	-0.191	0.101
20 < years old < 35	0.026	0.019	0.022	0.019
50 < years old < 65	0.012	0.018	0.011	0.018
65 < years old < 80	0.015	0.026	0.009	0.026
More than 80 years old	-0.213	0.039	-0.216	0.039
Female	0.045	0.016	0.047	0.016
Household size	-0.018	0.005	-0.014	0.005
Rural, town or village (less than 5000 inhabitants)	-0.044	0.021	-0.044	0.021
Informal	-0.144	0.023	-0.138	0.023
Afro-descendant	-0.080	0.035	-0.079	0.035
Single female with children	-0.034	0.020	-0.038	0.021
Inactive (students, unemployed, house keepers, etc.)	-0.124	0.030	-0.138	0.031
Public employee	-0.038	0.026	-0.046	0.026
Retired	-0.041	0.026	-0.061	0.027
Self-employed	0.009	0.021	-0.009	0.021
House owner	0.017	0.014	0.019	0.014
Employee and receiving salary through bank deposit	0.107	0.021	0.065	0.022
Bank Account		0.120		0.014

Note: Figures correspond to the average effects on the probability of holding a credit card

credit cards, but there are no significant differences between public or private employees and the self-employed.

Table 20.4 shows the estimation results of the univariate probit model for *bank account holdings* while Table 20.5 shows marginal effects evaluated at the average sample mean of covariates.

The probability of holding bank accounts increases with household income and with each additional educational level achieved. We do not find a clear-cut life cycle pattern but evidence suggests that some cohort pattern could be present. The household size negatively affects the probability of holding a bank account. Unlike the credit card model, gender, residence and ethnic origins are insignificant to determine the probability of holding bank accounts. In particular, the result that being an afro-descendant is significant for credit cards but not for bank accounts brings some evidence about discrimination in the market.

Table 20.4 shows that compared with private employees, households whose head is an employee at the public sector or is self-employed are more likely to hold bank accounts, while households whose head is inactive are less likely to hold one.

We include in both univariate models an additional dummy covariate (*Dsalary*) that indicates whether the household head receives his or her salary through a bank account, and add the dummy variable of having a bank account in the univariate model for credit cards.⁷ Including these variables does not alter previous results about other covariates in the probit for credit cards. Little changes are observed in the model for bank accounts.

The covariate *Dsalary* plays a key role: it is a relevant factor to determine bank account and credit card holdings and it is related with one of the targets of the law of financial inclusion currently under discussion in the Uruguayan parliament. If passed, this law would make it compulsory to pay salaries through bank accounts or through other similar instruments available in local financial system, as one of the measures to promote financial inclusion.

Households whose members receive their wage through a bank account are more likely to hold bank accounts and credit cards. The probability of holding a bank account and a credit card increases by almost 36 and 10 percentage points respectively if the household's head receives their wage through bank accounts. When the bank account variable is included in the model for credit cards we find that its marginal effect is around 10

⁷ Even though it is necessary to have a bank account to receive salaries through banks, 21 % of households who receive salaries in this way declared no to hold bank accounts. That could be rationalized by the fact that some households do not make use of the bank services apart from earning salaries, and can be interpreted as lack of financial literacy.

Table 20.4 Probit estimations

Dependent variable: bank account holdings	1	2
Household income (log)	0.900*** [0.0375]	0.845*** [0.0381]
High school degree not achieved	0.0906** [0.0451]	0.107** [0.0460]
High school degree achieved	0.151*** [0.0440]	0.116** [0.0450]
Tertiary education degree achieved (not university)	0.208** [0.0850]	0.185** [0.0859]
University degree achieved	0.195*** [0.0749]	0.130* [0.0758]
Less than 20 years	-0.531* [0.297]	-0.618** [0.314]
20 < years old < 35	0.153*** [0.0516]	0.138*** [0.0532]
50 < years old < 65	0.0144 [0.0473]	0.0414 [0.0485]
65 < years old < 80	0.126* [0.0690]	0.166** [0.0697]
More than 80 years old	-0.0309 [0.0969]	0.0211 [0.0972]
Female	-0.0583 [0.0428]	-0.0389 [0.0435]
Household size	-0.0920*** [0.0138]	-0.0790*** [0.0141]
Rural, town or village (less than 5000 inhabitants)	-0.0772 [0.0559]	-0.021 [0.0570]
Informal	-0.390*** [0.0594]	-0.253*** [0.0610]
Afro-descendant	-0.146 [0.0923]	-0.0856 [0.0943]
Single female with children	0.0472 [0.0535]	0.0577 [0.0544]
Inactive (students, unemployed, house keepers, etc.)	-0.142* [0.0759]	0.272*** [0.0798]
Public employee	0.643*** [0.0585]	0.146** [0.0663]
Retired	0.0347 [0.0657]	0.449*** [0.0706]

(continued)

Table 20.4 (continued)

Dependent variable: bank account holdings	1	2
Self-employed	0.139*** [0.0534]	0.486*** [0.0577]
House owner	-0.0574 [0.0378]	-0.0452 [0.0386]
Employee and receiving salary through bank deposit		1.012*** [0.0574]
Constant	-9.514*** [0.379]	-9.460*** [0.385]
Regional dummies	Included	Included
McFadden pseudo R^2	0.203	0.2372
Correctly classified	72.25%	74.69%
Observations	6882	6882

Standard errors in brackets. *** $p<0.01$, ** $p<0.05$, * $p<0.1$

Dependent variable takes value 1 if the household own a bank account and 0 otherwise

Omitted variables: 35 <years old <50; private employee

% while the dummy *Dsalary* remains highly significant and its marginal effect is at around 6 percentage points. However, those figures can not be interpreted as the expected increase in the proportion of households holding credit cards for various reasons. Firstly, making it compulsory to pay wages through bank deposits would affect only formal employees. Secondly, a “*bank account*” could be endogenous in the model for credit cards.

Many factors that influence access to the financial system could not be observable. For example, it is not possible to observe if a particular household asked for a credit card or obtained it in the context of aggressive promotions. Also, most of the people do not know how to follow the evolution of financial markets or face difficulties in evaluating the costs of financial services. That is particularly important in Uruguay due to a lack of financial market depth and penetration.

To allow for unrestricted correlation between these unobservables we estimate a bivariate probit model including the same covariates as in the univariate models.

Table 20.6 reports the bivariate probit estimates and shows that unobservables are correlated. Results for “*credit cards*” slightly change in com-

Table 20.5 Marginal effects after probit estimation

Dependent variables: bank account holdings	Marginal effects	Standard error
Household income (log)	0.337	0.015
High school degree not achieved	0.042	0.018
High school degree achieved	0.046	0.018
Tertiary education degree achieved (not university)	0.073	0.034
University degree achieved	0.052	0.030
Less than 20 years	-0.231	0.103
20 < years old < 35	0.055	0.021
50 < years old < 65	0.017	0.019
65 < years old < 80	0.066	0.028
More than 80 years old	0.008	0.039
Female	-0.016	0.017
Household size	-0.032	0.006
Rural, town or village (less than 5000 inhabitants)	-0.008	0.023
Informal	-0.100	0.024
Afro-descendant	-0.034	0.037
Single female with children	0.023	0.022
Inactive (students, unemployed, house keepers, etc.)	0.107	0.031
Public employee	0.058	0.026
Retired	0.177	0.027
Self-employed	0.190	0.022
House owner	-0.018	0.015
Employee and receiving salary through bank deposit	0.379	0.019

Note: Figures correspond to the average effects on the probability of holding a bank account

parison with the univariate model. Some variables are more significant and the magnitude of their influence is stronger than in the univariate model. That is the case of the variables afro-descendant, the dummy which indicates that the household head is a single female with children and working status. The results of the bivariate estimation for “bank account” do not show differences with respect to the univariate model which includes *Dsalary* as a control.

Figures in Table 20.7 correspond to average marginal effects on the joint probability of holding both a credit card and a bank account.

Table 20.6 Biprobit estimation

Dependent variable: bank account holding and credit card holding	Bank account	Credit card	r
Household income (log)	0.846*** [0.0380]	0.604*** [0.0613]	
High school degree not achieved	0.108** [0.0459]	0.167*** [0.0447]	
High school degree achieved	0.116** [0.0450]	-0.0339 [0.0458]	
Tertiary education degree achieved (not university)	0.181** [0.0854]	0.0918 [0.0900]	
University degree achieved	0.129* [0.0756]	0.0318 [0.0829]	
Less than 20 years	-0.641** [0.317]	-0.412 [0.253]	
20 < years old < 35	0.142*** [0.0530]	0.0389 [0.0528]	
50 < years old < 65	0.0383 [0.0484]	0.0239 [0.0478]	
65 < years old < 80	0.169** [0.0697]	0.00146 [0.0694]	
More than 80 years old	0.0224 [0.0972]	-0.541*** [0.0982]	
Female	-0.0407 [0.0434]	0.132*** [0.0437]	
Household size	-0.0786*** [0.0140]	-0.0260* [0.0145]	
Rural, town or village (less than 5000 inhabitants)	-0.0201 [0.0568]	-0.110** [0.0551]	
Informal	-0.251*** [0.0608]	-0.314*** [0.0615]	
Afro-descendant	-0.0793 [0.0940]	-0.189** [0.0882]	
Single female with children	0.0638 [0.0544]	-0.107** [0.0535]	
Inactive (students, unemployed, house keepers, etc)	0.276*** [0.0795]	-0.393*** [0.0745]	
Public employee	0.151** [0.0662]	-0.139** [0.0681]	
Retired	0.450*** [0.0705]	-0.235*** [0.0663]	
Self employed	0.488*** [0.0576]	-0.103* [0.0546]	

(continued)

Table 20.6 (continued)

Dependent variable: bank account holding and credit card holding	Bank account	Credit card	r
House owner	-0.0436 [0.0385]	0.054 [0.0380]	
Employee and receiving salary through bank deposit	1.008*** [0.0574]		
Bank account		0.807*** [0.137]	
Constant	-9.473*** [0.385]	-6.116*** [0.577]	-0.302*** [0.0942]
Regional dummies	Included		
Observations	6882	6882	6882

Standard errors in brackets

*** $p<0.01$, ** $p<0.05$, * $p<0.1$

Omitted variables: 35 <years old <50; private employee

Household income, the education level, age, and working status of the household head are significant to determine the joint probability. Also, it increases with the education level of the household head. Household size and home residence are both significant to determine the probability of holding both instruments. Numerous households are less likely to hold these instruments while living in large cities affects positively the likelihood of holding both credit card and bank accounts. Households whose head is afro-descendant are less likely to hold both instruments.

Results show that working in the formal economy affects positively the likelihood of holding both instruments while inactive households' heads are less likely to hold them. Conversely, being self-employed affects positively the probability of holding both instruments.

We perform an exercise to assess the potential effect of making it mandatory for employers to pay salaries through bank deposits. Firstly, we proceed to impute the value 1 to the *Dsalary* covariate for all those formally employed and afterwards we compare observed with predicted average probabilities. We use the bootstrap method running 1000 replications to obtain the confidence interval. Results of different models are shown in Table 20.8.

Table 20.7 Marginal effects after biprobit estimations

Dependent variables: bank account holdings and credit cards holdings	Marginal effects	Standard errors
Household income (log)	0.340	0.013
High school degree not achieved	0.060	0.013
High school degree achieved	0.023	0.014
Tertiary education degree achieved (not university)	0.068	0.029
University degree achieved	0.041	0.025
Less than 20 years	-0.189	0.046
20 < years old < 35	0.045	0.017
50 < years old < 65	0.015	0.015
65 < years old < 80	0.044	0.022
More than 80 years old	-0.104	0.024
Female	0.016	0.013
Household size	-0.026	0.004
Rural, town or village (less than 5000 inhabitants)	-0.027	0.016
Informal	-0.119	0.015
Afro-descendant	-0.056	0.025
Single female with children	-0.006	0.016
Inactive (students, unemployed, house keepers, etc)	-0.023	0.022
Public employee	0.008	0.021
Retired	0.060	0.021
Self employed	0.101	0.018
House owner	0.000	0.012
Employee and receiving salary through bank deposit	0.253	0.013
Bank account	0.159	0.029

Note: Figures correspond to the average effects on the joint probability of holding both

In the univariate models, the 95th confidence interval for the effect of the measure on the proportion of bank accounts holders is between 5.2 and 6.5 percentage points, while the same figures for credit card holders are 0.9 and 2.2. In comparison with the univariate, in the bivariate model the effect on bank accounts remains unchanged but the effect on credit cards increases substantially. This is because the bivariate model is able to capture the indirect effect of the measure in credit card holdings through its effect over bank account holdings. The 95th confidence interval for

Table 20.8 Expected effect of making compulsory the payment of wages through bank deposits

Average probabilities	Bank account holders		Credit card holders		Both bank account and credit card	
	LL_CI	UL_CI	LL_CI	UL_CI	LL_CI	UL_CI
Univariate probits	5.25	6.59	0.89	2.18		
Bivariate probit	5.19	6.58	2.62	6.86	3.07	4.01

Note: Bootstrap standard error is obtained using 1000 replications. Figures are the lower and upper limit of the 95th confidence interval for expected increase in the percentage of holders, in terms of percentage points

the effect on credit card holdings in the bivariate model is between 2.6 and 6.9 percentage points, well below the average partial effect of 10 percentage points reported in Table 20.3. Finally, we find that an increase of between 3 and 4 percentage points on the proportion of households owning both bank accounts and credit cards could be expected.

Concluding Remarks

The analysis of the first stage of the “Survey of Uruguayan Household Finances” end ECH 2012 indicate that households’ income, education level and working status are the main determinants of the probability of holding credit cards and bank accounts in Uruguay. The higher the household income is, the higher the probability of holding credit card or/ and bank accounts. The probability of holding bank accounts monotonically increases with education level; but for credit cards we do not find differences among those who have at least some secondary education. Households whose heads are formally employed and work in the public sector are more likely to hold credit cards and bank accounts. Families living in small towns or villages are less likely to hold credit card and bank accounts. Gender and ethnic origins are not significant determinants for bank account holdings, although they are for credit cards. Credit card holdings are more likely if the household head is a woman, but are less likely for afro-descendant.

Employees who receive their wage through bank account deposits are more likely to hold bank accounts and credit cards. Such a result motivates us to perform a counterfactual exercise to estimate the isolated impact of making it compulsory to pay salaries through bank accounts. That measure is included in a law for promoting financial inclusion, currently under discussion in the Uruguayan parliament. The law also includes other measures towards financial inclusion which are not addressed in this chapter. Among others, it would allow for tax rebates for those who pay with credit or debit cards and would enforce other people apart from employees to receive earnings through financial institutions. Our results focused only on the effects on employees and indicate that bank account and credit card holdings would increase at around 6 and 4 percentage points, respectively.

Further Reading

- Angrist, D. J. (2001). Estimation of limited dependent variable models with dummy endogenous regressors: Simple strategies for empirical practice. *Journal of Business & Economic Statistics*, 19(1), 2–28.
- Honohan, P. (2008). Cross-country variation in household access to financial services. *Journal of Banking & Finance*, 32(11), 2493–2500.
- Lluberas, R. How people pay in Uruguay: the role of transaction characteristics, Banco Central del Uruguay, Serie Documentos de Trabajo DT 005/2014. http://oif.ccee.edu.uy/wp-content/uploads/2015/05/BCU_how-people-pay-in-Uruguay_the-role-of-transaction-characteristics.pdf. Accessed Jan 5, 2016
- Mookerjee, R., & Kalipioni, P. (2010). Availability of financial services and income inequality: The evidence from many countries. *Emerging Markets Review*, 11(4), 404–408.

Bibliography

- Caskey, J. (1981). Determinants of credit card accounts: An application of tobit analysis. *Journal of Consumer Research*, 8(2), 172–182.

- Hogarth, J., & O'Donnell, K. (2000). If you build it, will they come? A simulation of financial product holdings among low-to-moderate income households. *Journal of Consumer Policy*, 23, 409–444.
- Rhine, S., Greene, W., & Toussaint-Comeau, M. (2006). The importance of check-cashing business to the unbanked: Racial/Ethnic differences. *The Review of Economics and Statistics*, 88, 146–157.
- Tan, A., Yen, S., & Loke, Y. (2011). Credit card holders, convenience users and revolvers: A tobit model with binary selection and ordinal treatment. *Journal of Applied Economics*, XIV(2), 225–255.

Part 4

Mobile Payments

21

Mobile Banking in Africa: The Current State of Play

M. Rouse and G. Verhoef

Africa's Economy

African economies experienced high growth towards the end of the colonial period, but this trend was reversed by socialist policies after independence, and eventually exacerbated by the slump and recession in the world economy following the oil crises of the 1970s. African economies then fell into unprecedented levels of debt (which was the heaviest relative to per capita income in the world).¹ World Bank structural adjustment programmes in the later 1980s were aimed at liberalising markets, reducing the role of the state and freeing trade.²

¹ Madison Angus, *Contours of the world economy, 1-2030 AD: Essays in macro-economic history*, (Oxford: Oxford University Press, 2007).

² Van der Geest Willem, (ed) *Negotiating structural adjustment in Africa*, (London: James Currey, 1994).

M. Rouse (✉) • G. Verhoef

University of Johannesburg, Johannesburg, South Africa
e-mail: marybethr@uj.ac.za

These programmes were met with highly ideological opposition,³ but global market liberalisation soon found its way into the policy debates of African countries. In the 1990s African economies subsequently gradually returned to growth for the first time since the late 1960s. GDP growth in Africa declined from 4.7 % between 1965–1973, to 1.2 % between 1981 and 1985, and to 1.7 % in 1991. As the twenty-first century dawned upon Africa, sustained strong growth returned in market oriented economic contexts. Global market liberalisation and the democratisation of governments following the demise of the USSR brought about a fundamental change in Africa.⁴ Overall deregulation of financial services and improved factor mobility enhanced business prospects for new African enterprises. During 2013/14 Sub-Saharan Africa (SSA) (excluding South Africa) maintained GDP growth of 6 %, which was well ahead of the average for the global GDP growth of around 2.4 %.⁵ Rapid economic growth depends on optimal factor mobility, including the movement of money. Africa has therefore experienced unprecedented growth in infrastructure and telecommunication investment and information technology connectivity. Mobile technology developments dovetailed these trends in Africa. The mobile industry is a key driver of economic growth and employment across Africa. In 2014 the broader mobile ecosystem contributed 5.7 % to SSA's GDP. This was a contribution of \$102 billion in economic value and supported 4.4 million employment opportunities in the region. The mobile ecosystem contributed approximately \$15 billion to public finance through taxes paid.⁶

³ Husain I., (1994) "Structural adjustment and the long term development of Sub-Saharan Africa", in Ralph van der Hoeven and Fred van der Kraaij (eds) (1994) *Structural adjustment and beyond in Sub-Saharan Africa*, (London: James Currey: 150–171).

⁴ Babarinde Olufemi, "Africa is open for business: A continent on the move", *Thunderbird International Business review*, 51, (2009): 319–328.

⁵ Demirguc-Kunt Asli, Klapper Leora, Singer Dorothe and Van Oudheusden Peter, *The Global Findex Database 2014: Measuring Financial Inclusion around the World*. V. 7255. (Policy Research Working Papers, The World Bank, 2015).

⁶ GSMA, "2014 State of the Industry Mobile Financial Services for the Unbanked", accessed January 12, 2016, www.gsma.com/mmu.

Mobile Banking Framework

Mobile banking is the most innovative development in financial systems and provides a platform for payment services without the need for a formal bank account. Mobile banking has the additional advantage of improving financial inclusion, providing cost savings for money transfers and its potential for socioeconomic development across the world. Mobile payments or m-payments are defined as ‘the use of a near-field communication (NFC) enabled mobile device or a contactless card on a SIM to conduct payment in a proximity setting by connecting to a server, perform authentication and authorisation, make a payment, initiate accounting and finally confirm the completed transaction’.⁷ Mobile network operators provide the network infrastructure required for mobile payments (m-payments), thus providing convenience and ease of use to customers. They are best placed to provide the data, bill clients for purchases made, and settle payments with merchants. It was a logical step for network operators to provide financial services to customers that were previously the exclusive domain of financial institutions. It was also a sound idea for financial institutions to enter into partnerships with the mobile networks to provide financial services.

In the developed world banks and other financial institutions are increasingly making the shift from ‘human’ to ‘digital’ banking, placing growing emphasis on flexibility of use and ease of access to banking services, payment mechanisms and integrated money management and monitoring platforms. It has been established that digital usage has become closely linked to customer loyalty,⁸ despite forfeiting the anonymity of paper currency with non-anonymous electronic money.⁹ In the absence of well-established bank networks in developing countries people

⁷ De Reuver Mark, Verschuur Edgar, Nikayin Fatemeh, Cerpa Narciso and Bouwman Harry, Collective action for mobile payment platforms: A case study on collaboration issues between banks and telecom operators. *Electronic Commerce Research and Applications*. 14, 5 (2012): 331–344.

⁸ Arnfield Robin, *The customer's journey: Transforming the branch network*, (ATM Marketplace: Wincor Nixdorf, 2015).

⁹ Rogoff S. Kenneth “Costs and benefits to phasing out paper currency”. *NBER Macroeconomics Annual*, 29, accessed December 08, 2015, <http://www.nber.org/papers/w20126>.

tend to display a preference for cash and a distrust or scepticism towards mobile money transfer mechanisms.¹⁰ In developing countries the security concern to ordinary people carrying cash has become an additional motivation to address financial exclusion of the vast unbanked sector. Globally it is estimated that 2.5 billion people, of whom more than half are adults, have no bank accounts. In Africa only one in four persons has a bank account, but eight in ten have access to a mobile phone. By mid-2015, 200 million persons across Africa were accessing the Internet through mobile devices.¹¹ Apart from the notable cost saving of electronic payments,¹² far-reaching innovation enabled by mobile technologies can enhance the current growth trajectory of Africa.

Mobile Banking in Africa

Successful mobile banking penetration in developing economies has taken place mainly in Africa and South Asia. Sub-Saharan Africa had more unique subscribers than Latin America by late 2014, which placed the region in third position behind Asia Pacific and Europe. During the first decade of the twenty-first century, SSAs subscriber base increased by 13 %, which was faster than the global average growth of 6 %. The most success has been achieved in SSA with 81 % mobile money according to the GMSA global survey.¹³

By the end of 2015 SSA unique subscribers had risen from 200 million in 2010 to 386 million (with a penetration rate of 41 %) and 722 million connections (or a 77 % penetration rate). Mobile broadband connections were at 24 %, while data growth was driving revenues and operator investments. The mobile penetration rate of the two most populous countries in SSA, namely Ethiopia and Nigeria, is at 23 % and 31 % respectively. The impressive growth in the mobile market boosted revenues hand-

¹⁰ Dzokot Vivian Afi, "Making sense of mobile money in urban Ghana: Personal, business, social and financial inclusion prospects", IMTFI, accessed November 18, 2015, <http://blog.imtfi.uci.edu/2013/09/making-sense-of-mobile-money-in-urban.html>.

¹¹ Ibid.

¹² Babatz Guillermo, *Sustained effort, saving billions: lessons from the Mexican Government's shift to electronic payments*, (Better than cash Alliance, Mexico, 2013).

¹³ Ibid.

somely, but the rate of revenue increase has slowed down as more markets were integrated into mobile operations. The Global Financial Crisis had a profound adverse effect on mobile operators' revenue growth. Revenue growth was restored to around 5 % in 2010 and rose to around 7 % in 2013, but slumped to 3.5 % in 2015. This slowdown was not only a result of slower growth in subscriber numbers, but also cuts in mobile termination rates, intense price competition, new low-income customers spending proportionally less on communication services and the depreciation of most SSA currencies.

In the four regional blocks in Africa, the Southern African Development Community, with 15 member states, has the most developed mobile market. There are significant variations in penetration levels within the block, with 19 % in Madagascar to 70 % in Botswana and Mauritius. South Africa is the largest mobile market and accounts for around 33 % of total subscriptions in the entire region. By 2015, South Africa had 38 million unique subscribers in the block of 132 million unique subscribers. Technology transfers (uptake of 4G technology) are advanced with mobile broadband accounting for 25 % of total connectivity. SADC is also the second largest smartphone market in SSA. The leading country in mobile technological innovations over the last five years is Kenya, referred to as 'Silicon Savannah', the epicentre of this development.¹⁴ The regional block known as the East African Community, has a mobile penetration of less than 25 % (less than four in ten persons) of 63 million unique subscribers. Kenya has the highest mobile penetration rate of 42 % and Burundi 17 %. Access and affordability barriers to the two-thirds of the rural majority in the block explain the low penetration levels. The expansion of mobile broadband networks assisted the rollout of 3G and 4G technology, which of course is also enhanced by the growing adoption of cheaper smartphone devices. ECOWAS (Economic Community of West African States) is the West African regional block, with 163 million unique subscribers, that make up around 40 % of SSA subscribers. The region has a mobile penetration rate exceeding the SSA average, but the penetration rate varies significantly amongst members: Nigeria has 83 million subscribers and a penetration rate of 17 %, while Mali has a 68 % penetration rate. Technology innovation is slow in this region, with

¹⁴ Ibid.

2G accounting for 90 % of mobile connections. For data-only operations, 4G networks are being introduced in Côte d'Ivoire, Ghana and Nigeria, but those services are primarily limited to a few major centres. Smartphone usage accounts for only 20 % of total connections. In the 10 member Economic Community of Central African States mobile penetration reached 38 % by 2014, with 43 million unique subscribers in 2015. The level of technological innovation is low, with 90 % usage of 2G technology, although broadband introduction in Angola and Gabon facilitates the introduction of 4G. Smartphone usage is only at 15 %.¹⁵

In most SSA markets lively competition exists between service providers, except in Ethiopia. Ethiopia only has one active mobile network operator, Ethio-Telecom (also the only fixed line provider), which is a legacy of the former nationalisation of the economy. In some markets four or five operators compete, resulting in a very low Herfindahl-Hirschman Index (HHI) of 4834. This means that intense competition keeps costs low—a phenomenon that impacted negatively on operator margins resulting in discouraging new entrants to the market and gradual consolidation. In Tanzania Airtel acquired Zantel; in Kenya Safaricom and Airtel jointly acquired Yu's assets in the Republic of Congo, and Uganda Airtel also acquired the competitor Warid Telecom. Consolidation and expanding networks incentivised technological innovation, with expanding 3G uptake and the gradual 4G delivery in the technology-leading markets of Angola, South Africa and Zimbabwe. The new technology is gradually supported by the growing use of smartphones, as these devices become cheaper. In 2015, 160 million smartphones were in use in Africa.¹⁶

Kenya is especially known for mobile banking innovation leadership in Africa. This country has adopted widespread and diversified use of mobile payments. It is estimated that 60 % of the GDP of Kenya moves through mobile money.¹⁷ This is mainly as a result of the launch in March 2007 by Vodafone for Kenya's largest mobile network provider Safaricom

¹⁵ Ibid.

¹⁶ Ibid.

¹⁷ Pénicaud Claire, (2013) "State of the Industry: Results from the 2012 Global Mobile Money Adoption Survey Tables and figures", GSMA: Mobile Money for the Unbanked, accessed May 12, 2015, https://www.lib.uwo.ca/files/business/citation/Citing_Business_Sources_-_Chicago.pdf.

of the mobile money product M-Pesa ('M' denoting mobile and Pesa is the Swahili word for money). M-Pesa facilitates person-to-person transfers through the use of mobile phones. It was observed that people were selling airtime into a network akin to a banking grid, which enabled the recipient to resell the airtime and basically get 'cash' for the sold airtime. In remote areas and in the absence of extensive branch networks, mobile phones were used to facilitate cheap and instant payments to the broad population. M-Pesa uses a mobile phone to transfer money and deliver finance, and in the future it will also develop micro-financing facilities. M-Pesa enables users to deposit money into an account stored on their mobile phone. The account holder can then use a Short Message Service (SMS) using a secured PIN to send money to other users or withdraw deposited money at different retail outlets or pay for goods and services.

This product has been so successful that four years after its launch, it is estimated that approximately 70 % of all households in Kenya are using M-Pesa. As the population is spread throughout large parts of Kenya, the M-Pesa system allows users via an SMS to transfer money to another without having to physically transfer cash (saving on time and transport). As this system makes use of SMS technology, it provides a wide range of users the ability to use this technology as only a basic hand-held device is needed. The use of m-technology greatly reduces the cost of sending money over large distances, provides certainty of process and decreases the risk of theft. The M-Pesa system also consists of agents dispersed around the country that convert e-money into currency and vice versa.¹⁸ Only during the last 11 months of 2014 transactions to the value of more than 2.1 trillion Kenyan shillings were conducted through M-Pesa in Kenya—that is almost half the value of the country's GDP.

Soon afterwards product innovation led to the introduction of a related product, M-Shwari, a savings and loan facility. M-Shwari signed up 9 million customers and attracted deposits to the value of 135 billion (\$1.6 billion) Kenyan Shillings within the first two years of its operation. The loans issued through M-Shwari were cheaper to administer and easier to scale than the micro-lending schemes in operation. The M-Pesa facility

¹⁸ Jack William and Suri Tavneet, "Risk Sharing and Transactions Costs : Evidence from Kenya' s Mobile Money Revolution", *American Economic Review*, 104, 1 (2014): 183–223.

was later also linked to formal bank accounts through a partnership with the Equity Bank, based in Kenya. The product was named M-Kesho, a facility that used the M-Pesa platform and agent network to offer more banking services to customers, such as interest-bearing accounts, loans and insurance.

M-Pesa was soon introduced in neighbouring African countries. In 2008 M-Pesa was launched in Tanzania, but did not attract the same subscriber volumes as in Kenya. Vodafone introduced strategic changes to its service delivery to improve its market position in Tanzania, which resulted in the rapid expansion of the use of mobile technology. By March 2013 M-Pesa users rose to 5 million in Tanzania and by the end of 2015, Tanzania was the country in Africa with the highest proportion of registered mobile money account users per 1000 adults—1208 per 1000, compared to 1018 in Kenya, 762 in Uganda and only 76 in South Africa.¹⁹ Since the launch of M-Pesa other competitors such as Mobicash, Orange Money and Airtel Money now offer similar services to M-Pesa. M-Pesa has since spread to 10 countries: Tanzania, South Africa, Democratic Republic of Congo, India, Mozambique, Egypt, Lesotho, Albania and Romania; Vodafone has recently announced that it will provide M-Pesa in Ghana after launching a pilot project in August 2015.²⁰

M-Pesa in South Africa

Vodacom South Africa launched M-Pesa in September 2010 in partnership with Nedbank, and it was hoped that it would be as successful as the project in Kenya. South Africa, unlike the markets in East Africa, has a highly developed financial system and local banks have already made banking easily accessible to the low-income earners by increasing the number of branches in rural areas and providing bank accounts aimed specifically at the unbanked population. Nedbank was relying on the

¹⁹ Ibid.

²⁰ Steafel Eleanor, "Vodafone brings mobile money to 15m people without bank accounts in Ghana". *The Telegraph*, December 7, 2015, <http://www.telegraph.co.uk/finance/personalfinance/bank-accounts/12036626/Vodafone-brings-mobile-money-to-15m-people-without-bank-accounts-in-Ghana.html>, accessed December 15, 2015.

extensive mobile phone penetration in South Africa as well as the 13 million economically active South Africans without bank accounts, to grasp the opportunity M-Pesa offered for swift and cheap money transfers and retail purchases. South Africa already had other mobile banking applications and a number of these banking applications were provided by local banks. M-Pesa was not the resounding success in South Africa that it was in Kenya—it was taken up by just 100,000 users by May 2011. However, unlike in Kenya, there were only a few agents distributed around the country and its financial partner, Nedbank, has historically been the retail bank focusing on urban areas and did therefore not have the branch network to support the penetration of M-Pesa in remote rural areas.

The main reasons for the lacklustre appetite in the South African market for the M-Pesa opportunity were varied. In the first instance, cheap accessible channels existed to transfer money. The largest retailer in South Africa, Shoprite, has a facility in place whereby customers can deposit money for a small fee of R9.99 at any Shoprite outlet (of which there are more than 900 outlets in South Africa and 294 corporate and 39 franchise stores outside South Africa in 14 African countries) to any branch in the country, where the recipient can make withdrawals upon payment of purchases, or simply use it to purchase consumer goods from the outlet. Furthermore, a preference for cash remained high amongst those persons wanting to transfer money. A survey in 2014 on persons sending or receiving remittance transfers to or from family and friends within South Africa, showed that 32 % sent cash with a relative or friend.²¹ The regulatory rigidity in South Africa also contributed to the sluggish uptake of M-Pesa. The South African Reserve Bank does not implement a special dispensation for non-bank or e-money providers. This is the reason why mobile money providers in South Africa partner with banks, which is the strategic opposite of the experience in the other African markets. These mobile money providers are treated as banks and must comply fully with all the requirements associated with banks—such as customer identifica-

²¹ Robb Genna, "Why mobile money flopped in South Africa", *Tech Central*, July 17, 2015, <http://www.techcentral.co.za/why-mobile-money-has-flopped-in-sa/58282/>, accessed December 15, 2015.

tion by means of face-to-face identity verification and proof of residence. In Tanzania, regulatory accommodation was different to that of formal banks, and was the key to the success after the initial service delivery adjustments were made by Vodacom. In all of the other African jurisdictions the regulatory accommodation of mobile money providers outside the formal banking system has encouraged competition, pushed costs down and stimulated the growth in mobile money usage. In his explanation for the disappointing performance of M-Pesa, the CEO of Vodacom South Africa stated in May 2011 that the banking sector in that area is much more developed, thus alluding to the nature and regulatory context of banking in South Africa as the most convincing reason for the development.²² The reliance on Nedbank was also an error of judgement, since Nedbank had little penetration amongst the lower-income groups in rural areas and no attempt was made to put in place the type of widespread and informal infrastructure it had in Kenya.

The implementation of M-Pesa was suspended but re-launched in June 2011. A much expanded distribution network of agents in remote areas where people live and work was introduced. The South African Reserve Bank did not relax the regulatory requirements. This time people of a higher Living Standards Measure (LSM) were targeted, but only 1.6 million users were reported despite the low transaction fee of R10 per transaction. Vodacom was again forced to rethink and redesigned the product once again. The new M-Pesa in South Africa was launched for a second time on 31 July, 2014, with Bidvest as a partner. This time new features were added to the product: a chip and pin-protected Visa card was added to the service; a voucher system was added to upload cash and convert cash to M-Pesa, similar to buying airtime, at all Vodacom shops, selected Spaza shops and retailers; access was significantly expanded to 27,000 ATMs and over 240,000 merchant outlets in South Africa; person-to-person transfers were introduced and customers were promised that additional functionality would be added in the near future; and finally usage rewards were introduced. These included airtime and other offers, for example a doubling of airtime when purchasing airtime via M-Pesa and

²² Vodacom Group Limited, Interim Results for the six months ended 30 September 2015, accessed January 2, 2016, www.vodacom.co.za.

free airtime for activating the M-Pesa Visa card.²³ Vodacom was hoping to emulate the success it had with the product in Tanzania; however, by the end of September 2015 Vodacom Group stated that 1.2 million customers were added to the service since the second relaunch in 2014 and 1.3 million customers were active in the system.

Market commentators remain sceptical about the possibility of the South African M-Pesa project ever posting the impressive successes of East Africa markets.²⁴ The reality of the attempts to duplicate a successful service from other African locations in South Africa is that it failed. With a population in excess of 45 million people, the message is that ‘one size does not fit all’. The financial environment in South Africa is well established and is securely entrenched in a regulatory framework maturing since the establishment of the first central bank in Africa, the South African Reserve Bank (SARB) in 1923. A sophisticated financial services sector is subject to regulatory oversight, which contributed to the relative superficial impact of the GFC on South Africa. The South African Reserve Bank is not prone to relax these requirements in the light of the concerted effort to curb criminal activities related to money laundering.²⁵

The well-entrenched retail banks have succeeded in introducing many entry-level services to the unbanked sector, whereby many of the needs of the unbanked had been addressed in a different way than in other African markets with much leaner financial services networks or less sophisticated service provision. The FNB ‘e-wallet’ allows anyone with a valid South African mobile phone to send and receive money. The Shoprite countrywide money transfer service at a fraction of the cost of formal bank transfers has also entered the market served by the M-Pesa product in Kenya and Tanzania. A more convincing argument explaining the less than optimal success of M-Pesa in South Africa is that Vodacom changed the marketing angle every time the service was relaunched in

²³ Goldstuck Arthur, “Vodacom re-launches M-Pesa again”. *Mail & Guardian*, August 4, 2014, accessed August 4, 2014, <http://mg.co.za/article/2014-08-04-vodacom-re-launches-m-pesa-again>.

²⁴ Tarrant Hilton, “M-Pesa’s a bigger flop in SA than Vodacom’s letting on”. *Moneyweb*, July 30, 2015, accessed July 30, 2015, <http://www.moneyweb.co.za/moneyweb-opinion/m-pesas-a-bigger-flop-in-sa-than-vodacoms-letting-on/>.

²⁵ South African Reserve Bank (SARB), 2013 Annual report, accessed July 4, 2014, <https://www.resbank.co.za/Lists/News%20and%20Publications/Attachments/5795/Annual%20Report%202013.pdf>.

South Africa, without identifying explicitly what M-Pesa was in South Africa. At the first introduction of the service it was marketed as a mobile money solution, then in 2011 as a mobile money wallet allowing the user to store money safely, and in 2014 it was advertised as a platform to swipe and buy with a Visa card linked to the mobile phone.²⁶ The message was mixed and created confusion.

Vodacom faces competition in the mobile market with FNB, MTN, Standard Bank, and Net 1 launching or relaunching the products in recent months. In August 2014, MTN partnered with Centenary Bank in Uganda to allow their Mobile Money Customers to withdraw cash from any of Centenary Bank's ATMs across the country. Additionally, MTN launched Mobile Money in South Africa in 2012, and after receiving regulatory approval in March 2014, is able to offer a fully accessible bank account on a mobile device. Moreover, customers are able to use the Mobile Money Visa card at ATMs and till points to pay various electronic bills and earn customer loyalty points at Pick n Pay stores. However, again the M-Pesa relaunch by Vodacom failed to obtain significant number of subscribers with only 1.3 million subscribers by the end of March 2015. The success of the MTN mobile money initiative with Pick n Pay is perhaps due to the fact that the retailer is not a bank in South Africa—where the bank charges are notoriously expensive—and has a mass customer base in ordinary consumer goods and food.²⁷

Developments in Other Regions in Africa

The M-Pesa advantage as first mover in the market will most probably be difficult to match, but the growth in demand on the continent and the overall competitive environment contributed to the explosion in the

²⁶Tshabalala Sibusiso, "Why South Africa's largest mobile network, Vodacom, failed to grow M-Pesa", *Quartz Africa*, August 3, 2015, accessed August 4, 2015, <http://qz.com/467887/why-south-africas-largest-mobile-network-vodacom-failed-to-grow-mpesa/>.

²⁷ McLeod Duncan, "Vodacom's M-Pesa relaunch is a flop". *Tech Central*, May 18, 2015, accessed May 19, 2015, <http://techcentral.co.za/vodacom-m-pesa-relaunch-is-a-flop/56717/>.

industry. The successful expansion in Tanzania, where figures released by Vodacom in September 2014 show transactions to the value of \$1.2 billion per month through M-Pesa (a figure that equals a third of Tanzania's GDP), is testimony to the future of mobile money transactions in SSA.²⁸ The growth in the Tanzanian market occurred because of the very limited banking services networks in the country. This is a direct outcome of the total nationalisation of the Tanzanian economy under President Julius Nyerere, who introduced the so-called *African socialism* after independence in the 1960s.²⁹ After the era of the 'Mwalimu' (Swahili for 'teacher'—an honorary title given to him as leader of the liberation struggle against colonialism), which came to an end with his retirement in 1985 and passing away in 1999, Tanzania joined many African nations in embracing aspects of market liberalisation. Where formal banking institutions had established themselves in other East African states before decolonisation and continued operations after independence, this development was abruptly terminated in Tanzania. As Tanzania emerged into the new world of entrepreneurial opportunity and personal earnings, the predominantly rural population developed the demand for money transfers. While cash remained the medium of choice, logistics mitigated against it. Vodacom partnered with M-Pesa to fill the gap, but the Tanzanian market is an open competitive market with Tigo and Airtel competing mobile service providers. The expansion in the market is primarily ascribed to the large number of agents supporting all three service providers. In 2013 there were approximately 20,000 M-Pesa agents, but by 2014 this number rose to 73,000 – and around 2500 agents added per month. This verifies the extent to which the Tanzanian society has embraced the liberal market and justifies the doubling of Vodacom's network in recent times. Vodacom first closed the 2G gap and then moved to become the market leader in 3G service provision in Tanzania. M-Pesa complemented these efforts by securing interconnections with Tanzanian banks, which gave Vodacom access to both the banked and the unbanked

²⁸ De Vos Dirk "Why mobile money is so tough to crack", *Tech Central*, November 11, 2014, accessed November 12, 2014, <http://techcentral.co.za/why-mobile-money-is-so-tough-to-crack/152418/>.

²⁹ Austen A. Ralph, *African economic history: internal development and external dependency*, (London: J. Currey, 1987).

sector in the country. Even though M-Pesa was first used to transfer money between family and friends, as had been the case in Kenya, it developed into a business tool allowing customers the facility to pay for services, such as utilities (water and electricity). Merchant payment solutions were added to enable retailers to receive payment directly from an M-Pesa account. M-Pesa emerged as an entrepreneurial opportunity—agents earn commission from transactions—withdrawals are at a cost, but not deposits. Agents conducting 1300 commissions per month can earn up to \$350.³⁰

The developments in Ghana are following the trend. The official unbanked segment of the population is 70 %, but the rapid growth in the mobile money industry resulted in the number of registered mobile money customers leaping from 3,303,837 in 2013 to 5,424,650 in 2014, an increase of 64 %. This is about 17 % of the Ghanaian population. The Bank of Ghana recorded a massive rise in the number of subscribers from 20,346,016 in 2013 to 21,721,814 in 2014. The value of transactions are equally impressive—from GCc 2.4 billion (measured in Ghanaian Cedi) in 2013 to GCc 11.6 billion in 2014, which amounted to approximately a third of the 28 banks in Ghana's total deposit liabilities. The government passed new mobile money regulations in July 2015, which streamlined transaction flows, and enabled collaboration between the mobile money industry and the banking system and the Bank of Ghana. Competition is also tough in the market, with four mobile telecommunication companies operating in the market—Airtel, MTN, Tigo, Vodafone. Just over 60 % of mobile money users in Ghana live in urban areas and only 19 % of them live on less than \$2.50 a day. In November 2015 Vodafone extended M-Pesa to Ghana, adding Ghana as the eleventh market in which M-Pesa was offered. MTN is the largest mobile operator in Ghana and announced in November 2014 that it was processing about 25 million transactions in excess of GCc 3 billion per month. The industry is active in developing innovative products in mobile money services to reach to those outside the system and to address specific needs of the rural communities. In March 2015 Airtel announced the establishment of an innovative plat-

³⁰ Van der Bergh, R (2014) 'M-Pesa: Vodacom's money spinner in Tanzania' 29 September 2014. <http://techcentral.co.za/m-pesa-vodacoms-money-spinner-in-Tanzanai/51290/>

form in collaboration with Zeepay (a mobile financial services aggregator) to enable members of farming-based organisations to register on the platform and buy agro-inputs (such as chemicals, from suppliers registered on the platform) on credit, as well as access credit to do farm improvements. The programme is known as *Akuafø Nkosuo* and was piloted in the Ashanti region. Another mobile service provider Tigo partnered with BIMA, a micro insurance company to introduce fertiliser-imbued insurance for farmers. These developments are remarkable, given the findings of a study by Vivian Dzokoto in 2013 indicating a resounding preference for cash and deep mistrust of mobile money in Ghanaian society.³¹ A factor that affects the industry adversely though, is the high levels of taxation of industry in Ghana. Taxes account for almost 25 % of the cost of mobile ownership and the \$650 million the mobile operators pay in taxes annually, constitutes about 40 % of total revenue in the sector.³²

In Uganda the communication sector is one of the fastest growing sectors in the economy. The sector was opened to competition in 2007, currently allowing four operators (MTN Uganda, Orange Uganda, Uganda Telecom Limited and Warid Telecom). MTN is the dominant industry player controlling 41 % of the market, but there is tough competition with the other operators. The main operators in the mobile money industry in Uganda are MTN Uganda, in partnership with Standard Bank, M-Sente from UTL, in partnership with DFCU, and ZAP from Zaire in partnership with Standard Charter Bank.³³ In 2013 Orange Money also entered the competitive market. There is no legislation governing money services in Uganda, neither legal provision for third parties to deliver financial services of permission to non-banks and to issue mobile money without being subject to the full range of prudential regulations applied

³¹ Dzokot Vivian Afi, "Making sense of mobile money in urban Ghana: Personal, business, social and financial inclusion prospects", IMTFI, accessed November 18, 2015, <http://blog.imtfi.uci.edu/2013/09/making-sense-of-mobile-money-in-urban.html>.

³² Groupe Speciale Mobile Alliance (GSMA) *The mobile Economy Sub-Saharan Africa 2015*. London.

³³ Ndiwalana Ali, Morawczynski Olga, and Popov Oliver (2012) "Mobile money in Uganda: A preliminary study", accessed July 14, 2014, <http://www.gsma.com/mobilefordevelopment/wp-content/uploads/2012/03/m4dmobilemoney.pdf>.

to banks.³⁴ The Bank of Uganda found an innovative route around these limitations by requesting mobile money operators to enter into partnerships with banks that had to apply to the Bank of Uganda for a ‘letter of no objection’ to supply mobile money services. The Bank of Uganda aimed at protecting the value of the mobile transaction through the regulation of financial institutions.³⁵ By 2015 the statutory position had not changed in Uganda, which left the Bank of Uganda no alternative but to issue ‘guidelines’ to provide greater clarity to the mobile money industry. This regulatory context shows some similarity to the South African situation, but was different from Kenya, where the government refrained from linking the regulation of the banking system with the mobile money industry. The mobile market was nevertheless growing—50 % of mobile phone owners made or received regular payments using their phones. By the end of 2013, mobile money transfers hit the Uganda Shilling 1.6 trillion (around \$640 million) level.³⁶ Half of the registered mobile money users stored money on their m-accounts, but limited service innovation occurred in that market. Agents were predominantly doing cash-in cash-out transactions and other bank-related services such as bill payments and airtime top-ups. Saving, credit and insurance transactions were almost non-existent.³⁷ Recently operators in the mobile market have experienced declining revenue as a result of the competition in the market. This has led to the marketing of additional revenue streams, such as mobile data, 3G broadband services and mobile money services. Uganda is currently one of the fastest growing mobile money markets in SSA

³⁴ Staschen Stefan, “Mobile money moves forward in Uganda despite legal hurdles”, CGAP, March 9, 2015, accessed March 10, 2015, <http://www.cgap.org/blog/mobile-money-moves-forward-Uganda-despite-legal-hurdles>.

³⁵ Ssonko George Wilson, (2010) “The role of mobile money services in enhancing financial inclusion in Uganda”, Bank of Uganda, accessed May 12, 2013. https://www.bou.or.ug/bou/bou-downloads/research/BouWorkingPapers/2010/Aug/THE_ROLE_OF_MOBILE_MONEY_SERVICES_IN_ENHANCING_FINANCIAL_INCLUSION_IN_UGANDA_BOUWP0810.pdf.

³⁶ Tredger Chris, “Moves to regulate Uganda’s bustling mobile money market”, *IT News Africa*, January 13, 2014, accessed January 15, 2014, <http://www.itnewsafrica.com/2014/01/moves-to-regulate-ugandas-bustling-money-market>.

³⁷ Lee Annabel, “The future of Uganda’s mobile market: Why agent networks are key to growing the sector”, *Next Billion*, March 21, 2014, accessed March 22, 2014, <http://nextbillion.net/the-future-of-Ugandas-mobile-market>.

because of it being the country with the third largest registered mobile money accounts per 1000 adults in 2014 in SSA, namely 762.

Remittances in Africa

The rural poor and those living in remote areas in Africa, have limited or no access to formal banking services and thus have to use informal channels to make payment remittances. Also, the costs of sending remittances in Africa are very high.

There are many reasons for the high transaction costs in Africa, but a key reason is the underdeveloped financial and payment infrastructure. The limited use of formal financial infrastructure impacts directly on the transparency in the market. Without access to formal financial infrastructure there is a greater risk that the remittance sender is not informed of the speed of the service and importantly, of all the components of the transaction cost (exchange rate used, fees charged, any taxes imposed and any charges imposed on the recipient). This lack of transparency makes it difficult for users of remittances to compare the costs and services of various remittance providers adequately when selecting a remittance provider. This information is also necessary to strengthen competition and in so doing reduce the costs.

Competition in the market is further hampered by the dominance of two money transfer operators (MTOs), namely Western Union and MoneyGram that control the market and thus can impose their own high tariffs. This has resulted in the continued high tariffs imposed on remittances and the continued use of informal channels. However, the use of informal channels, usually transporting physical cash through friends or relatives who are travelling home on public transport, is also costly, slow and inefficient resulting in time delays and exposes the additional risk of theft. The other main remittance source providers (RSPs) are financial institutions. Nevertheless, the most expensive RSPs for sending money in Africa, and in fact worldwide, are commercial banks.

The total average cost of remittances is lower in densely populated regions of the world with better developed extensive formal banking systems. The average cost of sending \$200 (or local equivalent) amounted to 10.64 %

for commercial banks, followed by MTOs at 6.51 % and the post office at 6.04 %.³⁸ Total average cost of remittances in SSA is about one third higher than the global average. This lack of formal banking service infrastructure stimulated the mobile money transfer industry, which has developed into the fastest growing avenue of money transfers in Africa. As indicated by the growth in mobile phone transfers between June 2014 and February 2015 between Côte d'Ivoire and Burkina Faso, the mobile banking environment swiftly moved to supply in the market demand for banking services to the people in remote rural areas of the continent.

Part of the reason for the high remittance fees associated with banks is the higher overhead costs. Commercial banks, unlike MTOs, typically have higher overheads due to the number of bank branches, the provision and maintenance of automated teller machines (ATM) networks and the costs associated with ensuring compliance with a number of regulations (including bank specific regulations and capital adequacy requirements).

Within the African region, Sub-Saharan Africa (SSA) is the most expensive region for remittances. This is especially important as SSA has the highest number of domestic remittances in Africa with 48 % of people reported to have sent or received domestic remittances in the previous year, according to the latest Global Findex Database 2014.³⁹

The Global Findex was launched by the World Bank in 2011 and provides comparable information from 148 countries concerning how people save, borrow, make payments and manage risk. Mobile banking allows consumers easy access to financial services in their local area and facilitates access of households to the formal banking sector, thereby providing greater financial inclusion. In Kenya there is now a 75 % account penetration and 58 % of the population surveyed had a mobile money account. Kenya is now the leader in Africa with respect to financial inclusion mainly because of the successful use of mobile banking, with 75 %

³⁸ Demirguc-Kunt Asli, Klapper Leora, Singer Dorothe and Van Oudheusden Peter, *The Global Findex Database 2014: Measuring Financial Inclusion around the World*. V. 7255. (Policy Research Working Papers, The World Bank, 2015).

³⁹ Ibid.

of the population (aged 15 years or older) having a bank account. This is a remarkable feat considering that in the 2012 Global Findex report, only 42 % of adults in Kenya had a bank account. The visible impact of the innovations in payment and banking technologies on financial inclusion is clear as 63 % of adults in the poorest of 40 % of Kenyan households, now have a bank account. This figure was only 19 % when the first Global Findex survey was conducted.⁴⁰

The Global Findex data has shown that the account penetration has dramatically improved from 2011–2014 with a 20 % drop in unbanked individuals and with 700 million additional bank account holders. The Global Findex report attributes this significant change to a 13 % improvement in account penetration in developing economies and due to the innovations in technologies, in particular mobile money, that expanded financial inclusion in SSA.⁴¹

East Africa is leading the way with mobile money adoption. In Kenya 58 % of the adult population have a mobile money account followed by Somalia, Tanzania and Uganda, which all have 35 % of the adult population with a mobile money account.⁴²

The most important development that has given the mobile money industry massive growth potential is the introduction of network collaboration resulting in interoperability. This means that customers are allowed to transact across different mobile networks as well as across the borders of different countries. In April 2014 MTN Côte d'Ivoire and Airtel Burkina Faso entered into an agreement for interoperation in mobile money services. In a similar fashion Orange Côte d'Ivoire and Airtel Burkina Faso contracted in March 2015 to engage in similar collaboration. MTN entered into an agreement with M-Pesa customers in Tanzania, the DRC, Mozambique and Kenya and MTN Mobile Money users in Uganda, Rwanda and Zambia established the first mobile money corridor in SSA allowing customers to transact across networks and countries. In May 2015 Vodafone M-Pesa and MTN Mobile Money agreed

⁴⁰Ibid.

⁴¹Ibid.

⁴²Ibid.

to allow customers the freedom to transfer funds between the two services. The development is a very strong incentive to bring more customers into the mobile money industry and to enhance financial inclusion. Similar developments manifested in West Africa, where Orange operates an international money transfer service linking Côte d'Ivoire, Mali and Senegal. This facility quickly gained traction resulting in Orange money remittances to the value of nearly one-fifth of World Bank reported remittances between those countries.⁴³ These developments are significant in illustrating the strength of the growing mobile money industry in countering former cultural distrust and scepticism about security, since customers actually see money being remitted and recipients benefitting from the transfer of funds.

Conclusion

The successes and failures of mobile money payments systems have highlighted the lessons to be learnt. This raises the question, why have other countries in Africa not been able to successfully implement mobile banking on a wide scale as evidenced in East Africa? In most of the African countries the serious deficiencies of financial exclusion of the majority of the population presented the most fertile ground for the take-up of mobile money services. The exception is South Africa, where the sophisticated financial service sector complemented by an equally sophisticated regulatory system, poised two different interest groups against each other—formal banks with a high cost structure versus e-money service providers operating through digital networks and much less costly infrastructure. In order to ensure the success of mobile money adoption, network externalities must be established by attracting as many consumers and merchants as possible and by providing the convenience and efficiencies of other card payment methods. It is also key that financial institutions have strong relationships with merchants to ensure sufficient acceptance points for market penetration. In some African markets

⁴³ Donnelly Lynley, "Mobile money is on the move". *Mail & Guardian*, May 8, 2015, accessed May 17, 2015, <http://mg.co.za/article/2015-05-07-mobile-money-is-on-the-move>.

the involvement of major banks was required by statutory regulation to facilitate m-payments. In some markets this link was functional to the growth in the market, but in other markets the experience was different. In Kenya the lack of formal banking involvement in the market contributed to the innovative and dynamic development of the industry, while in Uganda and South Africa such links proved less than optimal. The absence of a well-developed formal banking services sector in Tanzania indeed hampered financial inclusion, but once mobile telecommunication companies entered the mobile money industry, financial inclusion was achieved more efficiently.

The higher the mobile money market penetration the more likely that transaction costs will be kept low. Barriers to the success of mobile technologies, amongst others, are security concerns relating to loss of data and a personal information, and a reluctance of customers to adopt new technologies. This reluctance to engage with mobile money technology has a strong cultural and tradition-based foundation and has been observed to inhibit the initial decision to enter the industry. A preference for cash, which is still a reality in the world as two-thirds of the global population still shuns m-banking, is gradually decreasing as the population is becoming educated in the use of mobile technology and is experiencing success with mobile transactions. The interesting observation is that more people in emerging markets (25 %) as opposed to respondents in developed markets (16 %) indicated in a recent global survey that they will be using mobile financial services in the near future—these include mobile services for savings, loans, insurance and payments solutions for medical purposes, education and more.⁴⁴

To stimulate the acceptance of the mobile payment system, a widespread network of agents across the country should be established in order to exchange e-cash for cash and vice versa as with the M-Pesa system. In African countries where a dispersed agent network was offered, mobile money services struggled to establish themselves, as vast distances between customer and agent inhibited frequent usage. Additionally, the mobile payment technology should be used across mobile networks and

⁴⁴ CXOtoday.com (2015) “Two-thirds of global population shun M-banking”, September 30, 2015, accessed October 5, 2015, <http://www.cxotoday.com/story/two-thirds-of-global-population-dont-use-mobile-banking/>.

should allow payments to be made to non-users. Another critical success factor is the expansion of the mobile network. There is also a need for a cohesive set of technology standards that both customers and merchants can rely on. An integrated, universal set of standards will allow for the widespread use of m-payments and cross border acceptance. Policies promoting competition in the telecommunications sector have resulted in innovative new technologies and allowed for the realisation of the associated cost savings.

Regulatory systems developed for a sophisticated financial services sector or regulatory systems not providing for the delivery of financial services by any other agent than a formally registered bank, have proven to be dampening the development of mobile money services. In the case of South Africa, growing criminal activities involving money laundering have contributed to the reluctance on the side of the South African Reserve Bank (SARB) to relax security identification requirements. The phenomenon of illegal immigrants seeking access to the South African market, has also contributed to the unrelenting approach of the South African central bank with respect to Fica (Financial Intelligence Centre Act) requirements for all money related services—be that entering into a mobile phone contract, or using any service of a financial nature. Innovative security regulation is required to enhance the e-money services and include those still outside the South African banking system into the broader financial services sector.

The social development benefits of broad utilisation of mobile money have been established. Mobile money enhances access to venture capital, it empowers entrepreneurs, it facilitates education and medical service delivery, it oils the wheels of enterprise, it makes transport services more easily accessible and secure and it enables the transfer of money to those outside the employment network. The mobile money industry has limitless growth opportunities in Africa, since it can provide the services needed more timeously, extensively and affordably than an industry dependent on costly fixed cost infrastructure.

Bibliography

- Arnfield, R. (2015). *The customer's journey: Transforming the branch network*. ATM Marketplace: Wincor Nixdorf.

- Austen, A. R. (1987). *African economic history: internal development and external dependency*. London: J. Currey.
- Babarinde, O. (2009). Africa is open for business: A continent on the move. *Thunderbird International Business Review*, 51, 319–328.
- Babatz, G. (2013). *Sustained effort, saving billions: Lessons from the Mexican government's shift to electronic payments*. Mexico: Better than cash Alliance.
- CXOtoday.com (2015, September 30). Two-thirds of global population shun M-banking.<http://www.cxotoday.com/story/two-thirds-of-global-population--dont-use-mobile-banking/>. Accessed 5 Oct 2015.
- De Reuver, M., Edgar, V., Fatemeh, N., Narciso, C., & Harry, B. (2012). Collective action for mobile payment platforms: A case study on collaboration issues between banks and telecom operators. *Electronic Commerce Research and Applications*, 14(5), 331–344.
- De Vos, D. (2014, November 11). Why mobile money is so tough to crack. *Tech Central*. <http://techcentral.co.za/why-mobile-money-is-so-tough-to-crack/52418/>. Accessed 12 Nov 2014.
- Demirguc-Kunt, A., Klapper, L., Singer, D., & Van Oudheusden, P. (2015). *The global findex database 2014: Measuring financial inclusion around the world*. V. 7255., Policy Research Working Papers, The World Bank.
- Donnelly, L. (2015, May 8). Mobile money is on the move. *Mail & Guardian*. <http://mg.co.za/article/2015-05-07-mobile-money-is-on-the-move>. Accessed 17 May 2015.
- Dzokot, V. A. (2013). Making sense of mobile money in urban Ghana: Personal, business, social and financial inclusion prospects, IMTFI. <http://blog.imtfi.uci.edu/2013/09/making-sense-of-mobile-money-in-urban.html>. Accessed 18 Nov 2015.
- GSMA (Groupe Speciale Mobile Alliance). (2015). 2014 state of the industry mobile financial services for the unbanked. www.gsma.com/mmu. Accessed 12 Jan 2016.
- Goldstuck Arthur. (2014, August 4). Vodacom re-launches M-Pesa again. *Mail & Guardian*. <http://mg.co.za/article/2014-08-04-vodacom-re-launches-m-pesa-again>. Accessed 4 Aug 2014.
- Groupe Speciale Mobile Alliance (GSMA). (2015). *The mobile economy. Sub-Saharan Africa 2015*. London.
- Husain, I. (1994). Structural adjustment and the long term development of Sub-Saharan Africa. In R. van der Hoeven & F. van der Kraaij (Eds.), *Structural adjustment and beyond in Sub-Saharan Africa*. London: James Currey.
- Jack, W., & Suri, T. (2014). Risk sharing and transactions costs : Evidence from Kenya's mobile money revolution. *American Economic Review*, 104, 183–223.

- Lee, A. (2014, March 21). The future of Uganda's mobile market: Why agent networks are key to growing the sector. *Next Billion*. <http://nextbillion.net/the-future-of-Ugandas-mobile-market>. Accessed 22 Mar 2014.
- Madison, A. (2007). *Contours of the world economy, 1-2030 AD: Essays in macro-economic history*. Oxford: Oxford University Press.
- McLeod, D. (2015, May 18). Vodacom's M-Pesa relaunch is a flop. *Tech Central*. <http://techcentral.co.za/vodacom-m-pesa-relaunch-is-a-flop/56717/>. Accessed 19 May 2015.
- Ndiwalana, A., Morawczynski, O., & Popov, O. (2012). Mobile money in Uganda: A preliminary study. <http://www.gsma.com/mobilefordevelopment/wp-content/uploads/2012/03/m4dmobilemoney.pdf>. Accessed 14 July 2014.
- Pénicaud, C. (2013). State of the industry: Results from the 2012 global mobile money adoption survey tables and figures. GSMA: Mobile Money for the Unbanked. https://www.lib.uwo.ca/files/business/citation/Citing_Business_Sources_-_Chicago.pdf. Accessed 12 May 2015.
- Robb, G. (2015, July 17). Why mobile money flopped in South Africa. *Tech Central*, <http://www.techcentral.co.za/why-mobile-money-has-flopped-in-sa/58282/>. Accessed 15 Dec 2015.
- Rogoff, S. K. (2015). Costs and benefits to phasing out paper currency. *NBER Macroeconomics Annual*, 29. <http://www.nber.org/papers/w20126>. Accessed 8 Dec 2015.
- South African Reserve Bank (SARB). (2013). Annual report (2013). <https://www.resbank.co.za/Lists/News%20and%20Publications/Attachments/5795/Annual%20Report%202013.pdf>. Accessed 4 July 2014.
- Ssonko, G. W. (2010). The role of mobile money services in enhancing financial inclusion in Uganda. Bank of Uganda. https://www.bou.or.ug/bou/bou-downloads/research/BouWorkingPapers/2010/Aug/THE_ROLE_OF_MOBILE_MONEY_SERVICES_IN_ENHANCING_FINANCIAL_INCLUSION_IN_UGANDA_BOUWP0810.pdf. Accessed 12 May 2013.
- Staschen, S. (2015, March 9). Mobile money moves forward in Uganda despite legal hurdles. *CGAP*. <http://www.cgap.org/blog/mobile-money-moves-forward-Uganda-despite-legal-hurdles>. Accessed 10 March 2015.
- Steafel, E. (2015, December 7). Vodafone brings mobile money to 15m people without bank accounts in Ghana. *The Telegraph*, <http://www.telegraph.co.uk/finance/personalfinance/bank-accounts/12036626/Vodafone-brings-mobile-money-to-15m-people-without-bank-accounts-in-Ghana.html>. Accessed 15 December 2015.

- Tarrant, H. (July 30, 2015). M-Pesa's a bigger flop in SA than Vodacom's letting on. *Moneyweb*. <http://www.moneyweb.co.za/moneyweb-opinion/m-pesas-a-bigger-flop-in-sa-than-vodacoms-letting-on/>. Accessed 30 July 2015.
- Tredger, C. (2014, January 13). Moves to regulate Uganda's bustling mobile money market. *IT News Africa*. <http://www.itnewsafrica.com/2014/01/moves-to-regulate-ugandas-bustling-money-market>. Accessed 15 January 2014.
- Tshabalala, S. (2015, August 3). Why South Africa's largest mobile network, Vodacom, failed to grow M-Pesa. *Quartz Africa*. <http://qz.com/467887/why-south-africas-largest-mobile-network-vodacom FAILED TO GROW MPESA/>. Accessed 4 August 2015.
- Van der Bergh, R (2014, September 29). M-Pesa: Vodacom's money spinner in Tanzania. <http://techcentral.co.za/m-pesa-vodacoms-money-spinner-inTanzanai/51290/>
- Van der Geest, W. (Ed.). (1994). *Negotiating structural adjustment in Africa*. London: James Currey.
- Vodacom Group Limited. (2015). Interim results for the six months ended 30 September 2015. www.vodacom.co.za. Accessed 2 January 2016.

22

Mobile Payments in Turkey (as of 2013)

Nurdilek Dalziel and Can Ali Avunduk

Introduction: Overview of Electronic Payments in Turkey

With a population of over 77 million, Turkey is an attractive market for new products and services. As of 2014, gross national income per capita is 18,884 USD and over 17 % of the population is within the age range of 15–24, while it is 12 % for most European countries. At 62.9 %, Internet use is the highest among the 16–24 age category. Moreover, 72.1 million people have a mobile phone, reaching a penetration level of 90 % of the population.

Cash payments, however, still play a significant role. According to the Central Bank of Turkey, banknotes and coins in circulation account for approximately 40 % of the total money supply. The unbanked popula-

N. Dalziel (✉)

Staffordshire University Business School, Stoke-on-Trent, UK

e-mail: nudilek.dalziel@staffs.ac.uk

C.A. Avunduk

Independent researcher, Istanbul, Turkey

tion is estimated at 27 million, which is another factor for high dependence on cash payments.

Nevertheless, with the development of ICT and technological infrastructure, electronic payments started to gain momentum. Internet users reached 35.3 million in 2014. The numbers of credit and debit cards reached 57 and 113 million respectively (Interbank Card Centre, 2015). Online banking is offered by 25 retail banks, 15 of which offer mobile banking. People using online banking at least once in September 2014 number 32.3 million.

In comparison, the mobile phone market is dominated by three GSM operators: Turkcell, Vodafone and Avea. Initiated by Turkcell in April 2009, they all offer mobile payments to their subscribers. Since their introduction in 1994, mobile phones have been on a steady increase. As of June 2015, 72.1 million people have a mobile phone, reaching a penetration level of 90 %. Over one million people are estimated to have used their phone for banking transactions.

Mobile Payment Concept

The mobile payment concept has various meanings. The main understanding in Turkey is “direct carrier billing” (DCB), which refers to a scenario where GSM carriers’ billing infrastructure is connected to merchants who sell virtual/physical goods through online platforms.

According to industry sources, over 10 million consumers initiated a payment in Turkey via their mobile phone, while around 50 % successfully completed a payment. For consumers who wish to perform a mobile payment transaction through their GSM operator, the only requirement is to own a mobile phone that allows the user to send and receive SMS messages. They do not need to have a bank account, which is one of the main strengths of the Turkish DCB. A 27-million unbanked population now has access to an electronic payment method as long as they own a mobile phone. Mobile payments are not allowed to corporate GSC subscribers. If the customer is on a pay-monthly plan, the purchase price is charged to the customer’s mobile phone bill. Alternatively, if the customer is on a pay-as-you-go line, the purchase price is deducted from the prepaid account. In this system, the mobile device merely acts as a tool

to confirm the order. Other than the price of the purchased product, the customer needs to pay the standard fee for the text message (SMS) they send in order to confirm their purchase.

How Does Mobile Payment Work Through GSM Operators?

There are currently over 500 merchants offering mobile payments ranging from small-scale firms to large ones, trading locally or internationally (such as Facebook, Nokia, [bilyoner.com](#), [peakgames.com](#), [binnazabla.com](#), [mybilet.com](#)). Ninety-nine per cent of them are virtual merchants while some offer both virtual and physical transactions. In order to partake in the DCB, the given merchant first needs to contact a GSM operator or the technology platform to open a merchant account. When an agreement is signed between the merchant and DCB, the merchant account is activated. At this stage, DCB defines a unique identification code for the merchant as well as their products and services. Then, the merchant integrates DCB APIs to their website, which allows adding in payment options of “Pay Now by Sending an SMS” and “Pay Now through Web Site” (Fig. 22.1).

When a consumer wishes to make a payment using their mobile phone, there are several ways for authenticating their mobile payment transaction although the essential principle remains the same: confirming that the order is placed and confirmed by the MSISDN (i.e. GSM number) that is inserted into the mobile device used, and that the user is fully notified and informed about the transaction before they approve it. Currently used authenticated methods are as follows:

- **SMS-Keyword Scenario:** The user texts a pre-defined keyword to a short code (for example by texting MC to 7979 in order to subscribe to *Marie Claire* magazine). Following this, DCB sends a text to the consumer informing the transaction to be made. The payment process is completed after the transaction is confirmed by the consumer. The transaction is itemised on the consumer’s mobile phone bill (unless they are a pay-as-you-go customer). The total balance for the phone

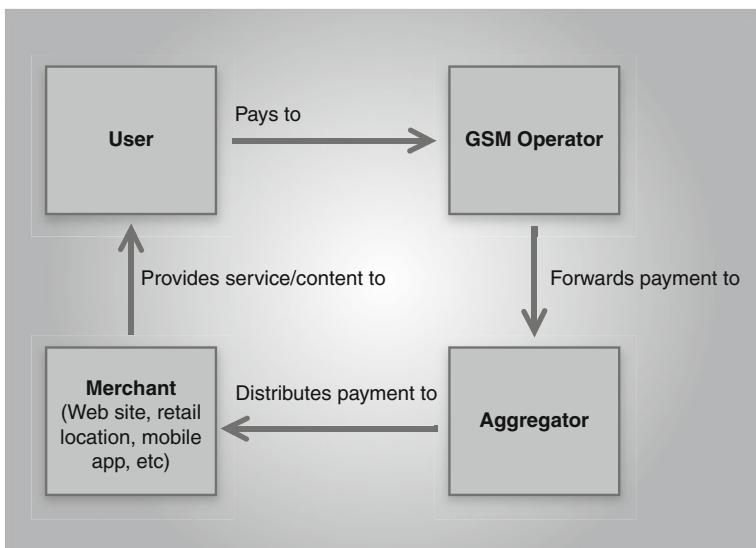


Fig. 22.1 An illustration of how the mobile payment system works (Source: authors' own)

bill needs to be paid in full by the due date. The mobile device and GSM operators simply provide an alternative payment method and hence do not deal with any product, order or delivery-related queries.

- **Web Scenario:** User enters their mobile number on the payment screen of the website where they want to make the purchase. Then the shopper receives an SMS requesting confirmation for the order. When the user replies to the incoming SMS with “EVET” (i.e. YES), the payment is approved. No PIN is required.
- **MSISDN forwarding:** This is a relatively new technique mainly used for purchases made for mobile apps. In this system the mobile device needs to be connected to the Internet through GSM Carrier’s connection (EDGE, 3G, and so on). The Carrier automatically detects the mobile phone number and bills the customer with no need for an SMS confirmation, which basically enables a “one-click-purchase” flow from the end-user perspective.

If the mobile phone is lost or stolen the consumer needs to inform the mobile operator. The consumer is responsible for any mobile pay-

ment made until they inform their operator. If the payment does not go through, the merchant does not provide the product. Prepaid subscribers do not constitute a risk for merchants. However, if a post-paid subscriber does not pay their monthly bill, the GSM operator does not pay the amount to the payment aggregator. In that case, the risk is on the aggregator and the merchant. Since the transaction limits are rather low this is not considered to make a significant impact on the take up of mobile payments.

Mobile Payment Aggregators (Technology Platforms)

Connecting GSM carriers' billing gateways with online companies, enabling payment infrastructure, and managing the money flow are done by third party companies, which are referred to as "payment aggregators", or "third party payment processors". To be able to perform as a payment aggregator, a company needs to be certified as an "official solution partner" of the GSM Carrier, meaning that the payment processor is capable of successfully integrating its platform to the carrier, and providing this service to merchants on behalf of the carrier.

Acquisition and retention activities, legal, technical and financial connections with merchants are mostly handled by payment aggregators, who are official solution partners to GSM carriers.

In Turkey, there are seven active mobile payment aggregators. Among those, [3pay.com](#) is the first and the largest company (50 % of the market share as of 2011), operating as a technology platform for all GSM operators in Turkey. 3pay is also the local partner of US-based social gaming company Zynga and the payment provider of Nokia for in-app purchases.

DCB is an alternative payment system to a virtual card. The virtual card is designed to be used as a credit card specifically for online transactions. It is not a physical card, so cannot be used to pay for store transactions. The customer sets the limit on the card for each transaction depending on the value of transaction they wish to undertake. After each transaction, the card limit can be reduced to zero, which is the most popular feature of a virtual card.

There is a significant difference between a virtual card and mobile payment. A virtual card is accepted by any online merchant who accepts a credit card whereas only merchants with a contractual partnership with one of the GSM operators can accept mobile payments. Since significantly more Turkish customers own a mobile phone than a payment card issued by a bank, the target customer base for mobile payments is potentially much larger.

DCB targets merchants to sell their technology rather than promoting the system to end-users (i.e. mobile owners). DCB does not require a traditional POS terminal. While marketing their technology, DCB highlights the advantages of their mobile payment platform from the merchant and consumer perspectives

Characteristics of the Turkish Mobile Payment Systems

DCB started in Turkey by Turkcell in April 2009. The driving forces for this technology are GSM operators and their technology partners (such as Mikro Odeme—ie Micro Payments) with no collaboration with financial institutions. Mobile payments do not aim to be a substitute for credit or debit cards. Their purpose is to provide a supplementary payment system particularly for online transactions that are underutilised. DCB wishes to increase their market penetration by taking advantage of low-value high-volume online entertainment transactions such as gaming and dating.

The merchant gets their payment for the product they sold from DCB. DCB charges the merchant a commission for their service, which is determined by GSM operators changing from 8 % (for store purchases) to 40 % (online games).

It is likely that all three GSM operators offer mobile payments due to competitive pressures in the market (a ‘me too’ approach). There is limited evidence that operators have made substantial investments to promote their DCB in particular to their customers, which will be elaborated in the next section.

Starting with the strengths of DCB, customers do not need to use a smart phone. While most contactless payments require an NFC-enabled

smartphone, any mobile phone that allows sending and receiving an SMS is compatible with DCB. Secondly, the purchase value is debited to a consumer's mobile account (or deducted from a prepaid credit balance) mostly after a confirmation SMS is sent by the consumer. Some mobile phones are initially locked to make a mobile payment (which requires a call to customer services to unlock the phone) while other providers offer their telephone unlocked. Although DCB can be used for store as well as online purchases, store purchases are rather limited, which takes us to the shortcomings of the Turkish DCB.

One important limitation is that each GSM operator builds up their own merchant network and restricts consumer purchases to their merchants only. In other words, consumers can use their mobiles with merchants that display their GSM operators' payment system logo. The market share for each GSM operator is likely to be limited and fragmented. It feels it is more important for operators to be seen as a player in this financial innovation rather than considering it as a long-term strategic initiative.

Another limitation of the DCB is that only low-value (i.e. micro) payments are allowed in the system, which differs across GSM Operators. Once the limit is reached no further payment is allowed. Lower limits are set for store transactions as well as for contractual subscribers. This can also be considered a strength since it limits consumers' financial loss when their card is lost or stolen and used fraudulently.

Customers need to build up a history with their mobile operator before they can participate in DCB. Normally the requirement is to be a customer of the given mobile operator for at least three months and no payment defaults. Promotion credit balances cannot be used to make mobile payments.

Other Mobile Payment Methods in Turkey

AVEA with a Bonus (Bonuslu AVEA)

With a partnership between Garanti Bankasi, GSM operator AVEA, MasterCard and digital security company Gemalto, AVEA subscribers can use their mobile phones like a credit card for contactless payments.

Transactions up to 35TL (9 GBP/11 USD) are allowed to proceed. Having started on a pilot basis in May 2010, the technology was extended to all AVEA subscribers in December 2010. Although the system requires an NFC-enabled smart phone, an ordinary mobile phone can also be used for contactless mobile payments by replacing an existing SIM card with an AVEA NFC SIM card. AVEA NFC SIM cards are sold at AVEA shops for 20TL (5 GBP/7 USD) to pay monthly customers and it is 40 TL for pay-as-you-go customers. The target market for AVEA with a Bonus system is the unbanked young population that own mobile phones. From a merchant perspective, this system eliminates the need for a POS terminal, and hence potentially more merchants can be included in the system.

Turkcell Mobile Wallet (Turkcell Cüzdan)

Recently, Turkish banks have started to offer mobile payments as part of mobile wallet. Turkcell, in partnership with four leading financial institutions (Akbank, Denizbank, Garanti Bankasi and Yapı Kredi Bankası), offers their customers the use of their mobile phones for a range of services from shopping to bus passes and corporate ID cards. Owing to NFC technology, a mobile phone can also be used for contactless transactions. In this system, Turkcell subscribers first need to transfer information about their Akbank, Garanti Bankası and Yapı Kredi Bankası credit cards to their mobile phones. Then when they shop they can choose any of the credit cards transferred to their mobiles to make the payment. Customers need to own an NFC-enabled smart phone and also to buy a special SIM card.

PayMobile

Launched in 2011, PayMobile is a contactless technology offered by collaboration between Yapı Kredi Bankası and Turkcell, which aims to enable a smart phone to act as a credit card. Customers download their credit card details onto their mobile. No more than three credit card details can be downloaded. This technology enables customers to use

their smart phone like a contactless credit card. PayMobile uses two systems: iCarte (for Visa transactions) and Sim Kart (for MasterCard transactions), which allows for transactions up to 35TL (9 GBP/11 USD). In addition to making a payment, customers can use PayMobile for a range of services such as viewing payment details, card limit, statement balance and access to previous statements. There is a one-off start-up fee which is 79TL (21 GBP/26 USD). In terms of refunds and exchanges, the policy that applies to credit card payments is valid for PayMobile. The transaction is charged to the chosen credit card statement.

Consumers' View on Mobile Payment Systems

Consumers' awareness of mobile payment services is rather low in Turkey. Despite receiving monthly phone bills, most customers do not recall receiving any direct mail regarding to DCB. Similarly, there are limited advertising and promotion campaigns through mass media. According to MO sources, payment providers should operate in a B2B2C context, rather than B2C, players being themselves, merchants and end-users. It is the merchant who markets this service to their customers. Potential customers are informed of the new payments system at the point-of-sale.

Another factor behind the lack of consumer awareness of mobile payments is related to the target market. The system targets relatively young people who are frequent users of online gaming sites, social networks and e-commerce. Especially, the online gaming industry in Turkey has been popular in recent years reaching 200 million USD transaction value in Turkey. According to MO, this market offers a good potential for cashless payments.

When we explained the features of DCB, customers did not seem too enthusiastic about mobile payments. Firstly, transaction limits were commented as highly restricting. Secondly, in Turkey the volume and value of virtual purchases are still behind most European countries. Online shoppers tend to use a virtual card, which is relatively more secure than a credit card. Therefore, customers were not sure what benefits they would receive when making a virtual payment by their mobile phones in comparison with a virtual card. Lastly, this was a time in Turkey when most

banks were promoting new products and services such as mobile banking, mobile wallet, mobile signature, contactless cards and so on. Customers felt there was an information overload, suggesting issues with customer segmentation and direct marketing. Out of such frustration, as pointed out by one of our interviewees, customers viewed mobile payments “as another technological fad”. If mobile payments are to be expanded to a wider consumer segment, these are some of the issues that need to be addressed by GSM operators and their business partners.

To conclude, the power of the Turkish DCB is related to their potential to contribute to a cashless society by tapping into a market that is underserved. Turkish DCB supplements, rather than substitutes, other payment methods since the system targets a consumer segment which is not exploited by other electronic payment methods: the *unbanked population*. DCB is still in its early stages; hence it is too early to comment to how successful the system has been in achieving its objectives. Nevertheless, our interviews with industry sources and the coverage in Turkish media suggest that the popularity and market share of mobile payments are likely to increase and hence will promote a further step towards a cashless society in Turkey.

Bibliography

- Interbank Card Centre (Bankalararasi Kart Merkezi). (2015). Number of POS, ATM, Cards. <http://www.bkm.com.tr/en/pos-atm-kart-sayilari/>. Accessed 12 Dec 2015.
- Turkiye Istatistik Kurumu. (2015). Hanehalkı Bilişim Teknolojileri Kullanım Araştırması, 2015. <http://www.tuik.gov.tr/PreHaberBultenleri.do?id=18660#>, Accessed 12 Dec 2015.
- Unsal, U. (2015). Turkiye'de Bankacilik Sektoru: 20111 – 2015 Eylul Turkiye Bankalar Birligi, <http://www.tbb.org.tr/tr/arastirma-ve-yayinlar/arastirma-ve-sunumlar/2015---1443>. Accessed 12 Dec 2015.

23

Electronic Payment System of Thailand: Mobile Banking Market Competition

Jarunee Wonglimpiyarat

Introduction

Many banks in Thailand are currently launching mobile banking services to capture the benefits of wireless connectivity. They view the mobile-enabled commerce as a strategic opportunity to offer new experiences of banking services to their customers. Under the competitive landscape of mobile commerce (m-commerce), Thai banks compete to use mobile phones as a new delivery channel to get closer to customers. This chapter explores the electronic payment system of Thailand with a focus on the mobile banking system and strategies of competition. The discussion is using the Managing Migration Paths Model¹ to support an analysis of the competitive landscape for mobile banking.

¹ Hamel Gary and Prahalad C.K., *Competing for the future*, (Harvard Business School Press, Boston, MA, 1994).

J. Wonglimpiyarat (✉)

College of Innovation, Thammasat University, Bangkok, Thailand

e-mail: jaruneew@tu.ac.th

Following the introductory discussion, the second section reviews the long-term adoption of telephony and the mobile banking innovation system of Thailand. The third section analyses the competitive landscape and strategies in competing for the future of mobile banking in Thailand using the Managing Migration Paths Model. The last section concludes with the implications of Thailand's readiness in moving towards an m-money economy.

Long Term Adoption of Telephony: The Case of Thailand

The payment system in Thailand can be divided into two major systems: physical payment (cash and cheque payment) and e-payment (Automatic Teller Machine or ATM, credit cards, Electronic Fund Transfer at the Point-of-Sale or EFTPOS, smart cards, Internet banking and mobile banking). E-payments are set to have a huge growth potential whereby mobile banking can be seen as an approach for providing financial services through the use of ICT. Figure 23.1 provides an overview of the mobile banking innovation system in Thailand. The payment landscape is comprised of commercial banks, foreign bank branches and specialized financial institutions, all of them regulated by the Bank of Thailand (BOT). The banking industry is closely linked with the ICT industry since the functionalities of mobile banking innovations hinge on the strategic alliances between banks and mobile phone companies. Major players in the Thai mobile communication market (having the largest mobile networks) are Advanced Info Service Public Company Limited (AIS), Total Access Communication Public Company Limited (DTAC) and Truemove (mobile phone operator of True Corporation). The diffusion of mobile banking innovations (S-curve of the innovation life cycle) is based on the ICT technology to enable 3G services.

According to a survey by the International Telecommunication Union (ITU) in 2014, Thailand's Internet use is the highest, climbing from the 105th rank in 2013 to 71st. In the Network Readiness Index (NRI) by the World Economic Forum, Thailand was ranked 67th in terms of ICT competitiveness as it climbed up from 74th in 2013. The fast paced ranking shows the high growth of ICT development in Thailand.²

² International Telecommunication Union (ITU) *Measuring the Information Society Report*, (International Telecommunication Union, Geneva Switzerland, 2014).

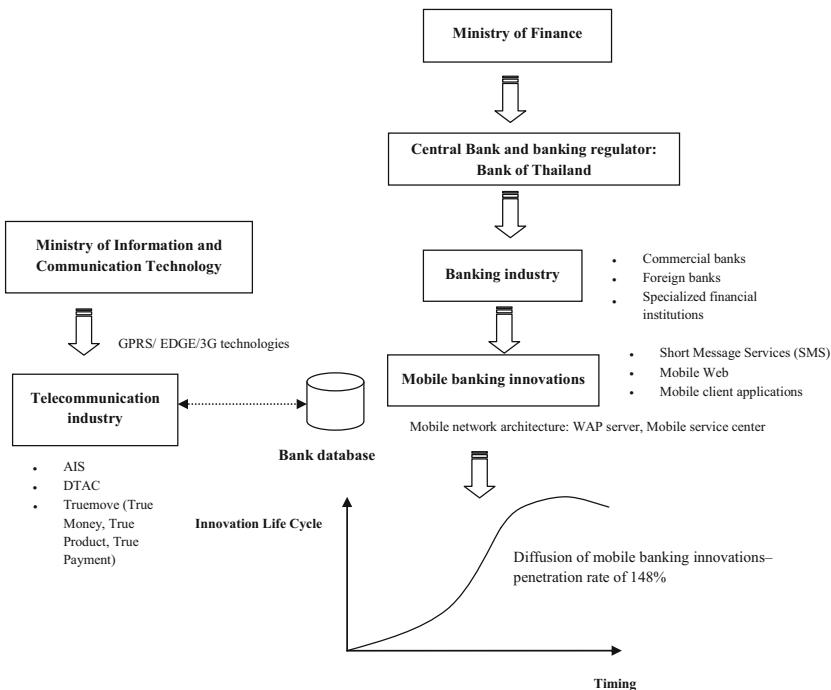


Fig. 23.1 Mobile banking innovation system in Thailand (Source: Author's own design)

The Thai mobile market moved towards 3G networks in 2013 and now mobile operators are committing to 4G. The mobile penetration of Thailand in 2014 was 146 % and increased to 148 % in the first Quarter of 2015 (Fig. 23.2). The same source reported that, in line with the high penetration rate, the use of smartphones had the largest share in the Thai market (the market share of feature phones and smartphones was 44 % and 56 % respectively). Figures from the National Broadcasting and Telecommunication Commission also showed the subscriber market share of the three major mobile network operators in Thailand in 2014 as being AIS 46.20 %, DTAC 29.20 %, Truemove 24.60 %, respectively.

With the high mobile penetration rate (148 % in Quarter 1 of 2015) and 98.9 million phone subscribers (compared to the fixed-line subscribers of only 5.6 million), banks see mobile commerce (m-commerce) as an opportunity to compete in the digital era. Many banks in Thailand use mobile

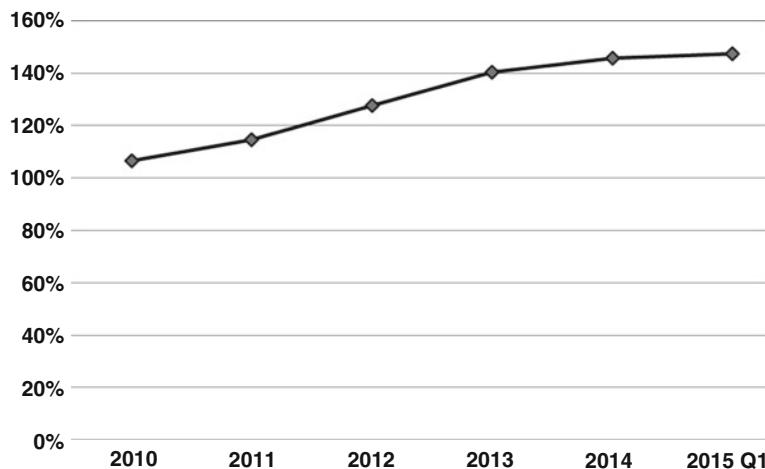


Fig. 23.2 Mobile penetration rates in Thailand, years 2010–2015 (Source: National Broadcasting and Telecommunication Commission)

phones as strategic tools to offer value-added financial services to their customers. There are seven banks competing to provide mobile banking services in Thailand: Kasikorn Bank, Thai Military Bank, Siam Commercial Bank, Bank of Ayudhya, Standard Chartered Bank, Krung Thai Bank and Bangkok Bank. Strategically, banks see the mobile phone as a new delivery channel for establishing close relationships with customers in order to cross-sell banking products/services and aim to achieve long term profits.

Competing for the Future of Mobile Banking in Thailand

Competing in the Future with the Managing Migration Paths Model

Hamel and Prahalad (1994) propose the Managing Migration Paths model to show how firms could create future markets and technology by entering into strategic alliances. The model stresses the importance of collaboration as they argue that collaborative innovation is less risky

and increases probability of success due to direct contact with customers. According to the same source, it is unlikely that any single firm would have sufficient capability to compete in all domains of competition in a complex economic environment. They argue that the use of collaborative strategy would reduce the risk of competitive innovation, reduce the absolute size of risks and capital involved and is necessary for the delivery of value to customers.

In addition, they argued that in competing for the future, companies need to create their own futures, envision new markets, and reinvent themselves. The characteristics of the Managing Migration Paths model are:

- (i) Creating and managing coalitions
- (ii) Learning and experimentation in the market
- (iii) Building global brand and distribution
- (iv) Setting standards and influencing regulation
- (v) Investing in core competencies

The term ‘mobile banking’ refers to a channel through which customers interact with a bank through non-voice applications such as text- or WAP-based banking services using a mobile device, such as a mobile phone or personal digital assistant (PDA).³ Mobile banking can be seen as an evolutionary step of money remittances to improve the payment system. Mobile commerce (m-commerce) represents the growth opportunity for the players in the financial services industry to extend financial services through mobile devices and wireless communication technologies.^{4,5}

In the mobile banking industry, collaboration can be seen as a means to create value networks and ensure adoption. Mobile banking services involve complexities and difficulties that require capabilities that are beyond the power of a single firm to provide.⁶ The advancement in infor-

³ Hoehle Hartmut and Lehmann Hans, “Exploring the state-of-the art of mobile banking literature”, (7th Global Mobility Roundtable Conference, Proceedings published by University of Auckland, Auckland, New Zealand, November 23–25, 2008).

⁴ Jenkins Beth, *Developing Mobile money ecosystems*, (IFC and the Harvard Kennedy School, 2008).

⁵ Laukkanen Tommi, ‘Measuring mobile banking customers’ channel attribute preferences in service consumption, *International Journal of Mobile Communications*, Vol. 5, 2 (2007): 123–138.

⁶ Wonglimpiyarat Jarunee, ‘Does complexity affect the speed of innovation?’, *Technovation*, Vol. 25 (2005): 865–882.

mation and communications technology (ICT) presents a new opportunity to improve banking capacity in response to a volatile economic environment and changing competitive conditions. The mobile banking innovation requires an extended network across several industries to allow multifunctional capabilities. The analyses of the Thai mobile banking system in the next section highlight the importance of collaboration across the industries to enable the development of the mobile wallet in financial services.

Analysis of Competitive Landscape and Strategies of Competition in the Thai Mobile Banking Market

In Thailand, the increasing competition forces banks to seek strategic alliances (network collaboration) to offer innovative solutions in the payment market. It is argued that the progress of mobile banking along the innovation life cycle needs network linkages between banking and telecommunication industries. The analysis of competing for the future of mobile banking in Thailand based on the Managing Migration Paths Model (Hamel and Prahalad 1994), shown in Fig. 23.3.

The analysis of the competitive landscape in the Thai mobile banking is shown in Tables 23.1 and 23.2. They present a study focused on the leading banks: Bangkok Bank, Kasikorn Bank, Siam Commercial Bank, Krung Thai Bank and Bank of Ayudhya. These five banks had the highest growth performance in the Thai banking industry in 2014.

In clearing a path towards a future of mobile banking in Thailand, banks enter into strategic alliances to provide value-added services to their customers. Kasikorn Bank is the most aggressive in expanding its mobile banking market. By partnering with DTAC, Kasikorn Bank can develop ATM SIM for mobile payment transactions, using a secure platform for financial transactions. Kasikorn Bank also collaborates with Advanced Info Service Public Company Limited (AIS), Samart i-Mobile, HTC Corporation (HTC) and Telephone Organization of Thailand (TOT) to offer K-Mobile Banking Plus. The use of collaborative strategy according to Hamel and Prahalad's

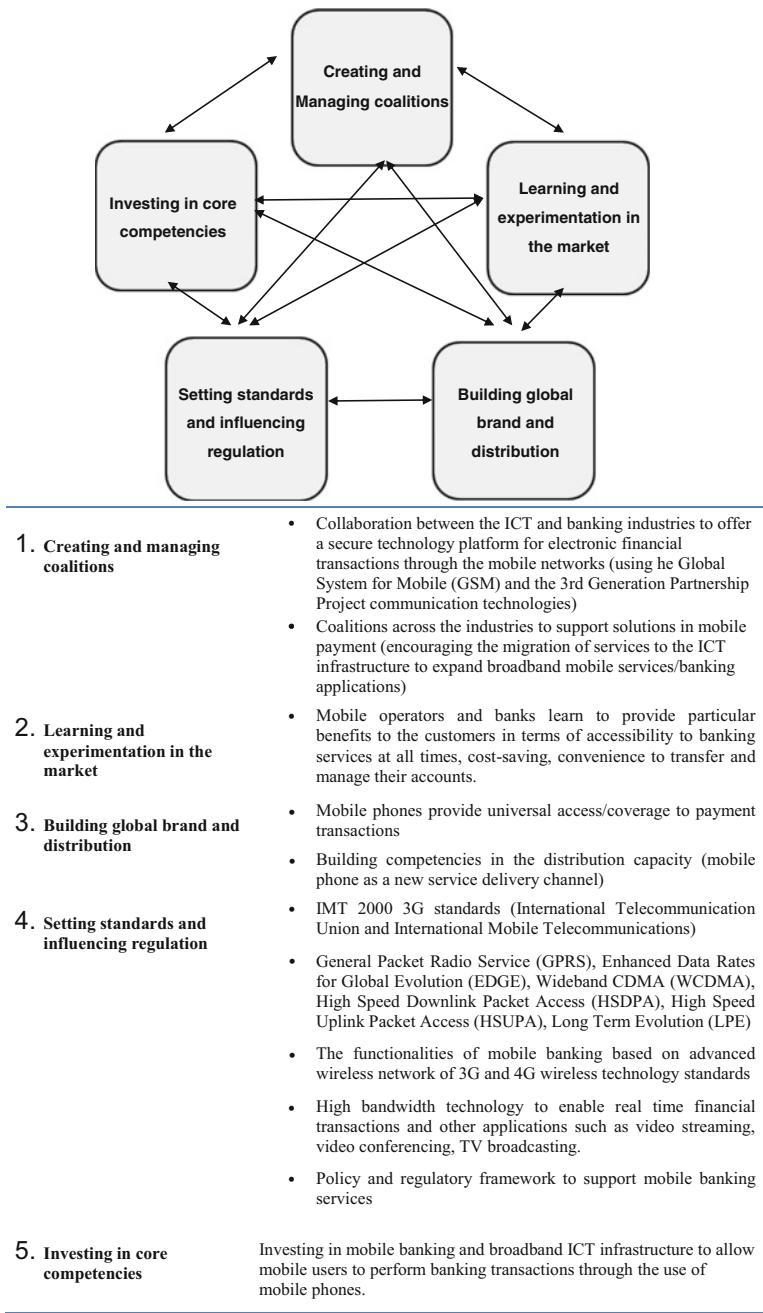


Fig. 23.3 Managing migration paths model and the future of mobile banking competition in Thailand (Source: author's design)

Table 23.1 Summary the competitive landscape in the Thai mobile banking, 2014

Bank	Bangkok Bank	Kasikorn Bank	Siam Commercial Bank	Krung Thai Bank	Bank of Ayudhya
Year of establishment Mobile banking services	1944	1945	1907	1966	1945

BBL Mobile iBanking

K-Mobile Banking Plus,
K-Mobile Banking SMS,
K-Mobile Banking ATM
SIM

SCB Mobile Banking

KTB Online@Mobile Banking

Krungsri Mobile Banking

Network collaboration (Managing Migration Model)	Business partner with AIS, DTAC, True, Hutch and international partner of Brookfield to support Bangkok Bank's mobile banking capabilities	Business partner with DTAC to develop ATM SIM for mobile banking services	Business partner with AIS to provide mobile Internet services	Business partner with DTAC for GPRS services	Business partner with AIS, DTAC and TrueMove as well as Cisco to provide audio, video and web conferencing capabilities	Business partner with AIS, DTAC and TrueMove providers to provide GPRS/EDGE/3G mobile banking services
---	--	---	---	--	---	--

Source: Author's own design based on the Thailand Commercial Banking Report

Table 23.2 SWOT analysis of the competitive landscape in the Thai mobile banking, 2014

Bank	Bangkok Bank	Kasikorn Bank	Siam Commercial Bank	Krung Thai Bank	Bank of Ayudhya
Strengths (S)	Strong corporate and retail customer base across Asia One of the region's strongest brand names Largest commercial bank in Thailand and one of the largest regional banks in Southeast Asia	First bank to launch mobile banking services and thus build customers' confidence and credibility Strong corporate and retail customer base and strong brand in Thailand	Extensive branch network Links to Thailand's powerful royal family WAP services can be used in all operating system platforms	Government-backed, state enterprise bank Thailand's largest retail bank	Strong brand and wide branch network
Weaknesses (W)	Slowing loans and deposits growth as the economic climate worsened	K-Mobile Banking ATM SIM could not serve all customer groups	Late entry in the mobile banking market	No international presence and dependence only on the Thai market	Relatively high NPL exposure

Opportunities (O)	<p>Well placed for expansion into China, where the bank has cultural and historic ties</p> <p>The first to market and so could build trust and credibility in the mobile banking system.</p> <p>Aggressive collaboration with mobile phone providers supports strong profit growth</p>	<p>The bank's main revenue is from mutual fund selling and so increases customer convenience via mobile use</p>	<p>Rapidly expanding branch network</p>	<p>New focus on profitability</p> <p>Growing competition in domestic market and from overseas (particularly from non-bank financial institutions)</p> <p>Political uncertainty in Thailand</p>
Threats (T)	<p>Growing competition in domestic market and from overseas (particularly from non-bank financial institutions)</p> <p>Political uncertainty in Thailand</p>	<p>Growing competition in domestic market and from overseas (particularly from non-bank financial institutions)</p> <p>Political uncertainty in Thailand</p>	<p>Growing competition in domestic market and from overseas (particularly from non-bank financial institutions)</p> <p>Political uncertainty in Thailand</p>	<p>Growing competition in domestic market and from overseas (particularly from non-bank financial institutions)</p> <p>Political uncertainty in Thailand</p> <p>Political uncertainty in Thailand</p>

Source: Author's own design based on the Thailand Commercial Banking Report

Managing Migration Paths model has helped turn Kasikorn Bank to be the leader of digital banking in Thailand with the highest account numbers of 7 million or 38 % of the total market share in 2014.

The use of strategic alliances underlying the competitive banking landscape aims at upgrading the core banking system and expanding the e-banking channels. This is evident in the case of Bangkok Bank's collaboration with Brookfield, Fiserv's Mobile Money service, to support its mobile banking capabilities; strategic alliances of Siam Commercial Bank, Krung Thai Bank and Bank of Ayudhya with AIS, DTAC and True Move to build a secure banking platform and enable short messaging service (SMS), wireless application protocol (WAP) and downloadable mobile applications.

Conclusions

This chapter discusses the electronic payment system of Thailand with a focus on the development of the mobile banking system and strategies of competition. The analyses and discussions of the competitive landscape of mobile banking innovations in Thailand based on Hamel and Prahalad (1994)'s Managing Migration Paths Model have shown the importance of strategic alliances between the banking and ICT industry to offer electronic and mobile payments (e-payments and m-payments). Currently, Thailand has a high mobile penetration in addition to a strong retail network, reflecting the country's readiness for m-banking opportunities. With the mobile penetration rate at 148 % in Quarter 1 of 2015, banks compete to use mobile phones as a new delivery channel in offering financial services to their customers in the digital era.

At present, there are problems regarding interoperability issues and lack of common technology standards in the mobile banking system. The move towards the m-money economy needs common technology standards for mobile banking to achieve technical and data content compatibility for multifunctional capabilities. The development of standards and security for mobile transactions would help support interoperability among multiple mobile ecosystems. Furthermore, in transitioning from cash to electronic money, Thailand needs risk-based regulations

on m-money (a mobile money regulatory framework) to support the mobile banking innovations. Given that the e-payment system is a key contributor to economic growth, the analyses in this chapter have shown that e-payment systems have become increasingly prominent in the Thai economy. This study provides useful lessons and implications for practitioners to support the potential of the mobile banking take-ups (diffusion of mobile banking innovation) in the future of digital banking.

Further Reading

- Ernst & Young. (2016). Mobile banking: Financial services meet the electronic wallet. <http://kw.wharton.upenn.edu/ey-global-banking/mobile-banking/>. Accessed 12 Jan 2016.
- Gianni, F., & Pier Luigi, P. (2015). An analysis of features and tendencies in mobile banking apps. *Procedia Computer Science*, 56, 26–33.
- Yue, Z. M., & Mark, D. (2007). *High-tech entrepreneurship in Asia: Innovation, industry and institutional dynamics in mobile payments*. Cheltenham: Edward Elgar.

Bibliography

- Hamel, G., & Prahalad, C. K. (1994). *Competing for the future*. Boston: Harvard Business School Press.
- Hoehle, H., & Lehmann, H. (2008, November 23–25). Exploring the state-of-the art of mobile banking literature, 7th Global Mobility Roundtable Conference, Proceedings published by University of Auckland, Auckland, New Zealand.
- International Telecommunication Union (ITU). (2014). *Measuring the information society report*. Geneva: International Telecommunication Union.
- Jenkins, B. (2008). *Developing mobile money ecosystems*. Cambridge, MA: IFC and the Harvard Kennedy School.
- Laukkanen, T. (2007). ‘Measuring mobile banking customers’ channel attribute preferences in service consumption. *International Journal of Mobile Communications*, 5, 2.
- Wonglimpiyarat, J. (2005). Does complexity affect the speed of innovation?. *Technovation*, 25, 865–882.

24

The Determinants of Mobile Payment Adoption: An Intercultural Study

Uwe Hack

Introduction: Mobile Is the New Technology Driver

The constantly growing and expanding market of mobile devices in today's fast advancing world has initiated numerous innovative functions and services that are available on mobile devices. The increasing role of smartphones or tablets in our everyday lives determines the demand for the services that make our lives easier and more convenient, help to manage daily routines faster, as well as enables us to stay connected and remain secure at the same time.

The mobile payments service is currently experiencing a rise. It is a service by which movement of money can be accomplished through a hand-held device thereby potentially replacing all other more complicated forms of payment. This comprehensive application together with the

U. Hack (✉)

Furtwangen University, Villingen-Schwenningen, Germany
e-mail: hack@hs-furtwangen.de

strong growth that mobile payments has experienced in the last few years (see Fig. 24.1) explains why in addition to traditional banks and credit card organizations, a number of very large international groups from different industries, such as telecommunications (Deutsche Telekom) retail and the digital ecosystems (Paypal, Google, Facebook), in addition to a large number of start-ups are focusing on this market.

In addition to the German and US companies mentioned above, quite recently, Chinese companies such as Alibaba and Tencent have impressed the market by an amazing growth of their respective financial services businesses. In Africa, M-Pesa, the local telecoms operator in Kenya has shown how mobile payment systems can provide access to non-cash money transfers to the unbanked part of the population. Thus, as in many other areas of the digital world, mobile payment is an international if not global development gaining market share from traditional payment systems in developed and developing countries alike. If mobile payments are to be understood in the context of global competition, there are two main questions to be answered. First, which conditions favour or hinder the development of new technologies, such as mobile payments; and secondly, are these conditions different from country to countries?

The major adoption of mobile payments worldwide is yet to be surveyed. There are various reasons that cause differences in attitudes towards the new technological wave of mobile technology among countries and

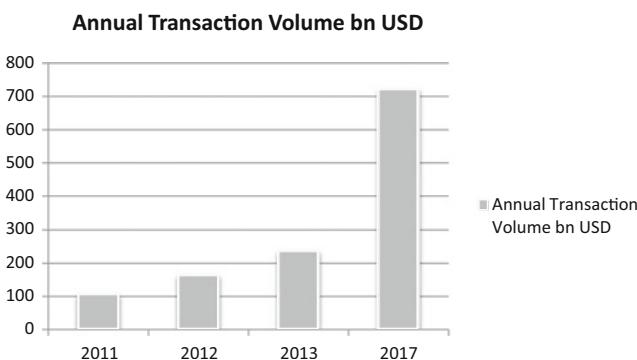


Fig. 24.1 Global mobile payment transaction volume from 2011 to 2017
(Source: Statista 2014. Statista, *Global Mobile Payment Transaction Volume from 2010 to 2017*, <http://www.statista.com/statistics/226530/mobile-payment-transaction-volume-forecast/> (accessed, Mar 19 2014))

particularly mobile payments. Among them there are not only financial factors, but also cultural determinants. Values and lifestyles differ around the world; therefore, there are different barriers that prevent new technology from expanding. This explains the cross-cultural orientation of this study. As cultural aspects, as well as questions related to economic development, appear to be relevant for the development of banking technology, a cross-cultural study into the two questions mentioned above was conducted, covering the geographical regions of China, Germany, Russia, the Hispanic world and France.

Conceptual Framework Derived from the Technology Acceptance Model

Technology adoption is a well-researched area both from a theoretical and empirical point of view. Our research is based on an adjusted version of the Technology Acceptance Model (TAM). Our version of TAM is based on three drivers of technology adoption, which are perceived usefulness, perceived ease of use and trust. According to Davis et al. (1989) perceived usefulness is defined as “the degree to which a person believes that using a particular system would enhance his or her job performance”.¹

Clarke (2008) summarizes the unique value proposition dimensions related to mobile-commerce to be: ubiquity, convenience, localization, and personalization.² Ubiquity refers to value offerings that will be provided anywhere and anytime. The convenience of mobile-payment methods perceived by consumers may have different aspects. These aspects include portability, flexibility, speed, ease of use, and ease of setting up and learning to use each payment method. Clarke relates convenience to the factors creating time and place utility for users, namely, the service can be used at their convenience. Localization is about value that can be added depending on a user’s geographical position. Knowing the location

¹ Fred Davis, Richard Bagozzi, Paul Warshaw, “User Acceptance of Computer Technology: A Comparison of Two Theoretical Models.” *Management Science* 35 (1989): 982–1003.

² Clarke Irvine, “Emerging Value Propositions for M-Commerce.” *Journal of Business Strategies* 25 (2008): 41–57.

of the consumer creates a significant advantage for mobile-commerce. Finally, personalization regards value propositions based on individual preferences and interests.

Trust can be described as the belief of the trustor that the trustee will fulfill the trustor's expectations without taking advantage of the trustor's vulnerabilities. Past research on online trust has highlighted two dimensions of trust: trust in trading partners and trust in the enabling infrastructure.³

According to TAM, the perceived ease of use, or convenience, is one of the primary determinants for adoption of mobile payments. Perceived ease of use is "the degree to which a person believes that using a particular system will be free of effort".⁴ Ease of use in the context of mobile payments includes the following: simplified registration procedures, uncomplicated payment processes, fast access to customer services, minimal steps required to make a transaction and extensive input capabilities.⁵ It also contains various attributes, such as portability, flexibility, speed, ease of setting up and the learning process.⁶

In summary, the three dimensions that should influence intention to use mobile payment systems can be related well to actual behavior and cultural traits and therefore a questionnaire design was used in order to determine the importance of individual factors as well to understand similarities and differences between the different regional groups. We have used the questionnaire in order to obtain information on these three factors as well as the general attitude of respondents towards using mobile payments and the experience of using mobile payments. We have used a structural model in order to relate the drivers to the attitude towards adoption and tested for cultural differences both in the structural model

³Chandra Shalini, Shirish Srivastava, and Yin-Leng Theng, "Evaluating the Role of Trust in Consumer Adoption of Mobile Payment Systems : An Empirical Analysis." *Communications of the Association for Information Systems* 27 (2010): 561–88.

⁴Slade Emma, Michael Williams, and Yogesh Dwivedi, "Mobile Payment Adoption: Classification and Review of the Extant Literature." *The Marketing Review* 13 (2013): 167–90.

⁵Tobbin, Peter, and John Kuwornu, "Adoption of Mobile Money Transfer Technology: Structural Equation Modeling Approach." *European Journal of Business and Management* 3 (2011): 59–78.

⁶Viehland, Dennis, Roslyn Siu, and Yoong Leong, "Consumer Willingness to Use and Pay for Mobile Payment Services." *International Journal of Principles and Applications of Information Sciences and Technology* 3 (2010): 35–45.

as well as in uni- and multivariate tests. The questionnaire used closed-ended questions with a five-point Likert-type scale.

Data and Sampling

Our goal was to collect data on the perspectives of potential mobile payment users. The aim was to obtain information on the attitude towards using mobile payments, the reasons for doing so, and whether there are cultural differences in those aspects. To do this, we developed a questionnaire in the respective language of our geographical regions. We also

Table 24.1 Socioeconomic factors

Variables	Responses	No/share
Gender	Female	41 %
	Male	59 %
Cultural background	Germany	82
	China	40
	Other	25
	Hispanic	22
	Russia	20
	Francophone	12
Age	Digital natives (<24)	37 %
	Digital immigrants (>34)	27 %
	Transition (24–34 years)	36 %
Education	High school	21 %
	Vocational training	13 %
	Bachelor	37 %
	Master and doctorate	29 %
Occupation	Natural science	7 %
	Social sciences	7 %
	Engineering	29 %
	IT	7 %
	Health sciences, medicine	5 %
	Legal profession	2 %
	Politics	0 %
	Business administration/economics	36 %
	Languages and culture	4 %
	Art and music	7 %

Source: Author's own

wanted to consider socioeconomic factors, such as education, income, and more. Therefore, we decided to conduct the survey in the outlet city Metzingen, a shopping outlet especially designed for affluent shoppers from around the world. In order to limit distortions due to language issues the questionnaire was provided by native speakers who were available for questions if needed.

In total we obtained 201 valid questionnaires, 82 from German participants, 40 Chinese, 22 Hispanic, 20 Russian, 12 francophone and 25 from other countries. The socioeconomic factors describing our sample can be found in Table 24.1 below. Our sample indicates that the respondents tend to be well educated, (more than 66 % have an academic education) and that the sample is well spread by gender, with the share of women being 41 %. In terms of participants' profession, engineering, business administration and economics represent about two thirds of our respondents while all other professions are evenly spread amongst the rest. Our survey participants tend to be relatively young with 73 % of participants younger than 35 years.

Results

Existing literature with regard to technology adoption suggests that in addition to the features of technology as described in the previous chapter, income, education and age tend to be relevant factors determining technology adoption in general. We would therefore expect to find a generally high interest in technology amongst our respondents both in terms of equipment as well as applications. Therefore our first test was related to this more general question. As can be seen from Table 24.2, the technical requirements and skills seem to be available to most respondents. Of the respondents, 92% have the required hardware and 80 % have experience in online-banking usage. Interestingly, most of the respondents (85 %) were aware of mobile payments as a service.

Table 24.2 also shows that banking applications are already widely used on mobile devices. There is a clear tendency to use mobile payment applications by a large majority of our respondents and around a quarter consider mobile payments as the preferred method of payment. In total,

Table 24.2 Technical resources and skills

		Answer	Percentage
1. Do you use a bank card?	Yes	97	
	No	3	
2. Do you use online banking?	Yes	80	
	No	20	
3. Do you use a smartphone?	Yes	92	
	No	8	
4. Do you use a tablet?	Yes	64	
	No	36	
5. Do you use online banking applications on your mobile device?	Yes	49	
	No	51	
6. Have you heard about mobile payments?	Yes	85	
	No	15	

Source: Author's own

85 % are aware of the ability to use a mobile device for making payments. A surprising 45 % of respondents have already used a mobile device for payment transactions. In line with other studies in this field we also find that mobile payments are not yet a common and well-established payment method, as only 18 % of participants reported to use mobile payments on a regular (i.e. weekly) basis.

Overall, we can conclude the following. On the one hand, awareness about the possibility of mobile payments is high. On the other hand, the technical equipment, both hardware and software, is widely available. Thus, the major ingredients for successful market development exist. Based on TAM, however, having the awareness and technical equipment is not sufficient for market success. We also need to consider facilitating factors as well as to examine an acceptable level of perceived risk.

Perceived Usefulness and Ease of Use

As a major driver then of mobile payment adoption we consider perceived ease of use and perceived usefulness. We have presented altogether 18 different scenarios to evaluate perceived usefulness on an individual usage basis and have also calculated the total score for perceived usefulness across all 18 scenarios. Looking at individual scenarios, the most

attractive application of mobile payments tends to be payments for everyday items and for small amounts. For instance, transportation and the ability to pay and store electronic tickets on mobile devices; to buy tickets for buses and trains; or to pay and extend parking time without going back to the car.

Evaluating the total score of perceived usefulness, there is a clear distinction between people that have already actively used mobile payments compared to people without such an experience. In line with Wang (2012)⁷, we find that perceived usefulness is higher if there is already a practical experience with the product or service to be evaluated. Actually experiencing the benefits of mobile payments appears to be strengthening the perceived usefulness of the mobile payment application as the average evaluation across all the 18 scenarios was higher by the respondents who have already used mobile payment systems.

Ease of use was tested in a similar way, looking at nine individual scenarios and the total score for all scenarios. As before, we find statistically significant differences between the experienced users of mobile payment systems and the respondents without such experience. Amongst the aspects suggested by Clarke (2008) we find the speed of making payments through a mobile was most valuable to our respondents together with the general perception that using a mobile is a convenient way to make payments.

Trust and Perceived Risk

A major obstacle for the use of a mobile as a payment device is the lack of trust in the security of the technology and the applications. More than half of our sample had reservations with regard to data security and the security and reliability of the mobile device. Looking at the two dimensions of trust separately, there is also a clear pattern with regard to the trust in the trading partner. The large majority of respondents (around 70 %) preferred traditional providers of payment services such as banks

⁷Wang Alex. 2012. "A Preliminary Model for Mobile Payment Acceptance." *International Journal of Mobile Marketing* 7: 37–51.

and credit card organizations, with the banks being clearly in the lead. People that so far had no experience with mobile payment systems were particularly concerned about the second dimension of trust, namely, the enabling infrastructure. However, both the experienced users and the respondents without experience showed a high sensitivity with regard to the riskiness of mobile payments systems. We did not find a significant difference between the two groups in the total score. A general lack of trust in mobile devices as well as the mobile infrastructure in particular were the major reasons provided in order to explain the lack of trust in the payment service. Interestingly, there appears to be no difference in the evaluation of risk and trust by age. Even the digital natives score high in their perception of risk and do not significantly differ in their assessment from other age groups. Mitigating factors that show the ability to reduce the perceived riskiness of mobile payment systems are an adequate framework of legal protection and the opinion of one's peers.

Cultural Differences

The general prerequisites for mobile payments with regard to infrastructure are met in all countries surveyed and they all have the required mobile banking applications. There were also no significant differences between the countries with regard to availability of mobile devices and respondents' familiarity with mobile banking applications. However, the actual use of mobile devices for banking transactions differs from country to country. In general, we find significant differences between the different geographical regions in particular with regard to perceived ease of use, while the assessment of risk does not differ from one region to the other. Chinese and French users are very active users while in the other countries less than 50 % of respondents were actively using a mobile for banking services. In particular Chinese respondents show not only a higher level of activity but also evaluate significantly higher the concepts' ease of use and perceived usefulness. One explanation for this could be that these evaluations are made relative to other alternatives, in this case the traditional banking system. In line with other developing countries the traditional banking system in China is less well established within the

broad population and therefore the long standing relationships with traditional banks have not been established in those countries. This might explain why other providers of payment systems such as mobile operators and providers find it easier to be considered valuable alternatives.

The Relationship Between Intention to Use and the Factors of TAM

In order to build a structural model relating the factors of TAM to the intention to use mobile payment systems we reduced the scenarios describing perceived ease of use, usefulness and trust on the basis of factor analysis. The factor analysis provided the main components presented in Table 24.3 explaining around 62 % of the total variance in responses. Our factor analysis yields that the concept perceived usefulness can be separated into usefulness in making payments and usefulness with regard to services associated with making payments. One example for such a service related to the payment is the ability to receive the invoices online and store invoices on the mobile device.

We used these five factors in our structural model estimating the following regression model:

$$\text{Intention to use} = \alpha + \beta_1^* \text{ "perceived usefulness payments"} + \beta_2^* \text{ "perceived usefulness service"} + \beta_3^* \text{ "Combined usefulness and ease of use"} \\ + \beta_4^* \text{ "perceived ease of use"} + \beta_5^* \text{ "trust".}$$

Overall, we find a significant relationship between usefulness, ease of use and trust and our dependent variable "Intention to use". Our model explains 45 % of the variability of our dependent variable and all explanatory variables are significant at the 95 % level of confidence. In line with Thakur (2013)⁸ and Chandra (2010)⁹ we can therefore confirm that these factors are major drivers of mobile payment adoption. We have subsequently tested whether gender or age will be relevant factors in our mul-

⁸Thakur, Rakhi, "Customer Adoption of Mobile Payment Services by Professionals across Two Cities in India: An Empirical Study Using Modified Technology Acceptance Model." *Business Perspectives & Research* 1 (2013): 17–29.

⁹Ibid.

Table 24.3 Main components of perceived usefulness, ease of use and trust

Main components	Concept	Cronbach α	Cum variance
Factor 1	Usefulness for payments	0.857	36.223
Factor 2	Useful service	0.831	45.245
Factor 3	Combined usefulness and ease of use	0.835	51.852
Factor 4	Ease of use	0.760	57.407
Factor 5	Trust	0.736	61.704

Source: Author's own

tivariate model. It appears that the intention to adopt mobile payments is neither gender nor age-specific as those variables were not significantly related to intention to use.

Conclusion

Mobile payment systems are one of the applications of mobile devices that are expected to grow robustly over the next few years. This is not only true for developed countries but also or even more so in developing countries. Mobile payment systems have the potential to provide banking services to the large number of unbanked inhabitants of many developing countries.

Based on the technology acceptance model we have looked into the requirements for adoption of mobile payment systems. The main findings indicate that perceived ease of use and perceived usefulness are major drivers of mobile payment adoption regardless of age or gender. Having practical experience with a mobile phone strengthens the evaluation of those benefits. Trust in two dimensions is also important for the adoption of mobile payment systems. In the area of "trust in trading partners" traditional providers of banking services such as banks and credit card organisations have a clear competitive advantage over new entrants to this field. From a competitive point of view, it will be very interesting to see how banks can build on that advantage or whether technology companies such as Apple will provide enough advantages in terms of usefulness and ease of use to outweigh the lead of banks in terms of trust.

Further Reading

- Boer, R., & de Boer, T.. Mobile payments 2010: Market analysis and overview. Innopay BV and Telecompaper BV. Accessed Jan 11, 2016. https://www.eba-portal.eu/_Download/Research%20and%20Analysis/2010/Mobile_payments_2010_Innopay.pdf (current Jan 25, 2012).
- Dapp, T. F. Fintech – The digital (r) evolution in the financial sector. Deutsche Bank Research. https://www.dbresearch.com/PROD/DBR_INTERNET_EN-PROD/PROD0000000000345837.pdf. Accessed 5 Jan 2016.
- Maurer, B. (2012). Mobile money: Communication, consumption and change in the payments space. *Journal of Development Studies*, 48(5), 589–604.
- Slade, L. E., Michael, D. W., & Yogesh, K. D. (2013). Mobile payment adoption: Classification and review of the extant literature. *The Marketing Review*, 13(2), 167–190.

Bibliography

- Clarke, I. (2008). Emerging value propositions for M-commerce. *Journal of Business Strategies*, 25, 41–57.
- Davis, F., Bagozzi, R., & Warshaw, P. (1989). User acceptance of computer technology: A comparison of two theoretical models. *Management Science*, 35, 982–1003.
- Irvine, C. (2008). Emerging value propositions for M-commerce. *Journal of Business Strategies*, 25, 41–57.
- Shalini, C., Srivastava, S., & Theng, Y.-L. (2010). Evaluating the role of trust in consumer adoption of mobile payment systems : An empirical analysis. *Communications of the Association for Information Systems*, 27, 561–588.
- Slade, E., Williams, M., & Dwivedi, Y. (2013). Mobile payment adoption: Classification and review of the extant literature. *The Marketing Review*, 13, 167–190.
- Statista. *Global mobile payment transaction volume from 2010 to 2017*. <http://www.statista.com/statistics/226530/mobile-payment-transaction-volume-forecast/>. Accessed 19 Mar 2014.
- Thakur, R. (2013). Customer adoption of mobile payment services by professionals across two cities in India: An empirical study using modified technology acceptance model. *Business Perspectives & Research*, 1, 17–29.

- Tobbin, P., & Kuwornu, J. (2011). Adoption of mobile money transfer technology: Structural equation modeling approach. *European Journal of Business and Management*, 3, 59–78.
- Viehland, D., Siu, R., & Leong, Y. (2010). Consumer willingness to use and pay for mobile payment services. *International Journal of Principles and Applications of Information Sciences and Technology*, 3, 35–45.
- Wang, A. (2012). A preliminary model for mobile payment acceptance. *International Journal of Mobile Marketing*, 7, 37–51.

25

Can Mobile Money Replace Cash in India?

Lakshmi Kumar

Introduction

Mobile money is at the intersection of finance and telecommunication and would hence face regulations originating from both these sectors. Most underdeveloped economies have a poorly and non-regulated financial sector while developed economies have a well regulated and developed financial and telecommunication sector. In poor economies, the bottom third of the population have hardly any access to banks and mobile money has provided the needed solution. However, how can consumer data privacy be protected? In addition, to what extend are consumers willing to shift from comfortable cash transactions to mobile money? India faces a unique challenge in that we are caught in the middle with a reasonably well-developed banking system but banking has

L. Kumar (✉)

Institute for Financial Management and Research (IFMR), Chennai,
India

e-mail: lakshmik@ifmr.ac.in

still not penetrated to the bottom 30 %, of which the penetration of mobiles has been deep.¹

The present banking network of the country (as on March 31, 2014) comprises a bank branch network of 115,082 and an ATM network of 160,055. Of these, 43,962 branches (38.2 %) and 23,334 ATMs (14.58 %) are in rural areas. Moreover, there are more than 140,000 business correspondents (BCs) of public sector banks (PBSs) and regional rural banks (RRBs) in the rural areas. Correspondents are representatives of a bank that provide basic banking services such as opening basic deposit accounts, handling cash deposits or withdrawals, transferring funds, dealing with balance enquiries, and issuing mini statements. The government assigned 13 million rural households to PSBs (including RRBs) for coverage. It was estimated that by May 2014 (when the latest figures were available), approximately 7 million households had been covered (with 5 million or 45 % remaining). It was also estimated that a further 6 million households in rural and 1.5 million in urban areas needed to be covered.²

The link between financial inclusion and information technology has been critical and one can observe that where the banks have not been able to penetrate, mobile services have succeeded. The Indian telecom sector witnessed substantial growth in the number of subscribers during the period 2013–14 (for which the latest data were available). At the end of the financial year, the subscriber base was 933 million, out of which 904.51 million were wireless subscribers. During the year, the wireless subscriber base recorded an increase of 36.71 million while the overall teledensity increased from 73.32 to 75.23.³ The period 2013–14 also saw an increase in rural teledensity from 41.02 to 43.96 while the urban teledensity decreased to 145.78 from 146.96. As per the data reported by the service providers, by the end of March 2014, about 117.01 million mobile subscribers had submitted their requests to different service providers for porting their mobile number. The Internet subscriber base in

¹ Basu Priya and Srivastava Pradeep, “Scaling-Up Microfinance for India’s Rural Poor”, *World Bank Policy Research Working Paper No. 3646*, accessed January 12, 2016, <http://ssrn.com/abstract=757389>

² Pradhan Mantri’s Jan-Dhan Yojana, “A National Mission for Financial Inclusion”, The Prime Minister’s People’s Wealth Program.

³ TRAI, (2012–13), “Telecommunication Regulatory Authority of India, Annual Report”, accessed January 15, 2016.

the country as on 31 March, 2014, stood at 251.59 million as compared to 164.81 million as on 31 March, 2013.

Models: International and Indigenous

Since mobile money lies at the junction of financial, telecommunication and security services, it is difficult to define who will lead its role. In most mobile money projects in developing nations, the mobile network operator (MNO) has played a leading role in initiation and implementation. MNOs currently spearhead more than 70 % of all mobile money initiatives across the globe.⁴ The likely reasons for this trend include the presence of a highly interconnected mobile network, existing tie-ups with agents for airtime top-up and other services, and customer relationships that merit trust and reliance.⁵ Coupled with the penetration of mobile technology amongst the lowest economic strata of the population, mobile money is believed to bring with it the high possibility of financial inclusion and empowerment.

Mobile money is increasingly finding support in many developing countries for this very reason. Two decades ago, there were the first (failed) attempts to make a financial transaction through a handheld device (see the case of Mondex elsewhere in this book). Today, owing to the advances in technology and communication systems, mobile money is changing the socioeconomic setup of communities and redefining the very idea of banking. Figures indicate that globally, the reach of mobile money is on the rise. As of 2012, there were 150 mobile money services in operation spread across 72 countries; of these, 41 were launched in the year 2012 alone. Almost 30 million active mobile money accounts have been identified in the world. Sub-Saharan Africa is the region that has witnessed the maximum number of mobile money deployments—this figure is only expected to increase in the coming years. For this very rea-

⁴ Pénicaud Claire, "State of the Industry: Results from the 2012 Global Mobile Money Adoption Survey", GSM Association, accessed December 20, 2015 http://www.gsma.com/mobilefordevelopment/wp-content/uploads/2013/02/MMU_State_of_industry.pdf

⁵ Ivatury Gautam and Mas Ignacio, *The Early Experience with Branchless Banking*, (Washington, D.C.: CGAP, 2008).

son, Fig. 25.1 would be an apt description of mobile money models present internationally. In the MNO-led model the mobile money operator is the leading player because of: (1) their highly connected and far reaching mobile networks, (2) their existing tie-ups with agents for airtime, top ups etc and most importantly (3) customer trust. Banks in this set up play the role of liquidity provision only.

In India, however, the concept of mobile money is at a formative stage. There is definitely a need for financial inclusion in the country, especially in rural regions that have not witnessed the introduction of banking services. India's central bank, the Reserve Bank of India (RBI) has extensively highlighted the scope and progress of mobile money in the country. As of March 2012, there were 0.14 million villages out of 0.6 million villages that were covered by formal banking systems, which meant that 145 million households were excluded from the banking system. As of January 2012, there were 313 million rural mobile subscribers out of 936 million subscribers in the country.⁶ The first set of mobile banking guidelines were released by the RBI in 2008. Ever since, mobile banking has been on the rise, with transactions increasing both in volume and value. The RBI has decided to opt for a bank-led model and believes that financial inclusion can be brought about when the following four comprehensive products are offered to customers via mobile banking—

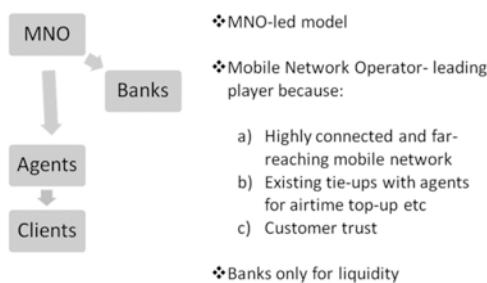


Fig. 25.1 The international mobile money model (Source: Author's own design)

⁶Katuri Nageswara Rao, "Rural Credit and Micro finance: What the RBI Internal Group Report Says", *Professional Banker*, 1 (2006): PBCS20601.

deposit, credit, micro-insurance and remittance. Adhering to Know Your Customer (KYC) and Anti-Money Laundering (AML) standards is a priority for the RBI. The commercial banks in the country have these basic standards and processes in place. The RBI also cites a twofold argument for not choosing the MNO-led model. First, in an MNO-led model, only the remittance product can be made use of. In India, non-bank players cannot offer the other three services that were cited by the RBI, which are integral for financial inclusion. Second, the bank-led model under the umbrella of the RBI is considered sustainable since there are a large number of competing MNOs in the country. Figure 25.2 describes the mobile money model present in India which is rather different from the international model.

Since the bank-led model has been adopted in India, customer complaints are handled by banks and not MNOs. The bank is the player in the partnership and has ownership towards customers. The question that arises at this juncture is the role of MNOs in this model. According to the RBI, MNOs are technology service providers (TSPs) while banks are the sole players offering banking services. MNOs can also assume the roles of BC-cum-TSP, through which they can become the business correspondent of a particular bank. The RBI's goal for mobile money is to achieve the 7A framework that will guarantee a high degree of utility and financial inclusion. The 7As in this framework stand for Availability, Accessibility, Acceptability, Affordability, Awareness, Assurance and Appropriateness.

Currently, there are several mobile money projects that are operational in India. Examples of bank-MNO pioneered services include Airtel Money by Bharti Airtel, mRupee by Tata Tel, MoneyonMobile by BSNL,

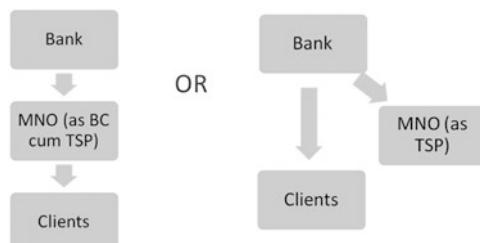


Fig. 25.2 The India mobile money model (Source: Author's own design)

Aircel-ICICI by the MNO Aircel and ICICI bank, and the Indian version of M-PESA by Vodafone. A successful mobile money project in the country that caters largely for the unbanked is one led by the financial services company EKO. A partnership between the State Bank of India (SBI), the largest public sector bank in the country, and EKO led to the initiation of SimpliBank in 2007 in the states of Delhi, Bihar and Jharkhand. EKO is now the Business Correspondent of SBI, ICICI Bank and Yes Bank in India.⁷

It is worth noting that migrant workers constitute about a third of the population of our country and nearly 70 % of them are women.⁸ They are treated as second class citizens and are often excluded from the general economic, social, cultural and political main stream of society. They come from different states seeking employment and their first goal is to remit money home. They have used several forms to transfer money home. Transfer has been in the form of hawala,⁹ the post office, the bank or the present mobile money transfer. We interviewed migrant workers in the outskirts of Chennai and Hyderabad who were either users of the mobile or non-users of the mobile to transfer money to their home.

Research Themes

As the network of mobile money operators scale up their services, questions of data protection arise. How much customer protection is there and how willing are individuals to shift from their comfortable cash transactions to mobile money?

With the introduction of mobile money in India, we wanted to research the empirical understanding about its role in replacing cash

⁷Nandhi, M, "Effects of Mobile Banking on the Savings Practices of Low Income Users – The Indian Experience". Institute for Money, Technology and Financial Inclusion Working Paper, accessed January 5, 2016, http://www.imfif.uci.edu/files/blog_working_papers/2012-7_nandhi.pdf

⁸UNESCO, "Internal Migration in India Initiative : For a Better Inclusion of Internal Migrants in India", accessed December 08, 2016, <http://unesdoc.unesco.org/images/0022/002214/221486e.pdf>

⁹"Hawala" is a traditional system of transferring money used in Arab countries and South Asia, whereby the money is paid to an agent who then instructs an associate in the relevant country or area to pay the final recipient.

amongst migrant and non-migrant workers in Chennai, Tamil Nadu and Hyderabad, Andhra Pradesh. We also wanted to understand the role of middlemen in this broad ecosystem. Lastly, we want to understand whether the poorer sections of society trust mobile money.

Proposed Model

In this chapter we are trying to estimate the impact of mobile money on the amount of money sent home and usage of mobile money as emergency money. The following two models are used for estimating the two aspects.

Model 1:

$$Y_{ij} = \alpha + \beta user_{ij} + \gamma X_{ij} + \phi_j + \epsilon_{ij}$$

Where, Y_{ij} =Amount of money sent home

i,j indicates individual i in location j

$user_{ij}$ = 1 for mobile money user
= 0 others

X_{ij} = vector of control variable: age of respondent, years of education of the respondent, occupation type, marital status, family size, number of working family members.

ϕ_j : Location dummy, ϕ_j takes 0 if origin of district and survey place is the same and 1 if origin of district and survey place are different.

Model 2:

$$M_{ij} = \alpha + \beta user_{ij} + \gamma X_{ij} + D_{ij} + \phi_j + \epsilon_{ij}$$

Where, M_{ij} : Dummy for emergency money sent

$user_{ij}$ = 1 for mobile money user
= 0 others

X_{ij} = vector of control variable: age of respondent, years of education of respondent, occupation type, marital status, family size, number of working family members.

\emptyset_j : Location dummy, \emptyset_j takes 0 if origin of district and survey place is the same and 1 if origin of district and survey place are different.

D_{ij} : Distance travelled by respondent to use mobile money.

Analyses of Data

We analyse our data using the questionnaire method. We first piloted informally both mobile users and non-users to get an idea about their remittance pattern, their usage frequency of the different modes of transferring money and their need for mobile money transactions. With the help of our estimating model as discussed we developed our final questionnaire which was administered to all the clients. The model consisted of analysing both users and non-users of the mobile as a means of transferring money both as remittance to their hometown and a means to transfer money for emergency. Our sample consisted of 494 mobile users and 300 non-mobile users in the outskirts of Chennai and Hyderabad respectively. Hence, our complete sample was 794 clients.

Before we go on to analysing the hypothesis it would be useful to understand the demographics of the population to understand the differences and similarities between mobile users and non-users. Table 25.1 provides the descriptive statistics of the population.

It can be seen from Table 25.1 that the average age and the average family size of the respondent, whether they are mobile money users or non-users, is almost the same. A further 75 % of the mobile money users came from a different state in search of better opportunities as compared to non-mobile money users where the percentage from another state was 49 %. The average monthly income of the mobile money user and non-mobile user is Rs. 11,535 and Rs.10,165 respectively. The study has found that mobile money users have on an average sent about Rs. 6850 whereas non-mobile money users have sent about Rs. 3312. In addition, mobile money users have also sent on an average

Table 25.1 Descriptive statistics

	Age	Number of family members	Different state	Average monthly income	Average monthly income sent	Emergency money sent
<i>Panel 1: Mobile money user (N = 494)</i>						
Mean	33	5.5	0.75	11,535	6850*	5380
Standard Deviation	5.02	4	0.5	6050	2034	1098
Median	27	5	1	10078	2045	5123
<i>Panel 2: Non-mobile money user (N=300)</i>						
Mean	32	5.4	0.49	10,165	3312*	0
Standard deviation	7.98	3.01	0.47	5347	2865	0
Median	29	4	0	7000	3055	0

Source: Author's own design

*At 10% level of significance

Note: * indicates 10 % level of significance

Rs. 5380 as emergency money whereas non-mobile users have hardly sent any money at all.

Hypothesis 1

Ho: The mean of the **average money** sent by the mobile money user is equal to the mean of the average money sent by the non mobile money user.

H1: The mean of the average money sent by the mobile money user is greater than the average money sent by the non-mobile money user.

Table 25.2 shows the results of the t test for Hypothesis 1, which is the result from the regression results of Model 1. It clearly indicates that respondents using mobile money as a mode of money transfer greater amounts of money per month than non-mobile users. Specifically, they transfer 64 % more money to their hometowns as compared to non-mobile users. Hence we can reject the null hypothesis and conclude that average money sent by the mobile money user is greater than the average money sent by the non-mobile money user.

Table 25.2 Impact of mobile money user on average money sent

	Coefficient
User dummy	0.64***
Age	0.11**
Marital status	0.048
Sex	0.12**
Education	0.13***
Village dummy	0.15*
constant	0.32
R ²	0.27

Source: Author's own design

Note: ***, **, * indicate 1 %, 5 % and 10 % level of significance

Hypothesis 2

- Ho: The mean of the **average emergency money** sent by the mobile money user is equal to the mean of the average emergency money sent by the non-mobile money user.
- H1: The mean of the average emergency money sent by the mobile money user is greater than the mean of the average emergency money sent by the non-mobile money user.

To test Hypothesis 2 we look at Table 25.3 which are the results from the regression of Model 2. It clearly indicates that respondents using mobile money as a mode of emergency transfer per month is greater than non-mobile users per month. Specifically, they transfer 44 % more emergency money to their hometowns as compared to non-mobile users. Hence we can reject the null hypothesis and conclude that average emergency money sent by the mobile money user is greater than the average money sent by the non-mobile money user.

Tables 25.2 and 25.3 also show that the several control variables that we used are significant at various levels as indicated under the tables. "Age" is significant when it comes to usage of mobile money. Most migrant workers are between the age of 25 and 35 and are very comfortable with the usage of the mobile; hence young adults are target clients for mobile

Table 25.3 Impact of mobile money user on emergency money sent

	Coefficient
User dummy	0.44***
Age	0.09**
Marital status	0.23***
Sex	0.08
Education	0.08
Village dummy	0.18***
constant	0.28
R ²	0.27

Source: Author's own design

Note: ***, **, * indicate 1 %, 5 % and 10 % level of significance

money. We also find that usage of mobile money is significantly higher among married men, because men seem to move to other states in search of better job opportunities and remit money back home to their families. Obviously, the significance of the “village dummy” amplifies the fact that mobile money usage is greater among men who have come from other districts/states.

Furthermore, transaction activity amongst the mobile money user is more intense than that of non-users. They seem to interact financially with personal networks more often and make larger transfers over larger distances. Clients transferred money to their personal bank saving accounts or to their family accounts in their home country. Most of them got to know about mobile money when they were topping up their mobiles for recharge and hence the MNOs strategy of “pull” worked better than “push”. The trust element was rather high with mobile money as clients received an “SMS” of delivery of money to their account.

We discovered, however, that most mobile clients preferred to keep cash in hand as there were very few operators who provided below poverty line (BPL) families with mobile wallets. Hence, cash was king. “Airtel”, an MNO was providing mobile wallets but it seemed to target mobile literate users only. We also noticed that there was an ecosystem developing among mobile clients. Often it was difficult for migrant workers to open bank accounts in their place of work and would hence remit money

to their hometown with the help of their employer. This sub-ecosystem might potentially be developing into a binding one too. It is hence essential for clients to have independent bank accounts as well as money on the mobile so that they may use them as required.

Concluding Remarks: A Proposed Model for India

Mobile money is fast catching on in India. In India, mobile money is bank-led as compared to several other developing and underdeveloped countries like Kenya, Ghana and Afghanistan. Clients, particularly migrants, have a need for mobile money, feel drawn to it and share the same trust in it. This research shows that mobile money has huge potential both from the client perspective as well as from the revenue standpoint. This is one model in which a large percentage of Indian workers can be brought into as being financially inclusive, an elusive agenda for decades.

The runaway success of the M-Pesa model that is being emulated worldwide is a basic remittance model, a model to drive the client to remit money to their family. In India too, the target by many Mobile Money Operators (MNOs) is to create a single product, namely a remittance product, and target the same to the migrant worker. Many MNOs have used this basic model as their revenue model. The question that arises is what next? Figure 25.3 below is a proposed model for the mobile money ecosystem in India.

Interoperability is the mandate of the central bank of India but what seems to happen in reality is very different. We find MNOs tying clients to banks or worse still clients having no access to bank accounts and left to the mercy of their employer for all their financial needs. As we can see in Fig. 25.3, under ideal conditions we can create a model path to financial inclusion for migrant workers in India. Ideally we first create a bank account and a mobile account for a client and allow the client to transfer money in a manner such that it is bank agnostic. Secondly the client's account is activated so that (s)he can receive any government

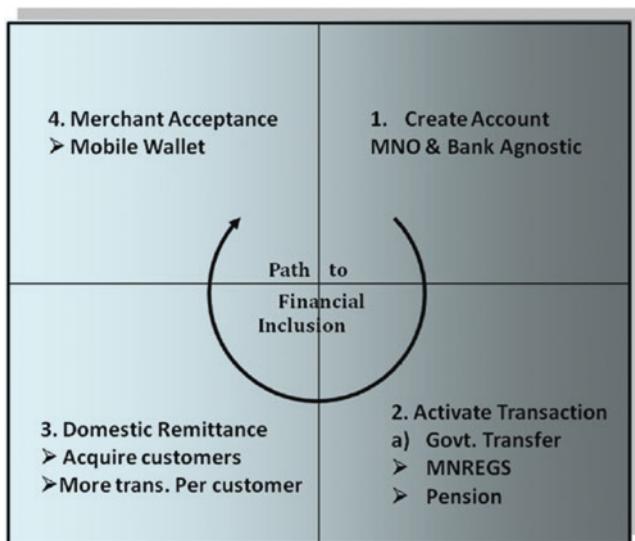


Fig. 25.3 A Model for mobile money ecosystem in India (Source: Author's own design)

transfers to his bank account while he receives a message on his mobile. It is possible for him to transact his account from any bank/bank branch/MNO. Thirdly, the MNO goes about acquiring many customers and helps him/her with the basic remittance product. This follows with the client engaging in other bank products that are asset-oriented products like savings or insurance products. The MNO then develops the mobile wallets for the customer and simultaneously finds acceptance of the mobile wallet at various retail merchants. His dual role of connecting people to asset products in banks and to mobile wallets can transform people from holding less cash and transferring it to the mobile. The whole process obviously requires a change in the mindset of the people. Obviously when there is a need in the mind of a person there is a chance for change. Just like how the remittance product is a success because of an inherent need of the client, it is necessary for the MNO to look out for the client's needs and create the opportunity. But sometimes one can pre-empt a need or create a need like suggested in the proposed model in Fig. 25.3 by being ahead of the learning curve of the client.

As reported by UNESCO in 2012 about 30 % of the population in India are migrants and there is a huge opportunity to include and tap them into the economic, social and political system of the progress of our country.

Bibliography

- Jenkins, B. (2008). *Developing mobile money ecosystems*. Washington, DC: IFC and the Harvard Kennedy School.
- Ivatury, G., & Mas, I. (2008). *The early experience with branchless banking*. Washington, DC: CGAP.
- TRAI. *The Hindu* Online Newspaper. <http://www.thehindu.com/business/Industry/mobile-subscribers-largest-in-uttar-pradesh-tamil-nadu/article4686257.ece>. Accessed 5 Jan 2016.
- UNESCO-UNICEF. (2012). Workshop compendium: UNESCO-UNICEF national workshop on internal migration and human development in India, 6–7 December 2011, Volume 1: Workshop report, New Delhi, UNESCO and UNICEF.

26

A Gentle Introduction to Side Channel Attacks on Smartphones

Laurent Simon

What Are Side Channels?

Let us consider Fig. 26.1. An input I is given to a computer program CP which outputs O . In addition to the output O returned by the program, various kinds of *unintended information leaks* may occur. These unintended information leaks are called “side channels” because they do not originate from the program’s output.

Traditional side channels include power, timing, Electro-Magnetic (EM) emanations, Internet traffic patterns, and so on. For example, different operations executed by a program may consume different amounts of energy. So if an attacker can observe power consumption while the program runs, some information about secret operations can be extracted. These are called *power* side channels and they are relevant for banking cards. Another source of side channels is EM emanations, which are the

L. Simon (✉)
University of Cambridge, Cambridge, UK
e-mail: lmrs2@cam.ac.uk

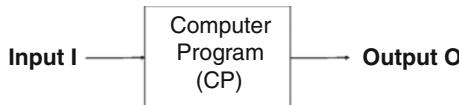


Fig. 26.1 Computer program taking input I and giving output O (Source: Author's own design)

result of current flows when the program runs on the CPU. These are also relevant on banking cards. The time it takes for a program to execute different operations may also vary and hence information is leaked; these are called *timing* side channels.

Side channels on smartphones look rather different. An emerging class of side channels is those that abuse sensors and peripherals such as the built-in accelerometer, gyroscope or camera. Given information leaked from one of these side channels, an attacker can try to compromise a user's privacy; for example, by inferring secrets such as a password or a PIN. The data gleaned by an attacker through a side channel is, however, "noisy". This means that it does not contain enough information to recover the original secret reliably. This is what makes side channel attacks challenging in practice. For example, if an attacker can make a video recording of someone while they type their PIN, the video footage may provide valuable information to infer the original PIN. However, it might be the case that the footage has low resolution, or that some parts of the footage are blurred, and so on. Therefore, an attacker must process the leaked data accordingly to extract the maximum amount of information. This requires running algorithms that reduce the noise and highlight the valuable part of the data. Depending on the type of side channels and the secret one wants to infer, different techniques are used. For example, for power and EM side channels, statistical methods are usually used. For side channels based on sensors and peripherals (smartphones), Machine Learning (ML) methods are typically employed. We give a brief introduction of ML in the next section.

What Is Machine Learning?

Arthur Lee Samuel, an American pioneer in the field of machine learning and artificial intelligence, defined ML as the “field of study that gives computers the ability to learn without being explicitly programmed”.¹ More recently, Tom Mitchell,² a researcher in the field of ML, said “A computer program is said to learn from experience E with respect to some task T and some performance measure P , if its performance on T , as measured by P , improves with experience E ”. For example, if one wants a program that can predict a person’s gender (task T), one can give such program a set of past (known) data (for example height and weight) to learn from (experience E). If the program successfully learns patterns from the known data, then the program’s ability to predict the gender of unseen people will improve (performance measure P). Machine learning can be applied to various problems, including, but not limited to:

- Email spam detection;
- Handwritten character recognition;
- Image recognition;
- Face detection, for example find certain faces in an image;
- Weather prediction, for example predict if it will rain tomorrow;
- and more.

Features

An ML program takes as input a list of properties. In the gender prediction example, the properties were the *height* and *weight* of a person. In ML parlance, such data properties are called “features”. Every ML problem requires its designers to select a set of features. Feature selection aims at finding a minimal set of features that are indicative of the data patterns one is interested in. More discriminative features help the ML program

¹ Arthur Lee Samuel, “Some Studies in Machine Learning Using the Game of Checkers”, *IBM Journal of Research and Development*, 44, 1.2 (1959).

² Mitchell Tom, *Machine Learning*, (McGraw Hill, 1997).

learn patterns from the data. In the gender prediction example, one could consider a person's hair colour as an additional feature, but as there is no correlation between a person's gender and their hair colour, such a feature would not help the ML program learn better.

Models

Features selected by designers are used as input to an ML program. Designers first feed known data to the ML so that it can learn from it. This is called the *training phase*. After learning from the data, the ML program outputs a *model*. The model contains the algorithm and the parameters that maximise the performance measure P . This model can be seen as a reference to which future (unseen) data will be compared against. For example, in the gender prediction problem, parameters could be $(\text{height}_{\text{ref}}, \text{weight}_{\text{ref}}) = (1.7 \text{ m}, 55 \text{ kg})$ and the algorithm could be that if a person's height $> \text{height}_{\text{ref}}$ and weight $> \text{weight}_{\text{ref}}$, then the person is a male; otherwise it is a female.

Learning Methods

Learning methods can be broadly classified into *supervised* and *unsupervised* as follows:

Supervised Learning

In *supervised* learning, the designer labels training data (data that the ML will learn from) with known labels. This is often called the *training phase* or *learning phase*. For example, in the training phase of the gender prediction problem, the designer feeds to the ML program the height, weight, and the gender label of people. Once the ML program has learned from the training input, it outputs a model; this concludes the training phase. Then in the so-called *prediction phase*, one gives to the ML program unseen data to predict. Unlike in the training phase, labels are omitted from the input data. In the gender prediction example, this means only the height and weight is inputted to the model, and the ML program

outputs the person's gender. There are two main sub-classes of supervised learning algorithms.

The first is called *classification*. In this scenario, given unseen input data and a model, the ML prediction outputs a label or a list of the most likely labels. The gender prediction problem is a classification problem, because the ML predicts one of the labels "male" or "female". The second sub-class of supervised learning is *regression*. In this scenario, the ML predicts actual values rather than labels. A regression problem could be one where the input is a person's gender and height, and the output would be an actual weight in kg.

Unsupervised Learning

In *unsupervised* learning, no labels are attached to input features during the training phase. Instead, the ML learns patterns and relationships within the input; then it outputs a model that represents the underlying structures of the input. One example of unsupervised learning is *clustering*, which aims at finding groups of "similar" elements within input data. One example of clustering could be to have as input a list of people's height and weight, and the ML would output clusters of people with "similar" characteristics.

There are many different algorithms involved in ML, and they usually depend on the task at hand.

There is a trend towards the use of Artificial Neural Networks (ANN) for deep learning as these algorithms excel at understanding complex patterns in large amounts of data.

In the next sections, we review two recent research papers that use side channels to breach users' privacy.

TouchLogger by Liang Cai and Hao Chen³

The Assumptions

This paper considers a banking app protected by a PIN on a smartphone, as shown in Fig. 26.2. Here the computer program (*CP*) considered is the

³ Liang Cai and Hao Chen, 6th USENIX Workshop on Hot Topics in Security, 2011 (Abbreviated as CC11 hereafter).



Fig. 26.2 Example of PIN pad

Source: Author's own design

banking app. As input, the *CP* takes a PIN from the user. As output, it unlocks the app if the PIN is correct. The paper further assumes that the smartphone has a touch screen, and that the user holds the smartphone in one hand whilst typing with the other.

For privacy reasons, all smartphones prohibit an app from reading another app's data. So if a user enters a PIN in app *A*, then only *A* can read the PIN and other apps cannot. However, Liang and Chen realised that during user input, certain side channels exist that can be exploited (Fig. 26.3).

The Side Channel

Each time a user's finger touches a digit on the screen, the phone moves as the result of the touch. This is what the authors call a *motion-based* side channel. The motion induced by a touch depends on several factors:

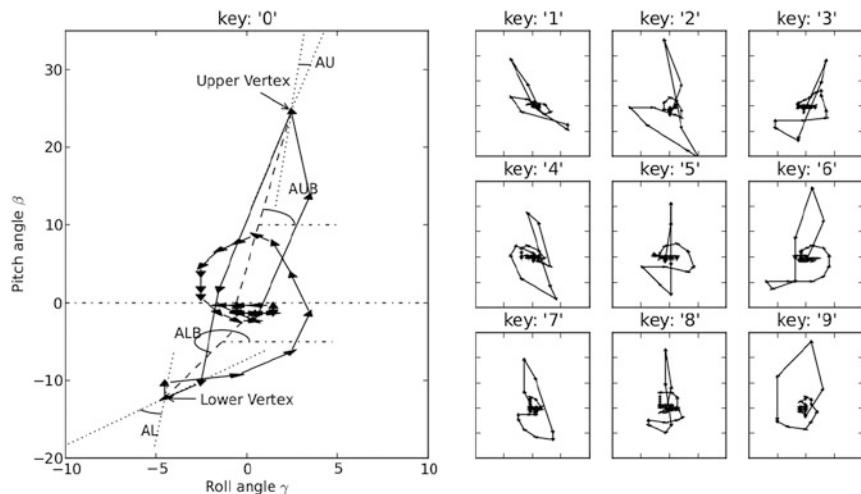


Fig. 26.3 Game played by users in the training phase. Users win if they touch the identical icons

Source: Author's own design

- The force with which the finger hits the screen;
- The resistance force of the hand holding the phone;
- The location of the holding hand;
- The location of the digit on the screen.

Liang and Chen further realised that the Android OS allows permission-less apps to read *orientation events* in real time. These events are derived from accelerometer readings. Each orientation event contains a timestamp and the value of the angles that characterise the phone orientation. So during PIN input, a malicious app reads these events; resulting in a list of orientation events allowing an attacker to capture the device orientation as a function of time.

The Features

We cannot give the raw data collected to an ML program directly. We must first extract relevant features from it. As shown in Fig. 26.4 (right), for each digit touched by a user, the device orientation patterns



Fig. 26.4 Typical patterns of pitch angles and roll angles when different digit keys are pressed Source: Cai and Chen (2011). Reproduced with the kind permission of the authors.

contain two distinct *lobes*: an upper one and a lower one. We can observe that:

- For digits on the left side of the screen (1, 4 and 7), the upper lobe points to the top left corner.
- For digits on the right side of the screen (3, 6 and 9), the upper lobe points to the top right corner.
- For digits on the middle of the screen (2, 5 and 8), the upper lobe points to the top.
- Similar patterns exist for the lower lobe.
- The size of the lobes depends on the digit touched.

Because of the observations described in the list above, the authors decided to use as features the *direction* and the *size* of these lobes.

The Learning Method

The last piece of the puzzle is to select the relevant learning method. During prediction, we want the ML program to output the digit typed by a user or a list of the most likely. So we can associate a label to each digit and use a supervised learning method. In fact this is a classification problem, since the ML program predicts a label or a list of the most likely. Unlike previous examples, this problem has ten labels rather than two.

Pulling It All Together

For the ML program to learn, an attacker must first perform the training phase. In this phase, one must give to the ML program not only features, but the associated label—here, a digit. This means that a malicious app must be able to collect a user’s touch events for which it knows the position of the touch. We cannot do this in advance because touching patterns usually depend on users. So essentially, the app must trick the user into touching certain screen locations it knows. One way to achieve this is for the malicious app to look like a game where a user must touch different parts of the screen to win (Fig. 26.4). When a user plays the game, not only can the malicious app read the orientation events, but it also knows where it asks the user to touch the screen. Once enough training data is collected, the malicious app extracts the features and gives them (along with the labels) to the ML program for learning. This outputs a model.

During the prediction phase, the malicious app reads orientation events while the user types his banking PIN in the banking app. Again it extracts the same features. Then it gives to the ML program both the model and the features (but not the labels since it does not know them), and the ML program outputs a list of the most likely digits. This is repeated for each digit to infer PINs. In their evaluation, the authors found that 65 % of the time, the correct PIN was one of the 81 most likely PINs. This may not seem enough to be a threat, especially if there is a limit on the number of incorrect attempts before a bank PIN is invalidated. But for an attacker who can infect thousands or millions of devices, this means

enough PINs could be guessed to loot accounts. Furthermore, the results could be improved by taking into account the fact that users do not select their PINs randomly.

Pin Skimmer by Laurent Simon and Ross Anderson⁴

In 2013, Ross Anderson and I discovered that accelerometer readings were not the only side channels available on mobile platforms.

The Assumptions

As with TouchLogger, we assume that a malicious app runs on the device along with a banking app protected by a PIN; and that the malicious app can collect enough training data for the learning phase. Unlike TouchLogger, we assume that a user types his PIN with only one hand, entering his PIN with the thumb of the hand holding the device.

The Side Channel

The side channel we exploit differs from TouchLogger's in two ways. Firstly, the change of orientation is not the effect of the thumb touching the smartphone, but the necessary condition for the thumb to reach the button. Figure 26.5 illustrates this. For the thumb to be able to reach digit one, the supporting fingers must push the phone upward towards the thumb. This has the effect of making the orientation of the smartphone change slightly.

Secondly, we infer the device orientation through the camera rather than the accelerometer: every time the user's finger touches the screen, the malicious app takes a picture with the front camera. Figure 26.6 illus-

⁴Laurent Simon and Ross Anderson, 3rd Annual ACM CCS Workshop on Security and Privacy in Smartphones and Mobile Devices, 2013.



Fig. 26.5 Supporting fingers push the phone upwards to touch a digit
Source: Author's own design

trates the difference in phone orientation for pictures corresponding to the OK-button and digit one.

The Features

As features, we use the relative rotation between two images taken at the same position. The rotation is extracted from the pictures taken from the malicious app as follows:

- Given a digit image and an OK-button image, the common *key points* are extracted. Key points are image locations that correspond to the same item in different pictures. They mostly correspond to the chest and the face of the user; they are depicted with white circles in Fig. 26.6.
- Given the common key points, the relative rotation from the OK-button image (taken as reference) to the digit image is computed. The rotation can be expressed as a 3×3 matrix.

We use each element of the matrix as a feature. Features are used as input to the ML program for learning (along with labels) and without labels in the prediction phase.

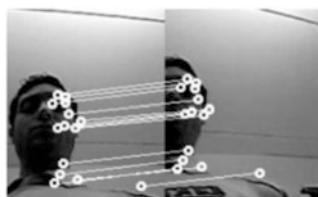


Fig. 26.6 Key points of OK-button picture (*left*) and digit one picture (*right*)
Source: Author's own design

The Results

In our evaluation, we considered a set of 50 4-digit PINs. The correct PIN entered by a user was one of the two most likely predicted PINs 30 % of the time; and one of the five most likely PINs 50 % of the time. When selecting from a set of 200 8-digit PINs, the correct PIN was one of the five most likely PINs 45 % of the time; and one of the ten most likely PINs 60 % of the time.

Conclusion

Smartphone side channels often rely on sensors and peripherals to breach a user's privacy. They are difficult to protect against because they are not obvious. For example [1] and [2] infer a user's physical location based on smartphone power consumption and accelerometer readings respectively. Even a system that is claimed secure could be vulnerable to known or unknown side channel attacks. So security practitioners should be aware of these attacks and try to mitigate them. Side channels cannot be discarded as the premise of fraud or PIN theft.

Further Reading

- Roman, S., Kehuan, Z., Xiaoyong, Z., Meholi, I., Apu, K., & Xiaofeng, W. (2011). Soundcomber: A stealthy and context-aware sound trojan for smartphones. *Proceedings of NDSS*, 11, 17–33.

- Sarfraz, N., & Cecilia, M. (2014). Mining users' significant driving routes with low-power sensors. *Proceedings of the 12th ACM Conference on Embedded Network Sensor Systems*, ACM, pp. 236–250.
- Yan, M., Aaaron, S., Gunaa, A. V., Dan, B., & Gabi, N. (2015). Powerspy: Location tracking using mobile device power analysis. *Proceedings of the 24th USENIX Security Symposium*, USENIX Association, August, pp. 785–800.

Bibliography

- Laurent, S., & Anderson, R. (2013). 3rd Annual ACM CCS workshop on security and privacy in smartphones and mobile devices.
- Liang, C., & Hao, C. (2011). 6th USENIX workshop on hot topics in security.
- Mitchell, T. (1997). *Machine learning*. McGraw Hill: New York.
- Samuel, A. L. (1959). Some studies in machine learning using the game of checkers. *IBM Journal of Research and Development*, 44(1.2).

Barriers and Drivers to Future Bank Adoption of Mobile Banking: A Stakeholder Perspective

Jennifer Mullan, Laura Bradley, and Sharon Loane

Mobile Banking

Mobile banking originally became topical in the late 1990s. However, it was not until the advent of the Wireless Application Protocol (WAP), enabling Internet access from mobile devices (mobile web), that interest was more widely sparked. Banking was one of the first services applied to the mobile web. Due to issues relating to security, limited service provision, expensive mobile phones, technology limitations and low customer demand, coupled with a lack of full commitment from banks, WAP-based mobile banking failed to fulfil its promise and many banks withdrew their services by the early 2000s.

J. Mullan (✉) • L. Bradley • S. Loane
Ulster University, Derry, Northern Ireland
e-mail: mullan-j5@email.ulster.ac.uk

Low customer adoption rates were compounded by banks themselves as they were thought to have employed mobile banking as a defensive marketing strategy, expecting online customers to move easily to the mobile platform, without giving consideration to the reasons why, and how, customers would use it. As a result, this situation did not materialise and failure ensued.

Mobile banking is considered an m-commerce service, differentiated from e-commerce, as a result of personalisation potential and access to anytime anywhere services. It is an example of a convergence service, merging the financial services and telecommunication industries, which were previously unrelated. Interestingly, diffusion of m-commerce is considered to follow a different path to e-commerce. Often the origin of both technologies is considered to influence this path, with e-commerce originating in the USA, as opposed to m-commerce, which originated in Japan. Mobile banking is typically characterised by wireless, remote communication between bank and customer via a mobile device. Unlike other channels mobile banking has multiple modes of access—SMS, browser and mobile apps—further compounding the complexity of understanding this innovation. Multiple benefits exist for customers and banks. Customer benefits include ubiquity, flexibility, convenience, privacy and mobility as regards anytime anywhere banking. “Mobility” is achieved by the ability to access banking services, 24 hours a day, independent of geographic location. Banks perceived benefits range from opportunities to cross-sell, potential to acquire new customers, cost reductions and increasing customer faction through the provision of personalized services. Most importantly, mobile banking is thought to strengthen the bank, as customer relationships are improved banks are seen to meet customer needs via mobile banking provision, thereby increasing customer loyalty. An important issue that academics and the industry have highlighted is just how willing customers are to change banks if mobile banking is not available. By ignoring mobile banking, banks may possibly face higher costs and lose customers. Globally, the majority of banks provide some form of mobile banking but, despite the clear benefits for banks and customers, to date it still remains at an early stage of adoption.

Study Background

The findings reported formed part of a larger study which sought to explore the future of mobile banking based upon stakeholder opinion. The study applied a futures methodology as the future adoption of banks was considered least understood and most important to develop and understand. The main study was conducted over two sequential phases. Samples were drawn purposefully. Initially a dedicated mobile banking blog was created to raise awareness of the study, identify potential Delphi participants and inform the Delphi questionnaire. The dominant data collection stage was a modified Delphi study that was administered via the Internet (online and email) over two rounds, consisting of 72 global experts representing eight mobile stakeholder industries; namely, retail banking, mobile telecommunications providers, academics, technology providers, mobile banking solution providers, mobile phone handset manufacturers, mobile payments providers and industry practitioners. The study sought to secure a wide breadth of disciplinary backgrounds, understanding and location. Delphi, the main methodological tool, is a flexible, insightful methodology suitable for studying complex phenomena, such as mobile banking where uncertainty exists, where technologies are at an early stage of diffusion, experts come from different fields and results can be generalised. Essentially Delphi is a 'structured communication' process in which several questionnaires are administered to a predetermined panel of experts in a number of "rounds", between which feedback is provided, in order for stability/consensus of opinion to be established. It is particularly suited to situations where there is a lack of available information—this is certainly true as regards bank adoption and the future of mobile banking. The panel were presented with a pre-determined list of drivers and barriers drawn from the blog and existing literature.

Driver Variables

The panel identified all drivers to future bank adoption as either "very" or "of some" importance (See Table 27.1 for an overview). Six key drivers were identified: customer acceptance and usage levels (75.0 %, n = 54),

reducing costs (62.5 %, n = 45), advances in electronic cash and mobile payments (61.1 %, n = 44), increased customer adoption of smartphones (52.8 %, n = 38), advances in technology (50.0 %, n = 36) and changing customer demographics (44.4 %, n = 36). Retail banking experts commonly changed their opinion regarding influences when it came to considering other panel members' responses. It could be assumed this shows a typical trend in banking to "follow the crowd".

The study did present conflicting opinion with technology providing differentiation among industry offerings. A possible explanation may be that mobile services need to be simple and easy to use. In fact, the study revealed that successful implementations to date have used existing technologies with no need to develop more advanced systems. The reality is that, according to panel members, technology to enable development and diffusion already exists. This is an interesting observation since WAP-based mobile banking failed to diffuse in early 2000s with many banks withdrawing their mobile services despite the technology existing to support it. We could assume this may be due to a developing country perspective bias within the panel. However, the study revealed contradicting opinions, suggesting that consumers have little influence on industry diffusion. This suggests that maybe future bank adoption is determined more by technology-push forces as opposed to demand-pull. Certainly limitations of available technology as regards network speeds and small screen size have impacted upon customer usage of initial browser-based technology and kept this at a low level. It could also be that the previous experience of WAP-based banking is influencing opinion regarding mobile banking since demand for mobile-based services is already evident.

Increased levels of competition were confirmed as an important key driver. It is anticipated that the financial services market will continue to expand with new entrants moving into the financial arena including such players as PayPal and Apple. This may also infer that banks are most likely to adopt mobile banking in highly competitive markets where competitive advantage is not the only desired outcome but the ability to simply match provision to survive. It is likely this industry will change further in the near future. This supports existing understanding that competition is a key facilitator of adoption based on past innovations including Internet

Table 27.1 Panel response for driver variables, Round 1 and Round 2

Variable description	Very important		Of some importance		Neither important nor unimportant		Of little importance		No importance	
	Rd 1 (%)	Rd 2 (%)	Rd 1 (%)	Rd 2 (%)	Rd 1 (%)	Rd 2 (%)	Rd 1 (%)	Rd 2 (%)	Rd 1 (%)	Rd 2 (%)
Advancement of electronic cash & mobile payments	55.6	61.1	33.3	27.8	5.6	5.6	4.2	4.2	1.4	1.4
Advancement of technology	44.4	50.0	27.8	25.0	16.7	15.3	9.7	8.3	1.4	1.4
Changing customer demographic	41.7	44.4	37.5	37.5	13.9	11.1	5.6	5.6	1.4	1.4
Customer acceptance & usage levels	70.8	75.0	23.6	19.4	2.8	2.8	1.4	1.4	1.4	1.4
Government intervention & support	22.2	22.2	34.7	36.1	16.7	16.7	19.4	18.1	5.6	5.6
Improved economic conditions	15.3	15.3	56.9	61.1	12.5	9.7	6.9	5.6	6.9	6.9
Increased customer adoption of smartphones	50.0	52.8	36.1	33.3	5.6	5.6	6.9	6.9	1.4	1.4
Increased levels of competition	40.3	40.3	47.2	50	6.9	4.2	4.2	4.2	—	—
Reducing costs	58.3	62.5	30.6	26.4	8.3	8.3	2.8	2.8	—	—
Standardised & universal technology platform	26.4	26.4	34.7	36.1	22.2	22.2	12.5	11.1	4.2	4.2

banking and general e-service developments. Government's intervention and support generated a lot of discussion. Evidence revealed that government intervention and support was important in order to increase financial inclusion. Opinion is, however, conflicting with some arguing this is applicable only to developing countries due to the need to protect consumers in emerging markets.

The importance of changing customer demographics raised differing perspectives, with some arguing that demographics have an influence, whilst others stated this is a constant issue, regardless of innovation or diffusion, and therefore its impact is minimal because demographics are constantly evolving.

The most interesting opinions were expressed in relation to the importance of increased customer adoption of smartphones. Evidence was found suggesting that accelerators differed between developed and developing countries. For example, how can smartphones influence adoption when populations in developing countries cannot get hold of them due to affordability? Furthermore, in developing countries, it was revealed that mobile banking services were accessed differently due to poorer quality of mobile telecommunication infrastructures and offerings. Therefore, the conclusion is that mobile banking is accessed differently between developed and developing countries. Within developing countries access is normally via re-conditioned phones from developed countries and therefore diffusion paths in countries with different economic backgrounds and structures will vary and require further investigation.

A key issue the industry and technology developers are facing is the need to develop a standardised and universal technology platform. In fact, panel members commented that a universal platform will accelerate evolution but what this is and who will drive its development is yet to emerge. The standardisation of technology platforms was important in supporting the mobile banking environment and enabling interoperability where access is similar to the global application of Visa. This move is required to facilitate development. The challenge is, however, the time involved in securing a standardised platform. This is because universal platforms take time to develop in the first instance, and secondly, to become accepted as a standard in an industry where universal

applications and developments are the exception, rather than the rule, of advancement.

Some interesting correlations emerged from this study—See Table 27.2 for an overview. A strong positive correlation was identified between advances in electronic cash, mobile payments and improved technology ($r = .599$, $n = 72$, $p < .01$), changing customer demographics ($r = .506$, $n = 72$, $p < .01$), reducing costs ($r = .586$, $n = 72$, $p < .01$) and standardised and universal technology platform ($r = .428$, $n = 72$, $p < .01$). This may imply that, as electronic cash continues to diffuse, mobile payments will become more widespread and accepted (and expected) due to continued advances in technology thus motivating banks to mobilise their services. Moreover, continued diffusion of electronic cash will be in response to changing customer demographics; therefore, by providing mobile banking, banks will be able to meet the needs of this target group. In addition, it may be that advancements in electronic cash will drive the standardisation of mobile banking technology; hence banks may be more likely to provide mobile banking in the future due to the appeal of potential cost savings produced. Advances in technology had a medium positive relationship also with increased customer adoption of smartphones ($r = .439$, $n = 72$, $p < .01$) and standardised and universal technology/platform ($r = .402$, $n = 72$, $p < .01$). It appears logical that as technology advances customer adoption of smartphones will increase. Continued advancement of technology is also likely to produce standardisation of mobile banking platforms. The study predicts a very logical future technology-driven path. Other positive relationships were identified between changing customer demographics and customer acceptance and usage ($r = .323$, $n = 72$, $p < .01$), increased customer adoption of smartphones ($r = .310$, $n = 72$, $p < .05$) and, most interestingly, with reducing costs ($r = .359$, $n = 72$, $p < .01$). It may be that a younger, more tech-savvy customer is likely to embrace mobile banking, thereby driving banks to adopt. In fact, the issue of costs and adoption depicts a very logical situation where increased customer use will encourage adoption with the added benefits for banks of reducing costs. Potential for cost reduction has traditionally been a key driver for banks to adopt new distribution channels and technologies.

Table 27.2 Correlation matrix driver variables

	1	2	3	4	5	6	7	8	9	10
Advancement of electronic cash	—									
Advancement of technology	.599**	—								
Changing customer demographic	.506**	.331**	—							
Customer acceptance and usage levels	.264*	.092	.323**	—						
Government intervention & support	.031	.014	-.066	.227	—					
Improved economic conditions	.152	.190	.162	.104	.266*	—				
Increased customer adoption of smartphones	.274*	.439**	.310*	.184	-.138	-.222	—			
Increased levels of competition	.159	.022	.195	.015	.139	.187	-.020	—		
Reducing costs	.586**	.417**	.359**	.342**	.101	.080	.132	.261*	—	
Standardised & universal technology platform	.428**	.402**	.214	.058	.226	.118	.210	-.143	.257*	—

Note: *Correlation is significant at the .05 level (2-tailed). **Correlation is significant at the .01 level (2-tailed)

Barriers

The panel identified the majority of barriers to be of “some importance” (See Table 27.3 for an overview). Interestingly, unlike the drivers, the panel considered none of the inhibiting variables to be highly influential (key) upon future bank adoption. This may imply that drivers have a stronger influence upon bank adoption, thereby indicating the future looks promising for high adoption levels globally and mass adoption materialising. The reality may be that stakeholders see the progression to, and of, mobile banking as inevitable and therefore are less inclined to consider factors likely to delay adoption. That said, panel members suggested that limited advances in technology, low customer adoption of smartphones and lack of government support and intervention were credible barriers to future development.

Advances in technology would be naturally assumed to influence adoption with a panel member, in terms of uptake and engagement, commenting that technology continues to have an impact on diffusion of mobile banking.

However, the suggestion is that, as a barrier limits advances in technology, it is unlikely to materialise, with a typical response indicating that technology will continue to advance beyond what we can comprehend and understand at the moment. In addition, technology should always be able to meet and exceed the needs of any potential innovators or users. Its irrelevance as a barrier to future bank adoption was confirmed by several panellists because technology is already considered sufficiently advanced to enable the widespread adoption of mobile banking among banks and customers. This is an interesting observation as technology limitations led to low customer adoption and usage in the early 2000s and eventually the withdrawal of services by many banks. The difference now is that customer acceptance and preparedness to use new technology is greater reflected in the widespread adoption of smartphones by populations generally. In fact, the theme emerged that low customer smartphone adoption was not applicable globally and relevant only within a developed country perspective.

Table 27.3 Panel response for barrier variables, Round 1 and Round 2

Variable description	Very important		Of some importance		Neither important nor unimportant		Of little importance		No importance	
	Rd 1 (%)	Rd 2 (%)	Rd 1 (%)	Rd 2 (%)	Rd 1 (%)	Rd 2 (%)	Rd 1 (%)	Rd 2 (%)	Rd 1 (%)	Rd 2 (%)
Absence of standardised & universal technology platform	16.7	16.7	34.7	36.1	19.4	19.4	15.3	13.9	9.7	9.7
Changing customer demographics	18.1	15.3	26.4	31.9	23.6	23.6	20.8	18.1	6.9	6.9
Lack of government intervention & support	15.3	15.3	18.1	18.1	30.6	31.9	23.6	22.2	8.3	8.3
Limited advancement of electronic cash & mobile payments	23.6	22.2	41.7	44.4	18.1	16.7	8.3	8.3	4.2	4.2
Limited advancement of technology	23.6	22.2	31.9	36.1	19.4	18.1	16.7	15.3	4.2	4.2
Low customer acceptance & usage levels	38.9	38.9	41.7	41.7	8.3	8.3	4.2	4.2	2.8	2.8
Low customer adoption of smart phones	27.8	23.6	27.8	31.9	20.8	20.8	12.5	11.1	8.3	8.3
Overall costs	27.8	26.4	45.8	47.2	12.5	12.5	6.9	6.9	2.8	2.8
Security concerns	38.9	38.9	43.1	43.1	6.9	6.9	5.6	5.6	1.4	1.4
Worsening economic conditions	15.3	15.3	40.3	43.1	25.0	25.0	12.5	9.7	2.8	2.8

The importance of worsening economic conditions as an inhibitor was also discussed. For example, the conclusion was that in poor economic conditions the demand for banking products decreases so its influence on diffusion may not be as significant. Lack of government intervention and support was considered “neither important nor unimportant” (31.9 %, n = 23). However, the importance of lack of government intervention and support upon future bank adoption produced several interesting opinions. For example, South African government intervention led to enhanced numbers of formally banked customers, thereby emphasising the importance of the role governments play in terms of financial inclusion in developing nations in particular.

Multiple statistically significant relationships between the barriers were identified (See Table 27.4 for an overview). There was a strong positive relationship detected between the absence of standardised, universal technology/platform and overall costs ($r = .526$, $n = 72$, $p < .01$). This infers that the absence of a standardised universal platform will lead to an increase in costs, possibly due to banks having to provide multiple technology offerings, thereby deterring banks from adopting mobile banking in the future. Additionally, relationships were revealed between the absence of a standardised, universal technology/platform and changing customer demographics ($r = .325$, $n = 72$, $p < .01$), lack of government intervention and support ($r = .377$, $n = 72$, $p < .01$), limited advances of electronic cash and mobile payments ($r = .404$, $n = 72$, $p < .01$), technology ($r = .493$, $r = 72$, $p < .0$), low customer usage ($r = .364$, $n = 72$, $p < .01$), security concerns ($r = .395$, $n = 72$, $p < .01$) and worsening economic conditions ($r = .473$, $n = 72$, $p < .01$). It appears that government intervention and control may be necessary in order to help standardise mobile banking technology, without which banks will remain reluctant to embrace and develop mobile banking in the future.

Table 27.4 Correlation matrix for barrier variables

	1	2	3	4	5	6	7	8	9	10
Absence of standardised & universal technology platform	—	.325**	.377**	.404**	.493**	.364**	.285*	.526**	.395**	.473**
Changing customer demographics	—	.257**	.312**	.259*	.447**	.406**	.294*	.326**	.303**	
Lack of government intervention & support	—		.309**	.463**	.372**	.304**	.264*	.524**	.325**	
Limited advancement of electronic cash & mobile payments	—			.556**	.389**	.130	.429**	.407**	.390**	
Limited advancement of technology	—				.311**	.453**	.524**	.362**	.279**	
Low customer acceptance & usage levels	—					.315**	.322**	.553**	.395**	
Low customer adoption of smart phones	—						.343**	.180	.112	
Overall costs	—							.268*	.543**	
Security concerns	—								.364**	
Worsening economic conditions	—									—

Note: *Correlation is significant at the .05 level (2-tailed). **Correlation is significant at the .01 level (2-tailed)

Conclusion

In this chapter the future adoption of mobile banking by retail banks was explored. An holistic insight was gained by the elicitation of multiple stakeholder opinions. The findings develop and contribute to the understanding of the bank adoption process of technology, particularly regarding the distribution of financial services through mobile channels such as mobile banking. Influences are concluded to differ between developed and developing countries thus helping to explain, in part, the different diffusion patterns globally. It would appear the key influences on future adoption of mobile banking include advances in electronic cash and mobile payments, advancement of technology, changing customer demographics, customer acceptance and usage levels, increased customer adoption of smartphones and reducing costs. Dominant influences appear to be technology, the customer and potential for cost reduction—all recognised traditional influences within technology adoption and are typical of the financial services industry when embracing previous innovations including, for example, ATMs and telephone banking. In fact, the identification of technology as a key driver signals the importance of bank selection of the correct strategic partner in order for mobile banking to be successfully diffused in the future. Customers do appear to be a primary influence and we can determine that banks' continued adoption of mobile distribution channels is essentially customer-led, emphasising that banks are increasingly customer-focused. Therefore, banks offering of mobile banking will enable them to continue to strengthen the bank–customer relationship by meeting the changing needs and wants.

A key conclusion/trend is that driving influences are perceived to be more influential upon future bank adoption than barriers. This may mean mass adoption of mobile banking is most likely in the future, which is possibly reflective of the traditional slow embracing of innovations in the banking sector and illustrating how, in practice, distribution channels are slow to change. However, we recommend that banks should be aware of any possible future barriers and try to overcome them especially in light of past experiences with WAP withdrawal. Withdrawal of services is normally a last resort and expensive—banks can ill afford to suffer

losses in the current highly competitive market—although it is considered highly unlikely that withdrawal of mobile banking would take place. The lessons to learn are how to best facilitate its introduction and read the signals from technology sources and customers to ensure the offering provides the level of service and engagement most likely to satisfy users. Practically, the findings presented here may help banks make more strategically informed decisions in the future regarding mobile banking.

Although the findings are found to be valid, reliable and insightful the limitations of the study need to be acknowledged. This chapter concludes with the identification of some statistically significant relationships; however, it is emphasised that findings can only be inductively generalised to the wider banking industry due to the nature of the data generated. Furthermore, only a bank perspective was explored and the sample was not evenly distributed between stakeholder industries. Lastly, the sample was statistically rather small. A larger sample would have enabled factor analysis to be carried out. Despite these shortcomings, the study is considered a success.

Bibliography and Further Reading

- BBA Report. The way we bank now: It's in your hands. www.bba.org.uk/landingpage/waywebanknow. Accessed 3 July 2015.
- Juniper Research. Whitepaper, Digital banking mobile and beyond. <http://www.juniperresearch.com/whitepaper/digital-banking-mobile-and-beyond>. Accessed 28 Aug 2015.
- Keeney, S., McKenna, H., & Hasson, F. (2011). *The Delphi technique in nursing and health research* (1st ed.). Hoboken: Wiley-Balckwell.
- KPMG Report. Global mobile banking report. <http://www.kpmg.com/UK/en/IssuesAndInsights/ArticlesPublications/Documents/PDF/mobile-banking-report-2015.pdf>. Accessed 28 Aug 2015.
- Powell, C. (2003). The Delphi technique: Myths and realities. *Journal of Advanced Nursing*, 41(4), 376–382.

Part 5

Payments Systems and Digital Currencies

28

European Payments: A Path Towards the Single Market for Payments

Ruth Wandhöfer

Introduction

Over the last 12 years Europe has been taking key steps both at the regulatory and the infrastructure level to achieve integration of the Single Market for Payments. The political vision of harmonising the existing fragmented landscape of national retail payment systems, schemes and formats has been strongly supported at the institutional level by the European Commission (EC), the European Central Bank (ECB), the European Parliament (EP) and Council. Equally the payment industry has been supporting these efforts with a view to helping their clients to benefit from the single currency by easing the transfer across borders.

European Payment Service Providers (PSPs) within the framework of the European Payments Council (EPC) have been working hard to establish a set of common schemes with harmonised technical and business rules that would enable a ‘European’ euro payment (a credit transfer or

R. Wandhöfer (✉)
Independent Scholar, Muenster, Germany
e-mail: r.wandhofer@gmail.com

direct debit) to be executed across and within EU member state boundaries, creating SEPA, the Single Euro Payments Area (Wandhöfer, 2010). Furthermore, the legal basis supporting ‘European’ euro payments has been provided by means of the Payment Services Directive, which came into force in late 2009. However, due to slow implementation and uptake of SEPA, the EU had to also adopt a specific Regulation that mandated SEPA migration.

At the same time, the rest of the world has been eagerly watching the European SEPA experiment and a number of countries in the African continent, the Middle East and within Asia have already adopted—or are busy planning for—the use of ISO 20022 XML (SEPA’s underlying standards framework) for their local or regional payment schemes and processes to gain efficiencies and enable market integration.

This chapter explores the path of European payments integration, challenges encountered on the way, solutions that were put in place, and will provide an update on the current state of SEPA as well as future objectives.

What Is SEPA?

SEPA aims to deliver efficiencies and economies of scale by removing the fragmentation around eurozone local Automated Clearing House (ACH) schemes, formats and systems. The goal of the initiative is to achieve an integration of the retail payments space for the euro and to enable effective competition between banks and other PSPs at domestic and pan-European level.

After years of designing SEPA schemes and struggling to find a consensus between industry participants on the exact definitions and rules—obviously every country considered their own national credit transfer and/or direct debit scheme the ‘best in town’—the SEPA credit transfers scheme based on which banks and other PSPs can create euro payment products for their clients was launched in January 2008. The SEPA direct debit scheme, on the other hand, took longer to agree, not least given the diversity of direct debit models that exist in the European markets. In November 2009, two direct debit schemes were introduced to the market, along with the key supporting regulatory measures —the Payment

Services Directive 1 and Regulation 924/2009 (see below). However, once all these building blocks were safely in place, the market forces that were expected to naturally drive SEPA migration forward turned out to be weaker than expected.

SEPA, from a business and standards perspective is effectively defined and governed by specific rulebooks; namely a SEPA credit transfer rulebook, a SEPA direct debit rule book (for use between consumers and businesses) and a SEPA business to business direct debit rulebook. The rulebooks designed and published by the EPC leverage the ISO 20022 XML financial messaging framework. As such the SEPA rulebooks are a subset of the ISO XML message itself (the latter containing 942 fields). This SEPA subset, whether we talk about the credit transfer or direct debit messages, consists of a set of mandatory fields, whilst the remaining fields defined in the SEPA messages are optional. The most important element of the SEPA rules is therefore to be found in the implementation guidelines, which define how to implement SEPA. These exist both for the interbank/PSP space and for the customer-to-bank/PSP environment (in case customers have themselves implemented ISO XML). The main focus of SEPA is, however, the interbank/PSP space.

Furthermore, taking into account the possibility of communities or groups of providers to develop value-added services based on SEPA, the rulebooks introduce the concept of Additional Optional Services (AOSs). Of course AOSs are not supposed to be in conflict with the existing SEPA schemes, but beyond this limitation there is significant freedom to develop AOSs. Finland, Greece and Italy have been the first communities to announce AOSs, which helped these countries to better reflect local practices. Nevertheless, AOSs are slightly at odds with pan-European interbank/PSP standardisation.

At a theoretical level, few would dispute that the harmonisation of financial infrastructures and standards that SEPA is intended to trigger presents tremendous opportunities. According to a study¹ conducted at the request of the EC, the replacement of existing national payment schemes by SEPA holds a market potential of up to €123 billion in sav-

¹ “Banking and Finance”, EU Commission, last modified November 27, 2015, http://ec.europa.eu/internal_market/payments/sepa/ec_en.htm

ings and efficiencies, cumulative over six years to the primary benefit of users. From a practical point of view, SEPA provides significant opportunities for businesses to implement fully standardised and automated solutions for the centralisation of their payables and receivables. Existing obstacles caused by the need to support each of the required individual domestic file formats in order to process payments can be removed and an improvement in the corporate's overall cash and liquidity management be realised. In addition, eurozone communities could decide for efficiency purposes to close their local ACHs, given that harmonised SEPA transactions, whether domestic or cross-border, can be cleared via the existing pan-European clearing house operated by the Euro Banking Association (EBA).

And finally SEPA will also allow driving forward the EU 'Digital Agenda'. The latest developments show a clear market demand for real time or instant SEPA transactions. As a consequence the EPC has delivered an initial business rule design for a SEPA instant credit transfers scheme in November 2015, which is expected to be put in place in the coming years. The combination of instant SEPA transactions and the potential for increased usage of e-invoicing would hold the prospect of greater efficiency on a pan-European scale, enabling more business processes to dematerialised and intra-European trade to grow.

The Legal Pillars of SEPA

In order to gain insights into the European payments harmonisation, it is important to take a closer look at the set of payments regulatory measures that have evolved over the last decade. Three key regulatory measures worthwhile reviewing here are the Payment Services Directive (PSD 1 and 2), the Cross-Border Payments Regulation 924/2009 and the SEPA Regulation of 2012.

Starting with the first ever broad conduct of business legislation for all PSPs, the PSD1 (its successor PSD2 was published in December 2015) covers all electronic payment transactions (credit transfers, direct debits, card payments) denominated in all currencies of the European Economic Area (EEA) travelling between banks and other PSPs located within the

EEA. The PSD1 sets out requirements covering consumer information, operational rules for execution and liability rules.

In support of the Single Market, PSD1 introduced the ‘sharing principle’ for charges: each customer (payer and payee) is required to pay their bank/PSP respectively for the provision of payment services. Another consumer protective measure is the enforcement of the ‘full amount principle’: for transactions within Europe intermediary banks/PSPs are not entitled to deduct from the full amount and PSPs are prohibited to take float upon receipt of funds.

Additionally, beneficiary banks/PSPs, are not permitted to apply a lifting fee in relation to incoming PSD1 transactions (whether cross-border or domestic) unless this has been agreed with the respective beneficiary in line with the ‘sharing principle’ for charges mentioned above.

PSD 1 also mandated a maximum payment execution cycle time of D + 3 upon agreement and D + 1 by default. From January 2012, all PSD1 transactions had to be executed within a max of D + 1.

To help the European payments industry implement the PSD1 coherently, the banking industry’s PSD Expert Group (chaired by the author of this article) published industry guidance in September 2009² and followed this up in June 2010 with a specific addendum³ in response to certain issues that appeared to be persisting.

However, the original PSD1 has been going through a review process. In July 2013, PSD2 was issued as a proposal by the European Commission and publication of the final rules in the Official Journal of the EU happened in December 2015. Member States will have two years to transpose the requirements into national law.

PSD2 has expanded its scope in order to include so-called ‘one leg transactions’, that is, transactions where only one PSP is located in the EU. In addition, all currencies—as opposed to EEA currencies only—are

² “Guidance for the implementation of the payment service directive”, European Banking Industry PSD Expert Group, August 2009, http://www.ebf-fbe.eu/uploads/documents/publications/Reports/Others/Brochure-_24-08-09-PSD-Web-2009-01152-01-E.pdf

³ “Guidance for the implementation of the payment service directive”, European Banking Industry PSD Expert Group, June 2010, <http://www.ebf-fbe.eu/uploads/documents/positions/Social/14-06-D0459G-2010%20final%20PSD%20Guidance%20Addendum%20%208%20June%202010%20final-LAYOUT.pdf>

now covered. However, these requirements only apply in relation to the European part of the transaction and are mainly concentrated on information requirements in the context of consumer transactions.

The directive now also covers third party payment services (TPPs) that fall under the definition of payment institution, which will be able to offer new types of payment services such as payment initiation services, account information services and payment instrument issuance. PSD2 introduces two types of TPPs:

1. Payment initiation service providers (PISP): those providing a software bridge between a payer and a PSP in order to facilitate online payments by initiating an order at the request of the payer.
2. Account information service providers (AISP): those providing payment service users with an overall view of their financial situation on several accounts with the same or different providers.

As a consequence, a set of new provisions obliging the account servicing payment service provider (ASPSP) to disclose information to TPPs on the availability of funds for a specified payment transaction as well as to enable secure communication between a TPP and itself to support payment initiation services and account information services, are also being introduced.

A number of regulatory technical standards following adoption of PSD2 that will define security requirements around authentication and the secure communication between TPPs and ASPSPs are still to be developed by the European Banking Authority (EBA).

The surcharging rules have also been modified. Surcharging in PSD2 has been harmonised as a permissible activity by payees across Europe; however, it is prohibited for transactions regulated under the Cards Interchange Fee Regulation (consumer debit and credit cards) and transactions subject to the SEPA Regulation.

Furthermore, PSD1 refund rules are being complemented under PSD2 by a specific ‘no questions asked refund right’ in relation to SEPA direct debits, which is now consistent with the SEPA rulebook. PSD2 industry guidance has been published in September 2016 by the European

Banking Federation Payments Regulatory Expert Group (PREG), which is chaired by the author of this article.⁴

The second EU legislative measure in a SEPA-supportive context is Regulation 924/2009 on cross-border euro credit transfers and direct debits (a revision of the former Regulation 2560/2001), which amongst its other requirements included a key measure that required banks/PSPs participating in eurozone national direct debit schemes to make themselves reachable for SEPA direct debits (Core) by 1 November, 2010.

Because of the initially slow migration towards SEPA, the EC also decided to adopt the so-called ‘SEPA Migration End-Date Regulation’ (Regulation 260/2012/EC) in 2012.

The key deliverable of this Regulation was to actually provide a start date—rather than an end date—for migration from domestic credit transfers and direct debit processes/format to the pan-European SEPA standards. This date, which was initially set for 1 February 2014, had to be postponed to 1 August 2014.

The second big date in the Regulation refers to the point in time by when any national ‘niche schemes’ (representing less than 10 % of national CT or DD payment volumes), which have been exempted from the initial deadline thanks to one of the Regulation’s transition provisions must fall into line. This date is the 1 February 2016.

Most importantly the Regulation specifies the use of ISO 20022 XML message formats when transmitting SEPA payments on behalf of customers.

The practice of paying a multilateral interchange fee (MIF) by the payee’s bank to the payer’s bank in relation to the execution of a DD collection (an existing practice in some EU countries) had to cease —by 1 November 2012 for cross-border DDs and by 1 February 2017 for national DDs.

In a couple of linked changes which the SEPA Regulation makes to another existing piece of payments law (Regulation 924/2009, see above), those countries still maintaining settlement-based balance of payments reporting requirements on their PSPs for payments over €50,000 will

⁴ “Guidance for implementation of the revised Payment Services Directive: PSD2 guidance”, European Banking Federation Payments Regulatory Expert Group, September 2016, <http://www.zyne.com/zhs/212663#p=0>

have to phase these out by 1 February 2016; and cross-border payments in euro over this amount are being brought under the existing Regulation 924/2009 requirement under which they must be charged the same as the corresponding national transfer.

To help the market implement this Regulation correctly the European Banking Federation Payment Regulatory Expert Group (PREG) published industry guidance in 2012.⁵

The World Is Watching SEPA

Beyond Europe, other countries and communities have been closely examining the SEPA rulebooks and the whole concept of a Single Payments Area. Many of these regions have recognised the benefits of this harmonization initiative and in particular the advantages that can be brought about by employing the innovative ISO 20022 XML standards.

For all these reasons, several countries have been looking to copy the SEPA concept and as a consequence, a number of what we might refer to, as 'global SEPA Replicants' are likely to emerge over the next few years.

Countries within Africa are looking closely at developing a SEPA-type harmonised payment zone. The point being that Africa is a very vibrant market and there is a great deal of regional economic integration, albeit at a lower state of development to date.

For example, the West African Monetary Union was established in 1994 between Benin, Burkina Faso, Guinea Bissau, Côte d'Ivoire, Mali, Niger, Senegal and Togo. This union is characterised by the recognition of a common monetary unit, the franc of the African Financial Community (CFA franc), which is issued by the Central Bank of West African States (BCEAO). In a further example, the West African Monetary Zone (WAMZ), founded in 2000 by Gambia, Ghana, Guinea, Nigeria, and Sierra Leone, is also looking to harmonisation of member state economies and the creation of a stable currency (the 'eco') that could rival the CFS franc of the West African Monetary Union.

South Africa, Namibia, Lesotho and Swaziland make up the Common Monetary Area (CMA), where currencies are trading on par with the

⁵'SEPA Guidance', <http://www.ebf-fbe.eu/uploads/SEPA%20guidance%20final.pdf>, accessed January 7, 2016.

ZAR (South African rand), which is accepted as legal tender in all countries. From a regional governance perspective the central bank payments oversight committee (CMA CPOC) is currently seeking to implement a CMA low-value cross-border clearing and settlement model and will focus on driving the standards and principles for the cross-border clearing within the CMA region. In that context the ISO 20022 XML standards are considered as the best option to employ.

Similarly, the South African Development Community is working on a progressive plan of regional integration in the payments and securities space with the ambition to launch a common currency by 2018.

Monetary union is also clearly an ambition in the Middle East. Led by the Gulf Cooperation Council (GCC), which is a political and economic union, six Arab states of the Persian Gulf, Saudi Arabia, Kuwait, Bahrain and Qatar, are participating in the monetary union project while the United Arab Emirates (UAE) and Oman withdrew in 2009 and 2006 respectively. Nevertheless, the UAE and Oman remain members of the GCC. The initial aim of the project to launch a common currency by the end of 2010 was slightly too ambitious. At present, businesses in the region trade based on a basket of GCC currencies, which mimics the European currency unit (the euro's predecessor). The next step is now the launch of the six countries—six currencies Real-Time-Gross-Settlement System of the GCC, which has recently completed its design phase.

Additionally, other examples of significant payment system re-engineering projects at a country or regional level may be seen in several parts of Asia—where for example countries such as Thailand and Indonesia as well as Japan have started adopting ISO 20022XML standards.

Conclusion

The harmonisation of European payments with the SEPA initiative can be considered as one of the largest regional payment transformation projects that has ever happened. In fact, for many this project was more significant and complex than the introduction of the euro itself.

SEPA eventually only came about due to the commitment of many stakeholders, including PSPs, clients, regulators, central banks, infra-

structure providers and industry bodies such as the EPC. It also became clear that not only the technical and business standards would allow this project to become reality, but that a number of regulatory measures were essential ingredients to the ultimate success.

SEPA shows that monetary unions can be made more effective by standardising transaction processes. This unlocks the ability to increase competition and allow for next generation solutions to evolve. The increasing move of many countries' payment systems to real time payments should go hand-in-hand with more streamlined adoption of global standards such as ISO 20022 XML, which would ultimately enable faster and more efficient cross-border payments around the globe, in spite of the missing global payment system.

Further Reading

Wandhöfer, R. (2010). *EU payments integration: The tale of SEPA, PSD and other milestones along the road*. London: Palgrave MacMillan.

Bibliography

- “Banking and Finance”, EU Commission. Last modified November 27, 2015. http://ec.europa.eu/internal_market/payments/sepa/ec_en.htm
- Guidance for the implementation of the payment service directive. European Banking Industry PSD Expert Group, August 2009. http://www.ebf-fbe.eu/uploads/documents/publications/Reports/Others/Brochure-_24-08-09-PSD-Web-2009-01152-01-E.pdf
- Guidance for the implementation of the payment service directive. European Banking Industry PSD Expert Group, June 2010. <http://www.ebf-fbe.eu/uploads/documents/positions/Social/14-06-D0459G-2010%20final%20PSD%20Guidance%20Addendum%20%208%20June%202010%20final-LAYOUT.pdf>
- SEPA Guidance. <http://www.ebf-fbe.eu/uploads/SEPA%20guidance%20final.pdf>. Accessed 7 Jan 2016.
- Wandhöfer, R. (2010). *EU payments integration: The tale of SEPA, PSD and other milestones along the road*. London: Palgrave Macmillan.
- Wandhöfer, R. (2014). *Transaction banking and the impact of regulatory change: Basel III and other challenges for the global economy*. London: Palgrave MacMillan.

29

The Single Euro Payment Area (SEPA): Implementation in Spain

Santiago Carbo-Valverde
and Francisco Rodríguez Fernández

The Rationale for SEPA

As the twenty-first century advances, geopolitical events are causing major concerns whereby the benefits attributed to globalization and market integration could be diminished. One of the most prominent examples of efforts towards integration is the European Union, involving multiple projects to achieve further consolidation in a number of areas. Even if geopolitical matters have questioned the reality of a borderless Europe, some of these projects are progressing. One of the most interesting projects is the convergence towards a single payments area. Over time, different legislative initiatives have progressively converged in the creation of the so-called Single Euro Payment Area (SEPA). The idea behind SEPA

S. Carbo-Valverde (✉)
Bangor University, Bangor, UK
e-mail: s.carbo-valverde@bangor.ac.uk

F. Rodríguez Fernández
University of Granada, Granada, Spain

is that all transactions (domestic and cross-border) offer the same conditions of ease, efficiency and security. Payment systems represent an essential part of the efforts towards integration in Europe, particularly in the eurozone, where a single currency is shared. In any event, SEPA covers all EU member states, as well as Iceland, Liechtenstein, Monaco, Norway, San Marino and Switzerland.

A project of the dimensions of SEPA involves substantial technical, logistical and even political challenges. The main three institutions co-ordinating the necessary efforts are the European Commission (EC), the European Central Bank (ECB), and the European Payments Council (EPC). The EPC is in charge of setting the instruments and standards necessary to guarantee efficiency and security. The main challenge is to deal with heterogeneities in technical, pricing and competitive standards in order to turn them into common practices.

SEPA mainly involves credit transfers, direct debits and payment cards. The first steps towards SEPA were undertaken in January 2008. The so-called SEPA Credit Transfers were put in place. This aim was to enable credit transfers to be carried out under the same operative and technical standards and conditions within the EU. This was followed by the launch of the SEPA Direct Debit—also setting homogenous standards for these transactions—in 2009.

As in other EU-wide initiatives, common regulations had to be agreed to launch SEPA. The main regulation was the so-called Payment Services Directive (PSD) in 2007. The aim of the PSD was to ensure that electronic payments within the EU—in particular credit transfers direct debit and card payments—become as easy, efficient, and secure as domestic payments within a member state, by providing the legal foundation to make the Single Euro Payments Area (SEPA) possible. The PSD also reinforced the rights and protection of all users of payment services (consumers, retailers, large and small companies and public authorities). Importantly, as the range of payment services and markets widens (i.e. mobile payments), the PSD has been recently revised. This has given rise to the Second Directive on Payment Services (PSD2). This new law was proposed by the European Commission in July 2013 and approved in October 2015. It enhances consumer protection, promotes innovation and improves the security of payment services. The PSD2 can be consid-

ered part of what has been labelled as SEPA 2.0. This consists of the new SEPA developments that look at innovations and new payment devices as game changers. This will involve relatively complex but relevant features such as cash management and payment hubs at banks and businesses or the bank rationalisation of the cash pooling infrastructure.

As SEPA involved huge changes in the industry, substantial implementation costs are involved. Several indicators, nevertheless, suggest that SEPA pays off. Converging to electronic payment standards within a single market generates significant cost savings. An impact study conducted by PricewaterhouseCoopers (PwC) for the European Commission on January 16th, 2014, estimates some of the benefits at the time of full SEPA completion:

- There are potential annual savings for all stakeholders (corporations, public sector, banks, and clearing and settlement mechanisms) of 21.9 billion euros as a recurring annual benefit resulting from price convergence and process efficiency. These benefits would result, *inter alia*, from the costs savings of a reduction of up to nine million bank accounts.
- 227 billion euros are estimated to be unlocked in credit lines and liquidity. These benefits are realized from cash pooling and efficient improvements in clearing. This means that better technical standards may increase, *per se*, the amount of credit.

The (Particular) Case of Spain

Spain is a particularly interesting case within the SEPA. As we will show in this chapter, the country has been characterized for offering one of the world's largest infrastructures for non-cash payments. However, cash payments are still highly used. Additionally, several changes, partly driven by SEPA, have recently taken place in Spain, introducing changes in the pricing structure of the payment card industry and significant changes in non-cash payments' adoption and usage.

The PSD was adopted in Spain by Law 13/2009 on Payment Services. Convergence has evolved relatively rapidly. The latest figures provided by the Bank of Spain reveal that:

- 86.2 % of the direct debits in Spain were already made following a SEPA standard as of mid-2014, as compared to 85.7 % for the EU average.
- In the case of credit cards, 95 % were already adapted to the EMV-security standard (the chip system designed by Europay-MasterCard-Visa) in 2013 while 99 % of the electronic fund transfer at the point of sale (EFTPOS) terminals in merchant stores were also prepared for EMV chip cards.
- Iberpay, which is the system in charge of processing electronic bank transfers in Spain, effectively processed 99.3 % of the SEPA transactions by 2013-Q2. This implies a significant improvement from the 87 % of 2008-Q1. Similarly, Iberpay also processed 98.3 % of the SEPA transfers received by Spanish banks from abroad. There are various technical challenges involved in this progress. Eliminating the legal, technical or business barriers that impede a pan-European interoperability was a challenge. Perhaps the most widely commented technical change has been the transition to the EMV chip cards. EMV is an acronym for ‘Europay MasterCard VISA’. As we discuss below, setting a common and safe standard with an EMV chip is being more controversial than expected as it is related to adoption and pricing decisions in the industry. Ninety-five per cent of cards in Spain were already using EMV chips in 2014.

Moreover, according to ECB figures, Spain had 56,258 automated teller machines (ATMs) in 2013. Only Germany (82,610), the United Kingdom (66,134) and France (58,536) have a larger ATM network in the EU. As for point-of-sale (POS) terminals, Spain with 1.3 million has the fourth largest network after France (1.8 million), the United Kingdom (1.6) and Italy (1.5). The ratio of ATMs per million inhabitants was 1219 in 2012 and only Portugal showed a higher ratio (1569). Similarly, the ratio of POS terminals per million inhabitants in 2012 was 28,513, only lower than that of Finland (35,471), Ireland (33,146) and Cyprus (30,221).

Nevertheless, even if the infrastructure is large, the use of cards still remains at an average EU level. In particular, the value of card payment transactions as a percentage of GDP was 10 % in 2012. In other countries, such as the United Kingdom or Portugal, the ratio exceeds 30 % of GDP while in others such as Sweden, France, Finland or Denmark is larger than 20 %.

Even if card use remains low relative to cash, other aspects of electronic payments have evolved to a larger extent in Spain. This is the case of direct debits (mainly to pay receipts) where banks operate as conduits of electronic payments. Direct debits represented 42 % of total bank transfers in Spain in 2012. The ratio is only larger in Germany (48 %). Other electronic transactions through banks, such as credit transfers (channeling funds between accounts) are only 15 % of bank transfers in Spain. The weight of credit transfers is larger in Eastern EU countries and in particular in Bulgaria where they reached 82 % in 2012.

But why does a large infrastructure not cause a sharp fall in cash usage? The ATM network can partly explain this. ATM transactions and POS transactions have opposite effects since the use of debit cards at ATMs increases cash withdrawals while the use of debit cards at POS reduces cash holdings for purchasing purposes. Recent studies (appearing in the further reading section) show that ATM transactions and POS transactions are significantly and negatively related and have a large economic impact on one another. Additionally, ATM transactions have a positive and significant impact on the demand for currency while POS transactions have a negative and significant effect that offsets the (positive) impact of ATM transactions. The technology mix (AMT plus POS), however, delays the transition from cash to non-cash payments in Spain.

There were 887 million ATM transactions in Spain in 2012, an absolute figure that was only larger in the United Kingdom (2915 million), Germany (2128 million) and France (1622 million). The total value of POS transactions per card was 1348 Euros in 2012, considerably lower than in Denmark (5741), Finland (4955), France (4847), Ireland (3907) and the United Kingdom (3879). Thus, why are ATMs still so important? ATMs were first deployed as a way of moving some cash management-related bank services out of the branch and they were developed in parallel to POS machines. However, the aim of POS machines is to promote

cashless payments and, therefore, these conflicting goals for ATMs and POSs may overlap for some time. According to reports published by the Bank of Spain, from 2002 to 2013 the value of POS transactions doubled from 46.8 billion euros to 98.5 billion euros. The value of transactions at ATMs was 1.3 times larger in 2013 than in 2009 and it reached 109.2 billion euros in 2013. It is also important to note the negative impact that the crisis had on ATM transactions, which has steadily been falling since 2007. However, the value of POS purchases with cards only fell in 2009. If the same trend continues, and considering the impact of SEPA on card use, one might expect the value of POS transactions to exceed that of cash withdrawals by 2017. The infrastructure itself has also recently changed due to the bank restructuring process since 2009. The number of ATMs has decreased from 61,400 in 2009 to 52,200 in 2013. POS terminals reached their peak in 2010 at 1.55 million and then fell to 1.32 million in 2013.

Payment Cards and Beyond: Competitive Issues

One of the defining features of Spain in the adoption of SEPA has referred to competitive issues. As a relevant payment method, more citizens are aware of the importance of payment cards in today's economic transactions. Nonetheless, little is known on how this industry works and the competitive implications of its structure. Payment card networks are comprised of consumers (cardholders), their financial institutions (called 'issuers'), merchants, the merchants' financial institutions (called 'acquirers') and a network operator or platform. A consumer makes a purchase from a merchant. Generally, the merchant charges the same price regardless of the type of payment instrument used to make the purchase. Consumers often pay annual membership fees to their financial institutions for credit cards and may pay service charges for a bundle of services associated with transactions accounts including debit card services. Merchants pay fees known as merchant discounts. Acquirers pay interchange fees to issuers. Basically, merchants complain they assume

the final costs as they pay discount fees to compensate acquirers for the interchange fees, while most consumers do not even pay a membership fee. In general, there is no consensus in the literature on what is the optimal level of an interchange fee. This fact is very relevant as these fees are highly correlated to those charged to merchants and to cardholders. The only consensus is that the optimal interchange fee (and consequently merchant fee) is not zero.

In this relatively complex structure of cross-services and prices, interchange fees are key and have received increasing attention from competition authorities all over the world (i.e. the Dodd–Frank Wall Street Reform in the US, the Reserve Bank of Australia interchange fee regulation in 2002, or the European Commission rulings against MasterCard and VISA since 2005).

One of the main features regarding the setting of incentives for higher card use in Spain has been pricing regulation. Once again, this is interesting because the reduction in interchange fees in Spain has occurred without the need of a regulatory change but with some mediation from authorities in negotiations between banks and merchant associations. In particular, the Spanish government promoted an agreement between payment networks and merchant associations in December 2005. The idea was to establish a timetable to progressively reduce interchange fees from 2005 to 2009, with different schedules for debit and credit cards. Average debit card interchange fees declined from 0.39 to 0.31 euros/transaction from 2005 to 2009, while the average credit card interchange fee fell from 1.23 to 0.67 %. However, most recently, following the EC 260/2012 SEPA regulation discussed above, further agreements have led to a decrease in interchange fees on credit and debit cards. The banks, more specifically, will be limited to charging a maximum of 0.2 % in the case of debit cards and 0.3 % in the case of credit cards. This should also reduce merchant fees, with an average of 0.6 % by 2014. It is unclear what the effect of such reductions has been and will be. In theory, the decision tries to follow the logic that suggests that interchange fees should be close to the marginal costs of the service, but this cost is very difficult to estimate in practice. At the same time, the industry has made substantial investments in the payment infrastructure and only a significant increase in card use for purchase transactions can compensate the effect of a reduction in fees.

Yet, calculating this effect is also difficult in an environment in which the effects of the crisis on the use of cards cannot be separated from the effect of the reduction of the fees themselves.

In any event, recent empirical findings (see Carbo-Valverde et al., 2016) find evidence suggesting that merchant acceptance has increased because of a reduction in interchange fees. Additionally, consumer adoption of debit cards is not found to significantly decrease because of a lower interchange fee. Besides, credit card adoption is found to increase dramatically during the period of interchange fee reductions. Despite higher fees, this suggests that the value proposition for those consumers previously not having credit cards has improved. Most importantly, reductions in interchange fees resulted in a dramatic increase in payment card transactions during this period. Finally, banks were also found to be better off as payment revenues from debit and credit card services increased as a result of lower interchange fees. This suggests that the increase in the number of transactions appears to offset the decrease in the per-transaction bank revenue.

Bibliography and Further Reading

- Carbo-Valverde, S., & Fransisco, R.-F. (2014). ATM withdrawals, debit card transactions at the point of sale and the demand for currency. *SERIES*, 5, 399–417.
- Carbo-Valverde, S., Chakravorti, B., & Rodríguez Fernández, F. (2016). The role of interchange fees in two-sided markets: An empirical investigation on payment cards. *Review of Economics and Statistics*, 98, 367–381.
- Economic analysis of SEPA: Benefits and opportunities to be unlocked by stakeholders. PricewaterhouseCoopers, January 16, 2014, http://ec.europa.eu/finance/payments/docs/sepa/140116_study_en.pdf. Accessed 20 Nov 2015.
- Gorjon-Rivas, S., & Fernandez-Bedoya, A. (2014). SEPA 2.0 – avanzando en la integración europea: la zona única de pagos en euros (SEPA) en perspectiva, *Revista de Estabilidad Financiera, Bank of Spain*, 26, 49–71.
- Martikainen, E., Schmiedel, H., & Tuomas T. (2013). Convergence in European retail payments. Occasional Paper Series 147, 6.

30

Revolutionizing Cashless Payments in Mexico: The Case of Mimoni/Lumbreña

Gabriel Manjarrez

Introduction

Credit card penetration in Mexico has hovered around 15 % of the population for over a decade. This is not a reflection of banks' unwillingness to have more customers. They would love to put formal revolving consumer credit in the hands of the estimated 40 million economically active, non Bottom-of-the-Pyramid (BoP) Mexican adults with no credit cards. The problem is assessing risk.

Only the 15 % top of the economic pyramid have a formal credit score composed by both positive and negative payment behavior. The other 85 % of the population do not have a complete (or reliable) credit score, if any. Most of those with any score hits have only negative payment data. Even though all credit-providing financial institutions and merchants are supposed to report both positive and negative behavior, our data (tens of thousands of customers) shows that about 60 % of the Mexico City

G. Manjarrez (✉)
Mimoni/Lumbreña, Palo Alto, CA, USA
e-mail: gabe@manjarrez.com

Non-Formally-Banked (hereafter NFB) population has any bureau hit and over 90 % of those are only negative hits. Outside Mexico City, the number falls to about 45 % with any hits, of which almost all are negative.

To summarize, Mexico has a population of approximately 120 million inhabitants, of which 53 million are economically active and only about 15 million have the depth and accuracy score for a bank to issue them a traditional credit card. The other 38 million are forced to contend with a non-existing, or, most times even worse, incomplete credit score, which severely limits their personal or microbusiness credit opportunities (not to mention the incremental costs when trying to rent a home, get insurance, etc.).

We have found that there is an apparent informal (it is hoped) collusion and the merchants and non-bank financial institutions only report negative data. They are reluctant to create competition by letting others know who their credit-paying customers are. By contrast, banks are required to report all payment behavior. There is, then, a very high correlation between not being formally banked and not having a full credit score. Note that even though most employees in Mexico receive their weekly or biweekly salary in a bank card, in the vast majority of cases the employee sees the card simply as an intermediary between the company and their money. In very practical terms, this means that on payday there is a huge rush to the cash machines to get it all out. Even though the card is, in effect, a bank-backed checkless checking (or current) account, there is such mistrust and or misinformation that it is almost never used as such. For the rest of this chapter we will refer to consumers with no formal bank relations (NFB) and customers with no full credit score indistinctly.

Mexico's lack of an accurate, comprehensive score has created a broad swath of NFB employees and entrepreneurs who are living in a very expensive economic disparity vis-a-vis their banked countrymen. Our customer segment, which comprises several million NFB Mexicans with an average household monthly income of US\$400 (far above the poverty level), is largely unable to get formal, unsecured consumer credit. That is, formal as opposed to a local unregulated loan shark or loans from family and friends.

We started Mimoni in late 2008 with the goal of creating a statistics-driven methodology to instantly, cheaply and reliably credit-score the large NFB population. In late 2013 we started applying our data-driven algorithms to online cash lending out of our own balance sheet (fixed and

wireless broadband penetration currently at around 50 % of the population. A large proportion of the NFB consumers have available Internet access). In the years before and since we started our operations, we have collected some key findings concerning payments and cash for the NFB population. We also launched Lumbra, leveraging our deep databases and large analytics teams, as a provider for Mexican established and de novo credit companies.

Yes, Cash Is King

Though this should be painfully obvious we were optimistic about a previous iteration of use of our statistical algorithms. In our early years, we used our credit risk models to convert NFB customers from prepaid to post-paid cell phone usage.

There is, worldwide, a very high correlation between post-paid cell usage and credit card penetration. This is self-evident: phone companies' shareholders dislike it when telcos take credit risk. Post-paid is a type of consumer credit, whose main risk for the carrier is the "free" handset given upon contract signature. The carriers, unable and unwilling to score customers themselves, rely on the banks' risk models, which are reflected on the issuance of a card with enough credit limit to handle the monthly recurring payments.

Typically carriers see a 6–7 month payback on the handset from a post-paid contract. Any customer default before then is a net loss. On the other hand, prepaid users are much less profitable than (paying) post-paid users. At the time (2010), post-paid Average Revenue Per User was at a minimum 50 % higher than the pre-paid ARPU. Carriers would love any tool or process that could convert prepaid to post-paid without the carrier taking on incremental credit risk.

This scenario was ideal for us. We were willing and able to credit-score the NFB customers and take on their post-paid line credit risk. We signed a partnership agreement with a large carrier where we would sell, under our own brand, post-paid lines with an exclusive and attractive minutes plan. For the NFB consumers, this was to be a huge boon in their communications. Given the (for all effective purposes) duopoly telco structure, Mexico had at the time the most expensive prepaid min-

utes of any OECD country; thus, again, we saw a regressive tax being levied on those with no accurate credit score. No score equaled no credit, equaled no post-paid, equaled line expensive minutes.

By 2013 we realized that even though our NFB users were realizing significant telco savings, if someone was willing to underwrite them for an unsecured personal loan, they would much rather it be in the form of perfectly fungible cash vs. financing their phone use.

Once we started selling the online cash loans, to the same types of customers, at the same credit level (i.e. amount at risk), we saw our customer acquisition costs decrease and our repayments improve by a significant factor. Our original hypothesis was that if telco costs were cheaper, since they were much harder to replace without our involvement, they would be sold easily and have a solid payment risk. That hypothesis proved to be incorrect. It turns out that the possibility of having a cash loan at a fair rate and from a reputable organization was a much more compelling proposition than cheap cell minutes.

Recently, we have seen a number of newly established financial technology businesses catering for the NFB consumers via cash-equivalents (i.e. financing cement to immigrants to build an abode back in their home country, ability to pay directly for a relative's utility bill). We posit that they will have similar difficulties in convincing NFB consumers to enthusiastically embrace non-cash equivalents.

Most of the NFB consumers' transactions are still cash-based. Further, since there are almost always larger immediate outflows than inflows, the ability to discriminate, in real time, which obligations to fulfill and which to ignore is key. If a potential inflow is being used exclusively to always pay my phone bill or my rent, without my control, that means I cannot choose to delay a rent payment in case I have, for example, to give priority to a medical bill.

Data In; Processes Out

We have spent over eight years collecting data of the non-poor NFB consumers in Mexico, finding correlations between the data gathered and the observed payment behavior. As any credit company finding a new way

to assess risk levels can attest, even the most sophisticated tools require an initial brute-force approach. You accumulate data, pile up the “goods” and the “bads” (payments) and, once you have enough of them, you start optimizing for Return-On-Investment (ROI, or, more accurately, for LTV.¹) You adjust approval rates and risk levels to maximize the value of each transaction, evolving as more data comes in or new sources of data are found.

A key finding has been that when it comes to Mexican NFB consumers’ payment behavior, everything counts. The flip side to having consumers that are not accurately or comprehensively scored is that you lose the largest hammer that credit risk-taking companies in more developed economies have: negatively impacting your credit score if you default. Having no score means that you have only a vague idea of what it would mean to have a good one. So even though we are one of the few organizations actively reporting good and bad behavior, we still have the challenge of communicating what that means to our customers.

The classic approach of cajoling non-payers by threatening their credit history is largely ineffective. That puts larger pressure on the incoming customer selection side, since it is very hard to bring back non-performing loans. It also meant we had to dig deeper into the power of analytics and algorithms than you would typically do. More traditional consumer lending players in developed economies will focus on the power of their analytics and its ability to wring out the last percentile of positive LTV through a new way of looking at the same data, though the actual loan disbursement, payment and collections processes are fairly well known and standard.

In the case of Mexican NFB customers, the analytics have to go above and beyond. We are using them to drive all of the customer-related processes, feeding data from our call center back to the black box to determine the best sales scripts, for example. Or including the number of times a customer has to call to have his login password reset as a variable to determine the credit limit for a subsequent loan.

¹ LTV is Lifetime Value, a measurement of each customer’s net present value, estimating all the costs and revenues from an average number of loans/transactions/time before churn.

Our clients have access to actual Mimoni humans when needed, and all those interactions are in a permanent electronic feedback loop to improve customers' satisfaction and repayment behavior. We have found that the way we address a customer, depending on their age and gender as well as level of education, can have a statistically significant impact on how well they pay their loans. The same goes for almost all customer touch-points. They each have nuances that can negatively or positively affect satisfaction and payments and those nuances, analyzed and defined by our decisioning algorithms, are constantly being input to the personnel training sessions. It is the ultimate irony that the human touch that our customers prefer versus the cold, calculating computers is actually almost completely scripted by the aforementioned machines.

One key behavior finding at Mimoni has been that once customers get over the barrier of a contactless first transaction (by speaking to our call center), we find that almost all customers will apply for and disburse their subsequent loans without human contact. It would seem to indicate that of the two main reasons, lack of trust and lack of sophistication, the former is much more relevant than the latter.

Cashless, Not Contactless

NFB customers in Mexico are living in the border between the analog and digital worlds. And it is not a narrow border. Even though our paid customer acquisition is 100 % digital, a majority of interested customers end up at our call center to finalize the application process for the first loan. The two main and unsurprising reasons we have identified for this are: lack of trust of a computer and/or lack of experience at navigating digital forms. The bottom line is, as mentioned in the previous point, at some point in the first loan application, human interaction is required.

In our utopian cashless, friction-free model, a NFB customer would completely fill out a credit application on her mobile device, get instantly approved and the funds would be wired to her mobile wallet, from where they could be spent or in turn sent to settle a personal or business debt.

Our more mundane reality requires us to be technologically toolled up for that utopia and also ready, willing and able to serve the so-near-yet-so-far market, where our customers need personal handholding to complete an application, go to a bank with an electronic money order to retrieve the loan amount in cash and make loan payments at convenience stores or banks. Mimoní does not handle any cash, but our customers' lives still revolve around it and we have to take this fact into account with all our processes. We disburse our loans either via bank electronic money orders sent by text to customers' phones or loading a prepaid debit card provided by us. When we use the debit card, 40 % of the customers will immediately take the full amount out as cash, even though there is a US\$2 fee (vs. no fee if they use the card to consume at stores or markets). Most of the others will spend some of it via the card and cash out the rest.

On receiving payments we also offer a cashless solution that our customers do not use. About 60 % of them are formally employed and receive their biweekly salary via a bank prepaid card. We encourage them to pay us via that account. It is free to use and user-friendly. Currently less than 1 % of our customers do it. Most of our customers make their loan repayments at convenience stores, where there is a US\$0.50 charge to them for each payment (plus a similar amount to us). Note that even the use of their salary prepaid card is cash-centric. The behavior of the vast majority of NFB formally employed is to head to the cash machine on payday and withdraw their full salary amount, leaving nothing on the card.

Conclusion

Even though we are a consumer lending company that manages no cash and offers 100 % cash-free solutions for keeping, spending and paying, almost all of our customers still prefer (and will pay extra for!) managing it all as a cash transaction. It would seem that as far as the NFB consumers in Mexico are concerned, no amount of convenience or discount replaces the need to interact with a person (at least initially) and no amount of fees will replace having the flexibility to have and spend their cash at their own discretion.

Bibliography and Further Reading

- Sendhil, M., & Eldar, S. (2013). *Scarcity: Why having too little means so much.* New York: Time Books, Henry Holt & Company LLC.
- Zaiats, O. (2015). *FinTech in a nutshell: A short guide for fintech beginners.* Kindle edition.

31

The Future of Money

Anette Broloes

Introduction

This is the story of a successful industry–academia strategic research project in a research area that still holds much potential—that of financial innovation and financial behaviour. It is told by the cluster facilitator bringing in the extensive work of the researcher. The project was part of an EU-Regional Fund project (2009–15) with the support of the Region of Copenhagen and the purpose of building a finance IT cluster in Denmark.

When industry partners were first invited to discuss potential initiatives in the field of finance and technology in 2009, their first focus was

Unless otherwise stated this chapter borrows freely from Stefánsdóttir et al. (2013) to which the author of this chapter was a contributor. The research to generate this report was sponsored by the EU Regional Fund and the Region of Copenhagen. EU project number is ERDFH-09-0026. The full report and other short presentations are freely available at <http://www.cfir.dk/en-GB/Projects/Pages/TheFutureofMoney.aspx>.

A. Broloes (✉)

Copenhagen Fintech, Copenhagen, Denmark
e-mail: broloes@post1.dknet.dk

to discuss the already rapid technical development in payments and how this would affect payment solutions and more broadly the possibility of reaching a cashless society. Based on preliminary research it was decided to form a project with partners from ICT, finance and research. The overall goal would be to understand the prerequisites of building a cashless society with the aim for Denmark to become the first cashless country. The project would focus on understanding customer and retail behaviour and analyse regulatory and other barriers to a cashless society. The research on behaviour was separated into a qualitative scenario based approach and a quantitative survey based part. This article reports only on the customer behaviour aspects. It was further expected that the collaboration might lead to the presentation of a demo of a new mobile payment solution.

Background and Organisation

The initial research showed good reasons why a cashless society is relevant. First of all, it is well-documented that the overall cost for society is much higher for cash payments than for card payments. The anonymity of cash also makes it prone to criminal uses which may explain why a lot of cash is issued in very high denominations not generally used by individuals or businesses.

Furthermore, the transportation of cash leads to high levels of CO₂ emissions and this dirty cash is the source of contamination.

The purpose of the project was to investigate the possibilities for replacing cash with other payment technologies in Denmark, whose population already comprises some of the most e-ready users in the world.

The project was formed at the end of 2009 with seven organisations working together. Copenhagen Finance IT Region (CFIR) managed the project, Danske Bank and Nets provided financial and infrastructural knowledge, IBM and CellPointMobile created the technical prototypes that were tested, and Copenhagen Business School (CBS) and Innovation Lab carried out the quantitative and qualitative research. This article focuses exclusively on the qualitative research and analyses carried out by Innovation Lab's User Studies team.

Methodology

A first fieldwork study was undertaken in spring 2010 to gain insights into attitudes and daily routines regarding money and payments. To ensure a representative sample of Denmark's population, households were selected based on both geography and income level. Data was generated through observation as well as semi-structured, qualitative interviews. The working hypothesis was that the lower the level of education and official income, the higher the incidence of cash. Generally speaking, this hypothesis was confirmed.

Additionally, the analysis showed that regardless of age, sex, income and education three main factors influence the choice of payment. These are economic control, value and social context.

To expand these results a Test Lab Centre was established at Nets where 30 "users" of money underwent rigorous testing, interviews and surveys. Testing took place across five scenarios: Retail, Parking, Cinema Box Office, Bar/Event, and Social (peer-to-peer transfers). Each of these scenarios was characterized by a unique set of payment solutions tailored to the given economic, physical and social context. All tested technologies were smartphone-based. The Test Lab approach was supplemented with live experiments in collaboration with Roskilde Music Festival and Slagelse Cinema.

Users were selected according to two main criteria, age and education. A variety of disability types were also represented in the sample.

Users tested three payment types in each scenario: SMS, QR and NFC. Each user was encouraged to begin with the type of payment he or she initially found most appealing, then move to the next most appealing payment types. Users were asked to show the contents of their wallets and to discuss this. They were also interviewed about their views on money, payments and security.

In order to be sure that reactions and thoughts were captured, a speak-aloud approach was used throughout. After each test the user was asked to evaluate the particular payment in terms of speed, efficiency, convenience, context and overall experience. All testing and evaluations were video recorded.

Analysis and Findings

A brief description of the five scenarios and live tests appears immediately below:

Retail Test Scenario

The retail scenario was built as a small shop in collaboration with the Danish retailer Føtex. Test users were invited to try different forms of shopping and payment experiences. One was based on an advanced application allowing the user to shop for specific items (for instance a recipe), to scan items bought and to keep track of spending.

Perceived Time Varies

The perceived duration of the actual payment transaction varied greatly although all were technically identical. If the tester was in a rush, the experience was considered slow regardless of the actual duration.

Assessing the Shopping Flow

Standing in line was considered to be a waste of time that broke the experience of flow. Paying via the NFC scanner counteracted this and was considered faster than paying with cards or cash. The transaction itself was only a portion of the payment experience, as testers associated elements leading up to the payment transaction as part of the transaction itself.

PIN Halts Flow

Testers felt that the PIN function was necessary in the application as they felt unsafe without it. Testers preferred PIN codes or login/password as security measures in case their mobile device was stolen, and to protect the credit card information saved in the application. Some testers were willing to use the application without PIN codes for smaller amounts of money, however, as

it would increase the flow and transaction speed. The scenarios showed that testers are open to alternative security solutions that support payment flow.¹

Attempting Overview

Saving paper receipts was part of most testers' ambitions to achieve better overview of money spent, though none actually reported following through on these intentions.

Self-scanning Does Not Add Value

Scanning the barcode on one's own items ought to provide added value to the shopping experience since time is saved and less handling of the goods is necessary. Most testers, however, found the app's barcode scanner to be slow and imprecise. This observation was confirmed by video data that revealed that self-scanning, unless the technology was more precise, required enormous effort on the part of the user. In particular, testers with young children felt that this added stress as they needed to look out for their children at the same time.

Parking Test Scenario

This scenario was set out as a parking poster resembling a parking facility.

Transaction Speed

Payment with the application was considered to be faster than both cash and card payments, and testers found that the transaction had good flow. Access to payment should be located as close to the parked car as possible and preferably from within the car via GPS, some testers suggested, to save time.

¹ The attitude towards the use of PIN was similar in all scenarios and is not discussed further in the following descriptions.

Flexible Parking Intervals

Many testers requested flexible parking intervals as they would prefer to pay only for the actual time parked.

NFC Supports Flow

NFC was the preferred solution among testers. After they tried all three options, NFC was found to be fastest and most effortless. Testers first selected the technology that was most familiar to them, usually SMS, but subsequently chose the solution that was fastest and easiest.

Cinema Box Office Test Scenario

This scenario was based on a ticket application allowing test users to choose a film based on web site information, to choose a show and choose seating and buy tickets, etc. The Test Lab scenario was supplemented by a live test in collaboration with Slagelse cinema.

Simplicity Is Key

Testers responded positively to the application because it was simple and used recognizable elements. Ideally, the testers would prefer that the cinema application be integrated into a more general digital payment or entertainment application instead of an application connected to a specific cinema theatre.

Spontaneity Is Supported

The app supported the natural flow of decision-making processes associated with going to the movies. The decisions were most often social, involving some negotiation as to which movie to see and when to see it depending on seat availability. All of these aspects were supported. Several users could browse through the app on a mobile device together, watch

trailers, check for availability and finally make a purchase. The process was completed in one sitting.

Efficiency Is Relative

Payment with the cinema application was generally considered faster than payment at the box office, even though steps such as selecting the film, time, seats and popcorn were considered to be part of the payment. As going to the cinema is most often a recreational activity, timesaving was not necessarily a priority for testers.

Text Messages Are Familiar, but NFC Is Better

Testers with no previous experience with NFC or QR initially preferred the familiar text message technology. NFC was the technology of choice for 91 % of testers after having tried it.

Event Test Scenario

This test was designed as a bar in the Test Lab and was supplemented with live testing at the Danish Music Festival in Roskilde.

Socializing Is Part of the Experience

In the Event Test Scenario payment efficiency may have counteracted social aspects of going out to a bar or café. Interaction with other guests and staff is part of the experience and a main reason for going out.

Known Technology

As NFC was mostly unknown among testers, text messaging was the preferred technology to use at the so-called Beer Walls where digital payments were tested. New payment technology must be clear, efficient and evoke trust.

Social Test Scenario

The social scenario was based on a peer-to-peer solution. It was possible to enter restrictions on the use of a cash transfer meant to support children's payments for instance. It was supplemented with a live test.

Faster Is Not Always Better

The application transactions were considered to be quick, which was not necessarily an advantage in this scenario. Direct money transfers require calm consideration and a sense of security. Some testers welcomed the swiftness of the application, as it was faster than normal Internet banking, immediately displayed the transfer and did not require additional security. Testers stated that having the application on their mobile device was a great advantage as it was always handy.

Control with Accounts

Some testers would have preferred the social application to be associated with a separate bank account, giving them control over what their money was being spent on. Others just wanted it connected to their main account as this was easier and faster.

Gifts Are Physical

Digital money transfers are not easily conceived of as gifts, as gifts are considered to be physical and tactile. As opposed to the abstract movement of numbers from one account to another, giving cash feels more "natural" because this physically connects the giver to the act of giving.

Usability and Supervision

Testers were generally opposed to a "Rule" function in the application allowing the payer to impose restriction on the receiver's use of money, as

it implied control. It was perceived as unnecessary and difficult to handle. Some testers saw some potential in the “Rule” function as a way limiting children’s spending, but would prefer it to be a definition of what can be bought through the application rather than something that excluded specific transactions.

Conclusion and Future Research

On the whole, the study showed that the Danish population is ready to adopt mobile payments, although there are varying degrees of readiness. The drivers of a gradual migration to the new payment platforms will be convenience and the three needs: Control, Value, Context as shown in Fig. 31.1.

The Motivation for Spending Money Is Social

The new technologies should add VALUE for both providers and users. Specific CONTEXTS should be taken into account and studied in depth in real, natural settings (live tests); it is usually the relations and experiences, not the payment processes per se, that are of immediate importance to the users. The solutions will be beneficial if they aim to integrate seamlessly into users’ everyday lives and routines, to make their lives easier and more manageable and to give them a sense of CONTROL.

In short, based on findings the following recommendations were described to practitioners:

1. Enable and support users to be in control of their finances.
2. Consider the larger situation in which spending occurs, and support/ enhance social value.
3. Provide creative opportunities for maximizing the value of the user’s money.

Furthermore, a gradual introduction of new payment technologies will help build user trust, as this will allow users to embrace the technology at



Fig. 31.1 Three basic needs when selecting means of payment (Source: Author's own)

their own speed. The experiments showed that the technology of entry is not necessarily the technology of ultimate choice. Users should be met at the technological level where they currently operate; they should not be expected to lift themselves above that level on their own initiative. Thus, introducing access to NFC through the gateway of text messages may appeal to the more foot-dragging segments.

Trustworthy and authentic communication is essential to the introduction of new technology. Trust is a strong selling point when choosing a payment instrument, and users trust the expertise of the financial establishment.

Users also want to know who benefits from the new payment technologies and how. They expect something in return, especially if their own investments of time, attention and money help financial institutions or allow vendors to make money.

Thorough, careful descriptions of the security framework are also necessary. These should be tailored to different user types and their needs. Some users will want to parse the technical specifications, but most will be content with recognizable signs that validate the technology and its source; for example, well-known logos and short, clear statements. The use of PIN codes is negotiable in the minds of many users. The ability

to set a PIN-free maximum amount of the user's own choice was a common wish. PIN codes were observed to stir ambiguous social feelings; at a deeper level, users display "defiant trust" in the face of the tendency to build ever-higher security walls.

As seen in the case of gift giving, the need for a tangible, physical representation of money will still prevail in situations where this very physicality is part of the social experience. Cash is strongly seen as the essence of "money" in the minds of users, even among those who rarely use it. This however must be expected to change with new generations of users.

Effects

The project lasted from late 2009 till the end of 2013. While the project was in progress two points of criticism where pointed out. One was that the test technologies were fast becoming old-fashioned as time moved on and new possibilities were developed. The other was the use of qualitative studies. However, the qualitative studies turned out to give an important insight into the general attitudes to the choice of payment that are relevant irrespective of the actual means of payments.

The project did not result in a new payment application. The participation of Danske Bank in the project has, however, probably contributed to the development of the very successful Mobile Pay Solution introduced to the market in 2014.

The project has generally contributed to the development of a strong Danish payment network including a growing number of fintech start-ups in the area. It has helped develop international relations in the area as well. These arrived at a peak when the world's largest payments conference "Money 20/20" decided to establish a European conference "Money 20/20 Europe" in Copenhagen in April 2016.

As mentioned, the Quantitative research was undertaken by the Institute of IT Management at Copenhagen Business School. From here, the "International Cashless Society Round table" was developed, taking place for the first time in Copenhagen in 2012.

Denmark: Closer to a Cashless Society Then?

Well, in 2015, 27 industry organisations developed a “Vision for Denmark as the world’s most digital country”. One of the recommendations was to support the development of Denmark as the world’s first cashless society. This has equally been adopted by the Innovation Network for Finance and IT hosted by the Association “Copenhagen Fintech Innovation and Research”. The network brings together a number of universities and industry organisations with the support of the Danish Agency for Science, Technology and Innovation.

Bibliography and Further Reading

See the call for the next “International Cashless Society Roundtable” in Copenhagen April 7–8th 2016. See more at www.cfir.dk

Stefánsdóttir, L., Thomsen, K., Tindborg, P., & Mouritzen, S. S. (2013). *User studies and tests of payment technologies*. <http://www.cfir.dk/Dokumenter/Documents/Future%20of%20Money%20-%20Report%20User%20Studies%20and%20Tests.pdf>. Accessed 20 Nov 2015.

32

Payments as We Know Them Are Changing—ebarts the Social eCurrency: Tomorrow's Cash

Yasmine Arafa, Cornelia Boldyreff, and Miriam Morris

The Global Context, and Our Focus Within It

The problem with global financial systems today and the current practice of economics is that they are divorced from the real economy. This means they are unable to meet people's social, economic and environmental needs.

Studying the flow of conventional money will not tell us much about real resources and real needs. Therefore this research has focused on the parts of the economy which conventional markets do not reach:

1. The gift economy—resources which are freely given

For example: a mother's care, voluntary work, open source software, free recycling, hospitality, looking after a sick relative, etc. These

Y. Arafa (✉) • C. Boldyreff
University of Greenwich, London, UK
e-mail: Arafa@greenwich.ac.uk

M. Morris
Church Housing Trust, London, UK

activities are the bedrock of Civil Society, and provide a foundation for all other economic activity.

2. The mutual exchange economy—resources which are provided in return for something

For example: neighbourhood watch scheme, car sharing, parent/teacher association. Some exchanges are facilitated by time banks, barter clubs, and a growing number of exchange and swap websites.

3. The potential economy—resources which are wasted or unused

Within every community there is a wealth of wasted and unused resources. Wasted resources such as wasteland, food waste, disused buildings, wasted energy, underused or unused possessions, landfill, etc. Examples of unused resources include, would-be entrepreneurs and leaders, those with new ideas, unique creativity and skills, the knowledge and experience of age, the energy and strength of youth, the capacity to care and support, the unemployed and underemployed, etc.

Within each community there is also a long list of unmet needs to which these resources could be applied: housing, education, healthcare, conservation, caring for the elderly, decent neighbourhoods, childcare, to mention but a few. In some communities even the basic needs of food, water and shelter are not met. The management of resources is the foundation of economics, and effectively matching resources to needs is the basis of a healthy economy.

Conventional Money

Conventional money (CM) fulfils three functions: a store of value, a unit of account, and a medium of exchange.¹ Because it is a store of value, money is prone to hoarding. Estimates in 2012 show companies are hoarding \$3.2tn,² and 1 % of the world population holds 50 % of its money. Moreover, money relies on scarcity to maintain its value, and this

¹ Greenham, Tony and Ryan-Collins, Josh. Where Does Money Come From? NEF (2011).

² Sakoui, Anousha. Pressure mounts for corporates' cash piles to be put to work. *Financial Times*, (21/01/2014) <http://www.ft.com/cms/s/2/1e1b9952-794f-11e3-91ac-00144feabdc0.html#axzz2rhh>

explains why there is not enough in circulation to provide an effective medium for exchange within everyone's reach.

More problematically, CM is created by banks issuing credit, so all money has to be paid back with interest. For this reason, money needs to make a quick return, and cannot facilitate activities such as care or education for all. Between 1998 and 2008 the money supply in the UK doubled but only 20 % of it went into the 'real' economy, 80 % went on assets such as property and financial speculation both of which command a higher and quicker return.³

Consequently, there is never enough money to provide for basic needs. The problem is a lack of money, not a lack of resources. Within every community there are many wasted and unemployed resources: talent, strength, ideas, skills, ambition, time, possessions, energy, wasteland, empty buildings, landfill and so on. There are many people and communities excluded from productive economic activity simply because CM is not able to facilitate the exchange of their goods and services.

Digital Money

Conventional Money is no longer backed by gold. It is fiat money—'a promise to pay the bearer'. It has no intrinsic value; it is just an IOU from a Central Bank, which is backed by a nation's taxpayers. Money is simply information, and most of it is digital. Only 3 % of money is hard cash in circulation, the rest is just digital data. Consequently, technology enables us to create new digital currencies. Many of these currencies are bought with CM (Facebook Credits (FB),⁴ iMoney⁵). Others are issued and redeemed by large organisations (Airmiles, and other reward points).

Bitcoin has demonstrated the potential of a peer-to-peer currency, but like CM its value is based on scarcity. Bitcoin is based on the model of gold.⁶ Immense fluctuations in value caused by speculative buying and

³ Fuentes-Nieva, Ricardo and Galasso, Nick. Oxfam International. (2014). <http://www.oxfam.org/en/policy/working-for-the-few-economic-inequality>

⁴ Facebook Credits. http://www.theregister.co.uk/2009/06/03/facebook_payments/

⁵ iMoney. <http://www.coindesk.com/apple-to-create-virtual-currency-imoney/>

⁶ Bitcoin. <http://bitcoincharts.com/>

selling of bitcoin have occurred, similar to the gold market. Hence a new type of democratic digital currency is required. It needs to be complementary to CM. It will be democratic because it is created by the users, and draws its value from the enormous untapped resources within our communities.

Barter and Exchange

In times of economic crisis people turn to bartering. During the 1930s a barter currency was set up in Switzerland to enable businesses to keep trading. Today the WIR is used by over 60,000 businesses and is credited with having stabilised the Swiss economy.⁷ When Argentina defaulted in 2001, hundreds of barter clubs sprung up, where people could go to exchange goods and services.⁸ At the height of the crisis over two million people were dependent upon them for their survival.

All over the world local exchange schemes, time banks and local currencies have been set up to encourage local trade and the reuse and sharing of resources.^{9,10,11} These have been very successful at supporting the elderly, keeping local businesses open, creating a sense of community, and rewarding volunteering.

Barter currencies are not just for the desperate, nor the worthy. Business-to-business barter is now well established; in 2009 it was worth \$12 billion in the USA, and growing rapidly.¹² However, by their nature barter currencies are exclusive and inflexible, and therefore limited. Unlike CM they do not have a standardised measure of value. They are

⁷ Allen, Matthew. Cash substitute greases business wheels. (2009) http://www.swissinfo.ch/eng/business/Cash_substitute_greases_business_wheels.html?cid=7613810

⁸ Pearson, Ruth. Argentina's Barter Network: New Currency for New Times. *Bulletin of Latin American Research*, 22, 2 (2003), 214–230.

⁹ LETS Schemes. <http://www.letslinkuk.net/>

¹⁰ Timebanking. <http://www.timebanking.org/>

¹¹ Bristol Pound. <http://bristolpound.org/>

¹² Barker Simon, "Bartering for Business", SMEWeb, accessed December 26, 2015. http://www.smeweb.com/index.php?option=com_content&view=article&id=4580:barteringfor-business&catid=55:features&Itemid=90

only tradable within closed groups. What is required is a common, global barter currency.

Using a Mutual Exchange Currency, ebarts, to Activate the Social Economy

The irony of our current financial system, so obsessed with efficiency, is that it creates enormous waste and irreversible destruction. Furthermore, because conventional money depends upon scarcity to maintain its value, there is never enough of it to do the things that matter most; for example: look after the vulnerable, educate the young, protect beautiful places, conserve cultural heritage—we can't even feed the hungry. To build resilient and sustainable economies we need other kinds of money.

In simple economics terms, we have the supply (wasted potential) and the demand (community needs) but we lack the currency (money) to facilitate exchange. Our initial focus group studies with young people, students, local community groups and local businesses have confirmed the need for an alternative currency which enables people to buy and sell without money and have been critical for the detailed development of ebarts.

Our user interviews with young people revealed how they are short of money and worried about the future, in particular about finding a job and somewhere to live. They are more connected with people online than in their local community. These young people have untold ideas, skills and ambitions which they cannot currently realise.

A Social e-Currency

A new currency, ebarts, has been developed with the aim of becoming as universal and useful as conventional money. Unlike other virtual or digital currencies, ebarts is a social currency and cannot be bought for conventional money. Nor is it issued by a company (like Airmiles or reward points). ebarts is a mutual credit system, which means that it is created

by the users, like a transferrable ‘IOU’ in exchange for real goods and services received. It can be exchanged online, by SMS, and by handheld devices, enabling those without access to networks to participate.

As a social currency, ebarts is intended to reach people who are currently not well served by the present economic systems. ebarts has been designed to provide an additional means of exchange. It is not intended to replace conventional money, but to complement it by doing things that conventional money cannot do. The aims of the ebarts as a social currency are to:

- increase productive economic activity, particularly in areas where there is not enough conventional money to meet needs and aspirations,
- reduce waste and energy consumption by encouraging local trade, and the sharing and reuse of resources,
- increase local resilience and social capital by bringing social networks to life, in real communities,
- unleash the potential of people’s natural entrepreneurship and individual talents, and
- relieve pressure on the current financial system and help to stabilise global markets.

A ‘Person-to-Person Market-Place’

As well as providing a currency, ebarts also provides a market place. The ebarts site is like a simplified cross between Facebook and eBay—with account holders’ profiles and listings of what people are offering and wanting.

Firstly, ebarts is a flexible and friendly way to trade. So if someone’s bike needs fixing, they post a request. If their shoes are hurting, they can sell them. If they have a few hours spare, they can find out which local charity could do with help that day. And if they’re hungry, they can find out which of the shops on the High Street are offering special ebarts deals that day. At the same time, the charity has a direct and flexible way to recruit and reward helpers, and the local businesses have a way to advertise online, in real time, to people in the area.

Secondly, ebarts is not aiming to compete with existing sharing and exchange sites (such as Streetbank or SwapShop) but instead as it will be possible for existing exchange sites to use ebarts on their site through a plug-in. This means that users will be able to trade goods and services on their favourite websites using ebarts, and link these exchanges to their ebarts account. ebarts has the potential to become the PayPal of the social economy.

Networks of Exchange

The Internet has opened up new networks of trust in the form of peer to peer trading, lending and sharing. A new ‘collaborative consumption’ is developing as people swap their possessions, share their cars, sleep on each other’s couches, give things away, broadcast their videos and music, and disseminate their knowledge and ideas. This has been a spontaneous revolution, driven by people’s need to participate and contribute. It is so powerful that major corporations are rethinking their business models in order to join in.

All currencies are based on the general term of trust. ebarts, however, is specifically based on the trust between individuals. In addition, all currencies are backed by assets. In the past, money was backed by gold—now it is backed by the assets of government and banks.

How ebarts Works

A set of ebarts apps are currently being developed to demonstrate ebarts to potential user communities. It will be possible for ebarts users to trade via their mobile phones and the web. A web plug-in is also being developed to allow other trading websites to allow the use of ebarts. A user-centred design approach has meant that early on use cases and user-interface screen shots have already been developed.

Accounts start on zero, and a trading limit is set. This is like an over-draft limit, but it also restricts the amount of credit in an account to keep the ebarts circulating. At the start of the ebarts process, users will open

an ebarts account. Each account is opened with the promise that '*I will give back what I take*'. Individuals, businesses and community groups can open accounts. One of ebart's unique characteristics is that its system is transparent and self-regulating, since each user's graphic 'heart beat' and credit rating will be visible. Furthermore, all transactions must be confirmed by both buyer and seller, or the donor and recipient. There is no obligation to trade with someone; transactions can be turned down if there is doubt.

Another unique characteristic of ebarts is that traders set the price of goods and services exchanged. Transactions in ebarts are made by debiting the buyer's account and crediting the seller's account by the same amount. Every debt is balanced by a credit, making the sum total of all ebarts accounts zero.

Account holders do not have to earn ebarts before they spend them, they can go into 'debt'. When they spend they are creating an IOU: a promise to repay their debt to the system. This is the way currency is created. A healthy ebarts account will have a high throughput and fluctuate regularly either side of zero. The sidebar screen shots show how this is represented. Therefore, ebarts is simply a 'medium of exchange'. There is no point hoarding or saving ebarts.

Account holders will also have a 'credit rating' generated by their trading history, expressed as a percentage. The ebarts system employs machine learning to assess the frequency, value, customer feedback and interconnectivity (how many trading partners) of each account holder to update their credit rating. This in turn will be used to alter the account holder's trading limit—increasing it in accordance with their previous use of ebarts.

Every account holder will have a profile on ebarts.com where they can advertise what they have to offer and what they want. Account holders can also trade on participating websites through an ebarts plug-in. ebarts will also be tradable in shops, markets and face-to-face between traders via mobiles and handheld devices. Many transactions will be dual currency, as ebarts is used by local retailers and businesses as part payment for goods and services. Businesses and individuals can donate to community groups, who in turn can use ebarts to pay 'volunteers'.

It is important to note that ebarts has no value outside the system. It is not underwritten or backed by the platform provider; its value lies entirely in the mutual trust between traders. If someone is not considered trustworthy, there is no compulsion to trade with them. Because of this, along with the transparency of the system, and the fact that every credit is linked to a debit, the opportunities and incentives for fraud are limited.

In addition, if a trader spends with no intention of providing goods and services in the future, they are limited by the trading limit on their account. Those who they trade with will still receive credit for the goods and services provided. Furthermore, their dishonest trading will have created currency to circulate within the system. Unusual trading behaviour will be identified, and accounts can be frozen if necessary.

Framework to Evaluate ebarts

Collaborative consumption and social networking are growing. ebarts will build on this success, and create new trusted networks of exchange. ebarts has been designed to:

1. enable people to trade without CM,
2. reduce waste and energy consumption by encouraging local trade, and the sharing and reuse of resources, and
3. bring social networks to life, in real communities, unleashing the potential of people's natural entrepreneurship and individual talents.

The ebarts platform can anonymously monitor the volume of users and their trading patterns addressing the first objective, contents of exchanges addressing the second objective, and provide data enabling trends in overall ebarts usage to be determined addressing the third objective above.

Data collected over time will provide the basis for longer-term studies on the penetration of ebarts and extent to which it is successfully reaching its intended user communities and achieving the above design objectives. The ebarts platform can be thought of as a laboratory for studying the development of a social economy and its evolution over time. Large data analytics will be at the core of the framework used to evaluate ebarts.

Conclusion

ebarts is a new global digital barter currency with the potential to be as secure, useful and ubiquitous as CM. ebarts aims to enable a thriving, global, barter economy by providing a common currency for use across the existing barter and exchange sector. It will open the barter sector to new people, groups and businesses.

ebarts is also a multiplatform currency designed to supplement CM by enabling economic activities that CM cannot. ebarts can help to stabilise economies because it is counter-cyclical. ebarts provides a new means of exchange and has the potential to enable a new social economy, which brings social networks to life in local communities. ebarts also provides a basis for democratic money.

Lastly, the suitably instrumented ebarts platform will provide the data needed to critically analyse its success in achieving its design objectives as well as a laboratory studying the evolution of ebarts in the future.

Bibliography

- Allen, M. (2009). *Cash substitute greases business wheels*. http://www.swissinfo.ch/eng/business/Cash_substitute_greases_business_wheels.html?cid=7613810
- Bitcoin Charts. <http://bitcoincharts.com>
- Bristol Pound. <http://bristolpound.org>
- Fuentes-Nieva, R., & Galasso, N. (2014). Oxfam International. <http://www.oxfam.org/en/policyworking-for-the-few-economic-inequality>
- Greenham, T., & Ryan-Collins, J. (2011). Where does money come from? NEF. iMoney. Coin Desk. <http://www.coindesk.com/apple-to-createvirtual-currency-imoney/>
- Kennedy, M. (2012). *Occupy money: Creating an economy where everybody wins*. New Society: Publishers.
- LETS Schemes. <http://www.letslinkuk.net/>
- Lietaer, B. (2001, January). *The future of money: Creating new wealth, work and a wiser world*. London: Random House.
- Lietaer, B., & Belgin, S. (2011). *New money for a new world*. Qiterra Press.
- Oates, J. (2009, June 3). How will sir pay? Facebook credits, that'll do nicely. *The Register*. http://www.theregister.co.uk/2009/06/03/facebook_payments/

- Pearson, R. (2003). Argentina's barter network: New currency for new times. *Bulletin of Latin American Research*, 22, 2.
- Sakoui, A. (2014, January 21). Pressure mounts for corporates' cash piles to be put to work. *Financial Times*. <http://www.ft.com/cms/s/2/1e1b9952-794f-11e3-91ac-00144feabdc0.html#axzz2rnx>
- Simon, B. Bartering for business. *SMEWeb*. http://www.smeweb.com/index.php?option=com_content&view=article&id=4580:barteringfor-business&catid=55:features&Itemid=90. Accessed 26 Dec 2015.
- Timebanking, <http://www.timebanking.org/>

33

Milestones for a Global Cashless Economy

Bernardo Bátiz-Lazo, Leonidas Efthymiou,
and Sophia Michael

The Past and Future of Retail Payments

Contributions to this edited book evolve around the central role banks have in retail payments (see Fig. 33.1 below). This analysis takes a long-term view all the way to the present while, in some cases, points to the future. Contributions come from different fields in academia, combined with others from active industry participants. Contributors examined issues that cut across the globe while simultaneously describing a particular location in detail. On balance, we believe all this makes ours an interesting and worthwhile project that furthers the understanding of technological change (and specifically the role of computer applications)

B. Bátiz-Lazo (✉)
Bangor University, Bangor, UK
e-mail: b.batiz-lazo@bangor.ac.uk

L. Efthymiou • S. Michael
Intercollege Larnaca, Larnaca, Cyprus

We have discussed the attributes of money as typically conceived by economists; that is, store of value, means of exchange and unit of account to then focus on its fungibility, durability and divisibility. However, contributors have also questioned the validity of these categories showing, for instance, the importance of the material in which money travels and the impact this has on people's behavior. Contributions to this book have thus also helped to better understand the social aspects of money and how the priorities of different communities shape the development of the financial system.

In this book we also explored the entrepreneurial challenges of payment systems faced by both established participants and new entrants. The role that the government, regulators and regulations play runs throughout the book. These are not only important institutions in managing the process (and sometimes the timing) of change in retail payments but also frame the social processes around it. On balance, most of our contributions focus on stories of success and cost control. There is thus scope to better understand how and why there is so much failure to theory of contestable markets retail payments. Such future research could be approached from different perspectives such as explaining the lack of adoption by consumers, more effective management of innovation within organizations (including querying organizational memory), the role of security, industrial and technological networks as much as trends in the globalization of retail payments.

Moving Beyond the 50-Year-Old War on Cash¹

To move beyond the scope of the contributions of this edited book we must first take a step back and discuss the origins of this debate. Specifically, and as mentioned by our contributors, the advent of the first computers into retail banking in late-1950s and during the 1960s was accompanied by the emergence of a futuristic vision where computer

¹An earlier and reduced version of this entry was published as "Around the World in 80 Payments – Global Moves to a Cashless Economy" by The Conversation <https://theconversation.com/around-the-world-in-80-payments-global-moves-to-a-cashless-economy-52882> (accessed January 8, 2016).

networks would predominate.² There was no consensus on the exact form this paperless, checkless, cashless society should adopt. Yet ever since then bankers, consultants, journalists, regulators and even philanthropists (such as Bill Gates) have dreamed about digital solutions displacing all forms of paper, including and especially banknotes.

Recent developments such as the near death of personal checks, greater use of credit and debit cards, and innovations such as PayPal, Square, Apple Pay, Bitcoin and many others that now populate the retail payments ecosystem have led us to believe the cashless society is well within our reach. Pundits and boffins alike point to Scandinavia (particularly Sweden, Denmark and Iceland) closely followed by Australia as countries where the digital dream is no longer science fiction but reality.

Indeed, 2015 was the year that for the first time in the UK, contactless transactions accounted for 1 in 10 card payments.³ Yet data from Retail Banking Research,⁴ one of the most authoritative sources in the area, suggests that even though cashless payments are growing rapidly across the world, cash remains resilient. This trend was corroborated by a host of other different sources including (but not limited by):

- A study commissioned by the ATM Industry Association of a panel of 30 countries, suggested that global demand for cash grew by 8.9 % between 2009 and 2013 (when the latest figures were available).⁵
- Victoria Cleland, the chief cashier at the Bank of England, estimated that demand for cash continues to rise in the more wealthy countries (such as the UK, USA and Canada) as well as the euro area. These countries have experienced year-on-year growth of between 5 % and 10 % (while up to 85 % of the cash in circulation is distributed by ATMs).⁶

² <http://www.bloombergview.com/articles/2012-03-29/visions-of-a-cashless-society-echoes> (accessed January 8, 2016).

³ http://www.fstech.co.uk/fst/UKCA_Contactless_Milestone_Oct_2015.php (accessed January 8, 2016).

⁴ <https://www.linkedin.com/pulse/cashless-payments-growing-rapidly-cash-remains-felix-kronabetter?trk=prof-post> (accessed January 8, 2016).

⁵ <https://www.atmia.com/news/atmia-publishes-new-global-cash-demand-study/2632/> (accessed January 8, 2016).

⁶ <http://www.bankofengland.co.uk/publications/Pages/speeches/2015/838.aspx> (accessed January 24, 2016).

- These rather simple estimates already show of the importance of cash in retail transactions. Even when allowing for inflation (while not disregarding the fact that other forms of payments have grown much faster than banknotes and coins), cash is still significant in retail payments. For instance, consider that the face value of US dollars in circulation in 1990 was \$288 billion or 4.8 % of the nominal value of GDP at the end of that year.⁷ By 2000, it had more than doubled to \$564 billion (5.3 %). Cash continued to grow during the financial crisis reaching \$942 billion in 2010 (6.2 %) and over \$1390 billion in 2015 (7.7 %). Interestingly, the increase in total cash in circulation over the last two and half decades, 383 %, almost doubled the increase in the size of the US economy over the same period (200 % as measured by the increase in its nominal value). All in all, then, there is evidence to support the view that cash is “resilient” and unlikely “to die any time soon.”⁸
- So, no less than 50 years on the journey and we are still not there yet. Then what should we be watching for when looking into the future? According to our contributors, what trends should be in our sight within financial technology and mobile payments? Where, how and why is cash vanishing?

Around the Cashless World in Eighty Payments

Europe

Like Phileas Fogg, let's start our journey in London, where one in ten card payments were contactless for the first time in 2015.⁹ But London

⁷ Estimates using data from http://www.federalreserve.gov/paymentsystems/coin_currircvalue.htm

and <https://research.stlouisfed.org/fred2/series/GDP> (both accessed January 22, 2016).

⁸ http://www.bankofengland.co.uk/publications/Pages/quarterlybulletin/2015/q3prerelease_1.aspx

(accessed January 24, 2016).

⁹ http://www.fstech.co.uk/fst/UKCA_Contactless_Milestone_Oct_2015.php (accessed January 8, 2016).

is also fast becoming the world's fintech capital. The rise of London's fintech has taken place in spite of start-ups in the USA having substantially more resources available for investment in this area.¹⁰ In the spring of 2016, Copenhagen will host Money 20/20, the world's prime breakout annual event for emerging technologies—the first time this forum will convene outside the USA¹¹ and an event that bears witness to the increasing importance of the European scene in understanding developments in retail payments and financial technology. In countries like France there are bakeries and in the Netherlands there are cafes and even supermarkets that no longer accept cash.¹²

Of course, people will continue to look at the slow death of cash in Scandinavia while very few will ask or develop a mobile app suited to the needs of refugee migrants.

North America

Meanwhile in the USA, EMV (or "chip and pin" in the vernacular and more precisely "swipe and sign"), was launched in October 2015 and doesn't seem to have done well during the holiday season, with reports of large retailers bypassing readers and going back to signatures.¹³ One must remember that EMV is not only a technical specification for devices that aim to reduce "card present" fraud as much as a protocol to determine who will bear the cost of fraud.¹⁴ It will be interesting to see the extent to which EMV is effective as fraud statistics pile up during the years ahead. As David Birch has noted,

¹⁰ <http://paymentweek.com/2015-10-6-is-london-the-fintech-capital-of-the-world-8492/> (accessed January 8, 2016).

¹¹ <https://www.money2020europe.com/> (accessed January 8, 2016).

¹² <http://letstalkpayments.com/which-countries-are-close-to-a-cashless-world/> (accessed January 8, 2016).

¹³ <http://www.forbes.com/sites/kateashford/2015/12/27/chip-cards-take-too-long/> (accessed January 8, 2016) and here <http://letstalkpayments.com/emv-fails-customer-experience-testing/> (accessed January 8, 2016).

¹⁴ <https://theconversation.com/chip-enabled-cards-may-curb-fraud-but-consumers-will-be-picking-up-the-tab-48410> (accessed January 8, 2016).

After all, now the US has finally started switching to EMV, surely the situation should improve? Sadly, no. As we all know, EMV only help with “card present” (CP) fraud. That’s why people have been talking about the expected surge in “card not present” (CNP) fraud in the USA following on from the introduction of EMV as sure as night follows day. That’s exactly what has happened everywhere else.¹⁵

This is not to imply that financial institutions and retailers are at odds with each other. On the contrary, the advent of Chase Pay and Walmart Pay suggests there are many “opportunity for retailers and banks to redefine how they work together and serve their own needs to connect with customers through their individually branded mobile apps.”¹⁶

The first full 12 months of performance for Apple Pay still place adoption below the pivoting point. In the meantime, however, card companies and banks supporting the scheme are giving the Apple brand credibility within retail payments. Whether financial instructions will want to extend the same courtesy with others such as Samsung Pay is something worth keeping an eye on.

All these developments show how retailers, banks and even regulators are innovating to bring about faster payments and a potential cashless economy.¹⁷

Africa and Middle East

In Africa the success of M-Pesa in increasing financial inclusion in Kenya is well known as is the growth of mobile payments in Botswana and South Africa.¹⁸ But it is also common knowledge how Safaricom (M-Pesa’s telecom owner) failed to replicate its model in neighboring countries such as Tanzania. Meanwhile, the Nigerian central bank’s Cash-less Nigeria Project has received little attention from external sources.

¹⁵ <http://www.chyp.com/doing-something-about-us-card-fraud/> (accessed January 24, 2016).

¹⁶ <http://www.atmmarketplace.com/articles/atms-in-2016-whats-in-the-stars/> (accessed January 8, 2016).

¹⁷ <http://www.pymnts.com/news/faster-payments/2016/who-is-making-payments-faster-in-the-u-s/> (accessed January 8, 2016).

¹⁸ <http://www.worldbank.org/en/programs/globalindex> (accessed January 8, 2016).

Africa and the Middle East remain the areas with the lowest global numbers of adults with a bank account while MENA countries (as well as China and other Asia Pacific nations) have been and will continue to be the world's growth markets for ATM manufacturers.¹⁹ This suggests the high use of banknotes in the everyday life of people in these regions.

Asia, Latin America and Oceania

In China, the mobile app WeChat is one to watch. WeChat, part of digital behemoth Tencent, has grown from its original service as a messaging app in 2011 to include cab hailing, food ordering and money transfers.²⁰ WeChat ranks as China's most popular app²¹ with 650 million users and is used to send both RMB and cryptocurrencies like Bitcoin between users.²²

Technology as a promoter of financial inclusion is the name of the game in poor economies where the bottom third of the population hardly have any access to the financial sector and mobile money is seen as the potential solution. Chile is a notable example of successful government initiatives in this direction.²³ Peru is also developing a mobile payments project at national level and bringing together key players.²⁴ But close attention should be paid to the Indian government's drive to replace money amongst its 1.2 billion people with mobile payments on top of a growing private network made up of 140,000 private business and public sector bank correspondents.²⁵

¹⁹ <http://www.rbrlondon.com/reports/global> (accessed January 8, 2016).

²⁰ <https://www.techinasia.com/wechat-allows-money-transfers-between-friends> (accessed January 8, 2016).

²¹ <http://www.scmp.com/tech/apps-gaming/article/1896648/wechat-trends-expect-2016-virtual-reality-more-ads-global-expansion> (accessed January 8, 2016).

²² <http://www.pymnts.com/news/social-commerce/2015/wechat-rings-in-chinese-new-year-with-bitcoins/> (VQo6cBDF_PE) (accessed January 8, 2016).

²³ <https://theconversation.com/cash-remains-king-in-chile-but-its-days-could-be-numbered-37952> (accessed January 8, 2016).

²⁴ <http://www.bloomberg.com/news/articles/2015-12-17/peru-s-banks-push-through-a-unified-digital-payment-system> (accessed January 8, 2016).

²⁵ <http://www.thehindubusinessline.com/money-and-banking/apgvb-bagsaward-for-financial-inclusion/article7318539.ece> (accessed January 8, 2016).

Will Fintech Find Its Passepartout?

Of course, digital is not the “silver bullet” for financial inclusion.²⁶ The challenges for mobile money and e-wallets are not fancy technology but convincing consumers of their adoption. These innovations sit at the intersection of finance and telecommunications and so face regulations from both. On top of that, India and other countries in Asia and Latin America have a significant number of transactions that take place outside the formal financial sector and typically, an overregulated telecommunications sector. At the same time, those at the “bottom of the pyramid” are fearful of and distrust established financial institutions as well as government attempts to increase the tax base.

In summary, while some countries have embraced mostly electronic forms of payment, this does not mean that others still using banknotes and coins are less efficient, dirty or backward. Differences between countries and amongst the rich and poor within them remain partly due to custom, culture and the regulation of retail financial markets. But also because new propositions that aim to insert themselves in the exchange of value have failed to make a case that is appealing to merchants, individuals, regulators or all of the above. There is more innovative technology looking for a market than consumers looking for alternative means of solving on the spot payments. In other words, retail payments are not broken. They (and particularly cash) work well in most countries, for most consumers, 99 % of the time.

Bibliography

- Andratozo. (2016, January). Digital is not enough. LatamAnalyst. <http://latamanalyst.com/2016/01/17/digital-is-not-enough/>. Accessed 24 Jan 2016.
- Ashford, K. (2015, December). Chip cards take so long, some retailers disabled them for the holidays. *Forbes*. <http://www.forbes.com/sites/kateashford/2015/12/27/chip-cards-take-too-long/>. Accessed 8 Jan 2016.

²⁶ <http://latamanalyst.com/2016/01/17/digital-is-not-enough/> (January 24, 2016).

- Batiz-Lazo, B., & Espinosa, J. F. (2015, March). Cash remains king in chile but its days could be numbered. *The Conversation*. <https://theconversation.com/cash-remains-king-in-chile-but-its-days-could-be-numbered-37952>. Accessed 8 Jan 2016.
- Batiz-Lazo, B., Haigh, T., & Stearns, D. (2012, March 30). Visions of a cashless society: Echos. *Bloomberg View*. <http://www.bloombergview.com/articles/2012-03-29/visions-of-a-cashless-society-echoes>. Accessed 8 Jan 2016.
- Birch, D. (2016, January). Doing something about US card fraud. *CHYP Tomorrow's Transactions*. <http://www.chyp.com/doing-something-about-us-card-fraud/>. Accessed 24 Jan 2016.
- Board of Governors of the Federal Reserve System. (2015). *Currency and coin services*. http://www.federalreserve.gov/paymentsystems/coin_currcircvalue.htm. Accessed 22 Jan 2016.
- Bureau. (June 2015). APGVB bags award for financial inclusion. *The Hindu Business Line*. <http://www.thehindubusinessline.com/money-and-banking/apgvb-bagsaward-for-financial-inclusion/article7318539.ece>. Accessed 8 Jan 2016.
- Cleland, V. (2015, September). *Working together to deliver banknotes for the modern economy: Speech*. <http://www.bankofengland.co.uk/publications/Pages/speeches/2015/838.aspx>. Accessed 24 Jan 2016.
- Cluckey, S. (2016, January). *ATMs in 2016: What's in the Stars?*. ATM Marketplace. <http://www.atmmarketplace.com/articles/atms-in-2016-whats-in-the-stars/>. Accessed 8 Jan 2016.
- Dean, B. (2015, October). Chip-enabled cards may curb fraud, but consumers will be picking up the tab. *The Conversation*. <https://theconversation.com/chip-enabled-cards-may-curb-fraud-but-consumers-will-be-picking-up-the-tab-48410>. Accessed 8 Jan 2016.
- Elton, C. (2015, December). Opening a nationwide mobile wallet. *BloombergBusinessweek*. <http://www.bloomberg.com/news/articles/2015-12-17/peru-s-banks-push-through-a-unified-digital-payment-system>. Accessed 8 Jan 2016.
- Federal Reserve Bank of St. Louis. (2015). FRED Economic Data: Gross Domestic Product. <https://research.stlouisfed.org/fred2/series/GDP>. Accessed 22 Jan 2016.
- Fish, T., & Whymark, R. (2015). How has cash usage evolved in recent decades? What might drive demand in the future?. The Bank of England. http://www.bankofengland.co.uk/publications/Pages/quarterlybulletin/2015/q3prerelease_1.aspx. Accessed 24 Jan 2016.

- Global ATM Market and Forecasts. (2015. September). RBR London. <http://www.rbrlondon.com/reports/global>. Accessed 8 Jan 2016.
- Global Findex. (2015). The World Bank. <http://www.worldbank.org/en/programs/globalindex>. Accessed 8 Jan 2016.
- Kennedy, R. (2015, October). Is London the Fintech capital of the world?. *Payment Week*. <http://paymentweek.com/2015-10-6-is-london-the-fintech-capital-of-the-world-8492/>. Accessed 8 Jan 2016.
- Kronabetter, F. (2015, December). *Cashless payments growing rapidly but cash remains resilient*. <https://www.linkedin.com/pulse/cashless-payments-growing-rapidly-cash-remains-felix-kronabetter?trk=prof-post>. Accessed 8 Jan 2016.
- Millward, S. (2014, June). WeChat users in China can now transfer money to each other. *TechInAsia*. <https://www.techinasia.com/wechat-allows-money-transfers-between-friends>. Accessed 8 Jan 2016.
- Money 20/20 Europe. (2015). <https://www.money2020europe.com/>. Accessed 8 Jan 2016.
- PYMNTS. (2015, February). WeChat rings in Chinese new year with Bitcoins. *PYMNTS.com*. <http://www.pymnts.com/news/social-commerce/2015/wechat-rings-in-chinese-new-year-with-bitcoins/>. Accessed 8 Jan 2016.
- PYMNTS. (2016, January). The race to the faster payments finish line in the US. *PYMNDS.com*. <http://www.pymnts.com/news/faster-payments/2016/who-is-making-payments-faster-in-the-u-s/>. Accessed 8 Jan 2016.
- Ray. (2015, April). *Which countries are closest to cashless societies?*. Let's Talk Payments (LTP). <http://letstalkpayments.com/which-countries-are-close-to-a-cashless-world/>. Accessed 8 Jan 2016.
- Sofia. (2015, November). *EMV fails customer experience testing*. Let's Talk Payments (LTP). <http://letstalkpayments.com/emv-fails-customer-experience-testing/>. Accessed 8 Jan 2016.
- Soo, Z. (2015, December). WeChat trends to expect in 2016: Virtual reality, more ads, global expansion of Tencent app's wallet function. *South China Morning Post*. <http://www.scmp.com/tech/apps-gaming/article/1896648/wechat-trends-expect-2016-virtual-reality-more-ads-global-expansion>. Accessed 8 Jan 2016.
- Thompson, S. (2016, January). Milestone for contactless in UK. *FS Tech*. http://www.fstech.co.uk/fst/UKCA_Contactless_Milestone_Oct_2015.php. Accessed 8 Jan 2016.

Index

A

- accepted
acceptability, 301
acceptance, 24, 25, .27, 29, 71,
72, 95, 118, 126, 127, 156,
158, 159, 162, 179, 181, 182,
184, 206, 252–4, 285–7,
290n7, 292n8, 293, 309, 327,
331–3, 336, 337, 358
accepting, 33, 135, 163, 179,
180, 184, 190n10
access, x, xxiii, 7, 57, 59, 73, 80, 89,
103, 115, 120, 126, 127, 142,
150, 158, 159, 168, 195, 196,
203, 211, 213, 222, 235, 236,
237, 242, 245, 247, 249, 250,
254, 260, 267, 270, 275, 284,
286, 297, 308, 325, 326,
330, 361, 364, 371, 376, 384,
398
accessibility, 126, 274, 301
account, 4, 14n3, 20, 26, 29, 44, 59,
67, 77, 78, 80, 90, 111, 114,
120, 121, 124, 127, 142,
150, 161, 168, 181, 184, 203,
206, 212, 213, 214, 215, 216,
218, 219, 220, 221, 222, 223,
224, 225, 226, 227, 228, 235,
236, 239, 240, 244, 246, 247,
250, 251, 259, 260, 261, 265,
280, 307, 308, 309, 320, 343,
346, 360, 365, 374, 375, 380,
384, 385, 386, 387, 398
accountable, 170
accounting, xxiv, xxv, xxix, xxxi, 115,
168, 213, 235, 237, 238

Note: Page numbers with “n” denote notes.

- adopted, x, 5, 6, 33, 67, 80n6, 96, 113, 115, 121, 161, 162, 171, 178n2, 207, 238, 301, 342, 354, 378
- adoption, x, 5, 33, 96, 121, 162–3, 238n17, 353
- Africa, 8, 233–254, 299, 348, 397–398
- agriculture, agrarian, 3, 15, 56, 64
- alloys, 39
- America, x, xxvi, xxi, 9, 17–20, 41, 44, 45n7, 45n9, 46, 52, 53, 56, 68, 76, 79, 97, 162, 169, 182, 236, 396–9. *See also* United States, US, USA
- American Express, 6, 113, 168, 172–4, 182, 183, 184, 192, 193
- anonymity, 87, 90, 235, 368
- Argentina, xxvi, 3, 4, 55–63, 66, 68–70, 72, 125, 133, 382
- Austrian, 46
- Automated Teller Machine, ATM
- cash dispenser, 110, 111
 - cash machine, 360, 365
- automatic till, 187, 188

B

- BancoEstado, 141n1, 142, 148–50
- Bank of Mexico, 119, 123
- banks
- bank, 2, 16n9, 24, 33, 44, 56, 68, 79, 87n4, 96, 107, 117n1, 132, 141, 156, 168, 177, 190, 202, 212, 233, 259, 269, 284, 297, 311, 325, 341, 352, 359, 368, 380, 391

- banked, 245, 335, 360
- banking, 6, 20, 25, 33, 44, 57, 68, 79, 87n6, 96, 107, 119, 132, 141, 157, 178, 190, 204, 235, 260, 269, 285, 297, 311, 325, 344, 374, 382n10, 393
- banknotes, ix, 2–5, 24–32, 34, 36, 38, 40, 41, 44, 46, 47–9, 52, 88, 90–2, 97, 98, 105, 182, 184, 289, 394, 395, 398, 399
- barter, 2–4, 75, 75n1, 76–82, 138, 382–3, 388
- Bitcoin, 189, 192, 381, 381n6, 382, 394, 398
- bond, 71
- Brazil, 4, 75–82
- brokerage, 58
- Business, 5, 16, 35, 47, 63, 73, 75n1, 95, 115, 119, 135, 142, 158, 168, 179, 201, 204, 215, 234, 268, 269, 284, 298, 341, 343, 353, 360, 368, 382, 398

C

- CajaVecina, 6, 141–50

card

- credit card, 19, 102, 112, 114, 118, 121, 128, 142, 155, 156, 158, 160, 162, 167–76, 183, 189, 192, 193, 193n17, 195, 195n21, 196, 201, 212, 212n1, 212n2, 213–20, 222, 224, 225, 227, 228, 263–7, 284, 291, 293, 357–61, 370, 392
- credit card fraud, 167–75

- debit card, 6, 103, 114, 118n3, 121, 142, 155–64, 181, 356, 357, 365
- payment card, 7
- cash, 1, 14, 28, 38, 45, 59, 69, 78, 85, 96, 108, 117, 133, 141, 159, 171, 177, 187, 201, 211, 215, 236, 259, 270, 284, 297, 328, 344, 353, 359, 368, 379, 391
- cashless
- cashless technologies, x, 4–7, 9, 115
 - Checkless, checkless society, 5, 97–9, 99n4, 100, 101, 101n13, 101n14, 102–4, 360, 364
 - checkless Society Committee, 101
 - cashless economy, 1, 141, 391–9
 - cashless society, xin1, 2, 4, 8, 9, 13–22, 85–93, 95–105, 183, 268, 368, 377, 378, 394
- Central America, 46
- central bank, 3, 29, 30, 32, 68, 91n10, 119, 120, 123, 132–5, 243, 254, 259, 271, 300, 308, 341, 348, 352, 381
- channel, 8, 78, 115, 120, 123, 127, 142, 269, 272, 273, 273n5, 275, 280, 311–23
- Chile, xxiv, xix, xxix, 3, 33–41, 126, 141–50, 398, 398n23
- China, 24, 49, 50, 90, 179, 279, 285, 291, 398
- circulation, 3, 6, 25, 26, 29–31, 34, 35, 39, 40, 43, 44, 47, 69, 72, 73, 88, 91, 92, 134, 167, 259, 381, 394, 395
- civil war, 3, 30, 44, 45, 45n9, 52, 53, 108
- clearing house, 77, 109, 342, 344
- coin, 72, 91, 144, 395n7
- colonial, 3, 30, 34–7, 50, 233
- commercial credit, 55–64, 80
- commodities, 20, 45, 62
- competition, 26, 88, 101, 122, 163, 175, 193, 194, 237, 238, 242, 244, 246–9, 254, 269–81, 284, 328, 329, 332, 342, 350, 357, 360, 392
- competitive, 8, 113, 122, 161, 183, 196, 238, 244, 245, 247, 264, 269, 270, 273, 274–80, 293, 328, 338, 352, 356–8
- consumer, xxiii, xxvii, xxxi, 6, 9, 53, 125, 163, 169, 170, 174, 175, 179, 184, 190, 193, 195n21, 196n25, 213, 213n5, 241, 244, 261, 262, 264, 265, 267, 268, 286, 297, 345, 346, 352, 356, 358, 360, 361, 363, 365.
- See also customer*
- contactless payment, 190, 191
- convertibility, 3, 16n9, 25, 28, 47, 48, 68
- corruption, 2, 14n1, 17, 138, 205
- costs, 8, 9, 43, 65, 66, 69, 73, 77, 81, 88, 91, 92, 93, 99, 99n7, 100, 127, 169, 180, 190, 207, 222, 235n9, 238, 239, 242, 249, 250, 253, 326, 328, 329, 331, 332, 334–7, 353, 356, 357, 360, 362, 363
- counterfeit, 25, 188
- credibility, 3, 25, 30, 278, 279, 397
- credit, 3, 19, 25, 33, 45, 55, 70, 76, 86, 96, 112, 118, 134, 142,

- 155, 167, 177, 189, 201, 211, 247, 260, 270, 284, 300, 342, 352, 359, 370, 392
- criminal, 12, 15n5, 104, 167, 169, 172, 175, 243, 254, 368
- crisis, 6, 25, 48, 51, 66, 68, 69, 73, 100, 118, 119, 133, 134n5, 136–7, 139, 237, 356, 358, 382, 395, xxvi
- customer, 9, 24, 63, 79, 104, 108, 111, 127, 142, 147, 148, 158, 159, 160, 179, 180, 193, 205, 235, 241, 244, 253, 260, 261, 262, 263, 264, 265, 268, 278, 279, 286, 292, 299, 300, 301, 302, 309, 325, 326, 327, 328, 329, 330, 331–4, 335–7, 343, 345, 360–2, 363, 364, 368, 386
- currency
 - cuasi-currency, 71n5
 - currency exchange rates, 52
 - digital currencies, 9–10, 32, 383, 392
- D**
 - data, 8, 65, 93, 111, 114, 122–5, 139n5, 149, 150, 157, 191n11, 192, 194, 207, 211, 212–13, 216, 235, 236, 238, 248, 251, 253, 275, 280, 287–8, 297, 298, 302, 304–8, 312–17, 319, 320, 327, 338, 359, 360, 362–4, 369, 371, 381, 387, 388, 394
 - debit, 6, 103, 104, 114, 121, 122, 127, 142, 155, 156, 157, 159, 161, 162, 163, 164
 - debited, 77, 80, 265
 - debt, 3, 7, 19, 26, 27, 30, 71, 87, 119, 163, 168, 189, 191, 195n21, 196n24, 233, 364, 386
 - demand, 3, 9, 25, 28, 34, 37–8, 62, 159, 161, 163, 244, 245, 250, 283, 325, 328, 335, 344, 355, 383, 394
 - dematerialization, 4, 85–93
 - Denmark, xxii, 355, 367, 368, 378, 394, 397
 - deposit, 24, 91, 158–60, 68, 203, 215, 216, 218, 219, 222, 223, 225, 226, 239, 241, 246, 298, 301
 - device(s), xxiii, xxx, 7, 8, 91, 92, 114, 142, 145n9, 146, 150, 158, 159, 169, 178, 179, 180, 182, 187–95, 197, 206, 235, 236–9, 244, 260–2, 273, 283, 288, 289, 290, 291, 292, 293, 299, 317, 319, 320, 320n4, 325, 326, 353, 364, 370, 372, 374, 384, 386, 396
 - digital, xix, xxi, xxiv, xxviii, 9–10, 138, 177, 192, 193, 202, 203, 205, 207, 235, 252, 265, 271, 273, 280, 281, 284, 287, 291, 344, 364, 372–4, 378, 381–3, 388, 392, 394, 398, 399
 - digit, 66, 102, 316–22
 - distrust, 36, 236, 252, 399. *See also* trust
 - dollar, 49–51, 67–9, 71–3, 96, 99, 171
 - dot com bubble, 8
 - doubloon, 46, 51

E

electronic, ix, xi, xxx, 4, 5, 7, 8, 76, 77–78, 79, 92, 97, 98, 99, 100, 101, 102n15, 103, 104, 112, 113, 114, 123, 138, 142, 156, 157, 159–160, 161, 164, 177–184, 192n14, 194n18, 202n1, 204, 207, 235, 235n7, 236, 236n12, 244, 259–268, 269–281, 290, 328, 329, 331, 332, 334, 335, 336, 337, 344, 352, 353, 354, 355, 364, 365, 399

electronically, 156, 159, 161

electronic cash, 7, 178, 181–183, 184, 328, 329, 331, 332, 334, 335, 336, 337. *See also e-money*

electronic funds transfers, 123

electronic payment, e-payment, xin2, xxx, 8, 102n15, 103, 104, 113n5, 192n14, 260, 268, 269–81, 344, 353

electronic purse, 7. *See also e-wallet e-money. See also electronic cash employer, 71, 308 Entrée card, 6, 156, 160–2 ethical, 2, 13 Eurogroup, 132, 136 Europe, 44, 49, 50, 53, 66, 90, 105, 108, 109, 111, 112, 135, 136, 182, 236, 341, 345, 346, 348, 351, 352, 377, 395–6 European Central Bank (ECB), xxx, 132, 341, 352 European Payments Integration, 342 e-wallet. *See also electronic purse exchange, ix, xii, xin2, xxiv, xxx, xxxii,s 3, 4, 10, 15, 16, 20, 25,**

30, 38, 43–7, 49–52, 60, 67, 70, 75–7, 80, 87, 90, 91, 102n15, 113n5, 156n3, 159, 159n11, 164, 178, 179, 189n7, 191, 192, 194n18, 249, 253, 380–8, 392, 393, 399

exchangeable, 23

exchange rates, 20, 43, 44, 46, 47, 51, 52

existing, 26, 122, 155, 159–61, 180, 206, 208, 266, 288, 299, 300, 327, 328, 341, 343, 344, 360, 385, 388

existed, 60, 96, 241

F

farming, 56, 57, 61

farmer, 56

Federal Reserve, xxx, 87n5, 91n10, 99, 100

fiat, 34, 35, 87, 87n4, 381

finance, xx, xxiv, xxiv, xxv, xxvi, xxix, xxii, xxxi, 7, 39, 39n12, 45, 52, 53, 97, 100n10, 121, 132, 134n5, 204, 234, 239, 240n20, 271, 297, 300n6, 343n1, 367, 368, 378, 392, 399

financial, 3, 15, 26, 33, 43, 55, 69, 79, 89, 97, 109, 117, 134, 142, 171, 184, 189, 202, 211, 234, 263, 270, 284, 297, 326, 343, 356, 359, 367, 379, 392

financial Institution, 79

financial intermediation, 38, 55–64, 392

financing mechanisms, 57

flight to quality, 47

- fractional reserve, 24, 25
 franc, 50, 348
 France, xx, 24, 26, 46, 50, 86n2, 88,
 99, 179, 285, 354, 355, 396
 Fraud, xxvi, 6, 167–76, 322, 387,
 396–8
 free-market economics, 20
 future(s), ix, x, xin1, xxv, xxx, 2, 5, 8,
 9, 13, 14n2, 15, 17, 19, 20,
 58, 65n1, 67, 77, 81, 85,
 85n1, 95, 96, 100–4, 139,
 145, 159, 192, 208, 242, 245,
 248n57, 253, 269, 270,
 272–5, 281, 314, 325–38,
 342, 367–78, 383, 387, 388,
 391–3, 395
- G**
- globally
 global, ix, x, xi, xxiv, xxvii, xxviii,
 xxxi, 1, 45n11, 90n8, 121,
 137, 175, 177, 181, 183, 234,
 234n5, 236, 237, 250, 251,
 253, 253n44, 273, 273n3,
 275, 284, 299n4, 327, 330,
 348, 350, 379–80, 383, 384,
 388, 391–9
 globalisation, x, xxxi
 gold, 14, 14n4, 16, 20, 23, 24, 26,
 27, 30, 37, 39, 43, 44, 46, 50,
 51, 87, 89, 91, 160, 189, 381,
 382, 385
 governance, 71, 137n4, 349
 governments, 34, 66, 70, 89, 234,
 335
 govern, 137
 Greece, 132, 134, 343
- greed, 2, 17
 growth, xxvii, 3, 5, 24, 27, 39, 53,
 53n17, 56, 57, 78, 99, 104,
 118, 120–5, 128, 139, 142,
 149, 170, 184, 233, 234, 236,
 237, 242, 244–6, 250, 251,
 253, 254, 270, 273, 274, 278,
 279, 281, 283, 284, 298, 394,
 397, 398
 guarantee, 29, 30, 58, 67, 100n7,
 110, 112, 301, 352
- H**
- Household(s), xxvii, 7, 9, 66, 69, 72,
 73, 211–28, 239, 250, 251,
 298, 300, 360, 369
- I**
- imperfect information paradigm, 62.
See also information
 asymmetries
 India, xxvi, 8, 49, 50, 179, 240,
 292n8, 297–310, 399
 industrialization, 24, 27, 53
 inflation, 3, 4, 26, 66–8, 91, 92,
 124, 395
 information asymmetries, 63. *See also*
 imperfect information
 paradigm
 innovation
 innovating, 33–41, 397
 innovative, xxviii, 3, 8, 77, 115,
 128, 235, 246, 248, 253, 254,
 274, 283, 348, 399
 institutions, ix, x, xx, xxii, xxiv, xxvi,
 xxix, 6, 24, 36, 40, 41, 62, 63,

- 67, 107, 108, 111–15, 136, 137, 142, 157, 178n1, 184, 204, 213, 228, 235, 245, 248, 249, 252, 264, 266, 270, 271, 279, 352, 356, 359, 360, 376, 393, 397, 399
- instituted, 123
- intermediation, 38, 55–64, 392
- International Monetary Fund (IMF), 132
- international trade, xx, 3, 20, 44, 47, 52
- invoice, 59, 292
- issuer, 25–7, 90, 99n6, 172, 178, 184, 196
- issuing, 24–34, 36, 40, 41, 88, 99, 122, 157, 162, 175, 181, 182, 184, 202, 203, 298, 381
- issued, 3, 7, 19, 24–31, 36, 68, 71, 72, 91, 102, 112, 121, 122, 142, 156, 160, 162, 180–2, 202, 206, 208, 239, 264, 345, 348, 368, 383
- L**
- labour, xxix, xxii, 17, 27, 59n4, 66, 68
- labor, 52, 59, 77
- “La Caixa”, xxvii, xxi, 5, 107–15
- Lancashire, 45
- Latin America, xx, xxvi, 9, 44, 53, 56, 68, 76, 236, 398, 399
- law, xi, 29–31, 33, 34, 36, 38–41, 57, 68, 119, 139, 142, 172–5, 202, 220, 228, 345, 347. *See also* statute
- legitimacy, xxiv, 6, 103, 133, 133n2, 136–7
- lending, 24, 55–64, 160, 239, 360, 363, 365, 385
- loans, xxvii, 33, 58–60, 62, 63, 139, 239, 240, 253, 278, 360, 362–5
- liability provision, 171
- liberalism, 37
- liquidity, 25, 44, 52, 81, 91, 135, 139, 344, 353
- Liverpool, 45
- London, xin2, xx, xxix, xxxi, 14n3, 18n12, 30, 48, 57n1, 65n1, 89n6, 91, 102n15, 113n5, 156n3, 179n4, 184, 189n3, 189n5, 189n9, 191n11, 192n14, 193n17, 233n2, 234n4, 245n29, 247n32, 395, 396, 398n19
- M**
- Machine learning (ML), 312, 313, 313n2, 386
- markets, x, xx, xxiii, xxiv, xx, xxxx, 8, 24, 33, 46, 47, 51, 55, 61n5, 62, 63, 68, 72, 77–9, 120, 125, 126, 133, 135, 137, 163, 189n5, 197n25, 222, 233, 237, 238, 240, 241, 243, 248, 252, 253, 267, 272, 273, 328, 330, 342, 365, 379, 384, 386, 396, 398, 399
- market, x, xxii, xxiii, xxiv, xxxx, 8, 9, 18, 20, 25–7, 34, 38, 45n7, 46–52, 52n16, 58, 59, 61, 62, 69, 77n4, 78, 80, 89, 109,

- 110, 112–15, 118, 120–2,
125, 138, 142, 145, 145n9,
146, 159, 162, 169, 178, 179,
179n4, 202, 204, 220, 222,
234, 236–8, 240, 241, 243–8,
248n36, 248n37, 249, 250,
252–4, 259, 260, 263–81,
283, 284, 289, 328, 338,
341–51, 353, 365, 377, 382,
384–5, 399
- MasterCard, 103, 112–14, 175, 177,
180, 183, 184, 207, 208, 265,
267, 354, 357
- materiality, 4, 7, 86, 89, 90, 92–3,
189–92
- materiality of money, 7, 86, 189
- materiality of payments, 86
- members, 16, 26, 61, 70, 76–81,
112, 114, 133, 183, 202, 220,
237, 247, 303–5, 328, 333,
349
- member, xix, xxi, xxii, xxiii, xx,
xxvii, xxx, xxxi, xxxii, 6, 77,
79, 100, 104, 156, 157, 162,
164, 181, 237, 238, 333, 342,
345, 348, 352
- merchant, 57, 58, 58n3, 88, 112,
114, 161–3, 169, 170, 172,
175, 242, 246, 261–7, 354,
356–8
- metal, 51, 92, 93, 193
- Mexico, xix, xxiii, xx, xx, 5, 45, 46,
50, 76, 117–28, 236n12,
359–61, 363–5
- Mexican, 5, 46, 50, 51, 119n4,
120, 126, 236n12, 359, 363
- Mimoni, xxiii, 9, 359, 360, 364, 365
- mining, 35
- ML. *See* Machine learning (ML)
- mobile banking, xxiv, 8, 9, 120, 121,
123, 124, 128, 233–54, 260,
268, 269–81, 291, 300,
302n7, 325–38. *See also*
mobile payment
- Mobile Money Operators (MNOs),
248, 302, 308
- mobile payment, xix, xxvii, xxix, 8,
21, 178, 235n7, 253, 260–8,
274–80, 283–93, 368. *See also*
mobile banking
- mobility
- mobile, 8, 21, 48, 104, 115, 120,
142, 159, 177, 203, 203, 233,
259, 269, 283, 297, 320, 325,
352, 364, 368, 385, 392
- mobiles, 265, 266, 298, 307,
386
- Mondex, xxvii, 7, 177–84, 299
- monetary circuits, 73
- monetary plurality, 4, 44, 47, 52
- monetary reform, 68
- monetary systems, 2, 13, 14, 17,
20–2
- money, 2, 13, 23, 34, 44, 58, 65,
85, 96, 118, 132, 143, 157,
179, 188, 204, 234, 259,
270, 283, 297, 360, 367,
379, 393
- money demands, 44, 52
- moneyless, 20, 96
- money problem, 18, 20
- money supply, 25, 39, 40, 44, 259,
381
- monopoly, 26, 27, 30–2, 34, 88, 89
monopolistic, 62, 63
- M-Pesa, 239, 240–4, 244n27, 245,
246, 246n30, 251–3, 284,
302

N

- Nations/Nations, 3, 14n3, 16n9, 19, 27nn1, 44, 101, 169, 201, 245, 299, 335, 398
nat West, xxvii, 178, 178n1, 179, 179n 3, 180, 181
neoliberal, 68, 70
network, x, xxiii, xxiv, xxvii, xxviii, xxviii, 4, 5, 6, 7, 59, 70, 76, 77–78, 79, 80, 81, 97, 100, 103, 110, 111, 113, 115, 121, 127, 142, 145, 155, 156, 160, 161, 162, 163, 168, 169–170, 171, 172, 173, 174, 175, 178, 179, 180, 191, 194, 202, 203, 204, 235, 237, 238, 239, 240, 241, 242, 243, 245, 250, 251, 252, 253, 254, 265, 267, 270, 271, 273, 274, 275, 277, 278, 279, 280, 298, 299, 300, 302, 307, 315, 328, 354, 355, 356, 357, 377, 378, 384, 385, 387, 388, 393, 394, 398
networked, 100, 156
New Orleans, xx, 4, 43–53
No formal bank relations (NFB), 360

O

- operators, 104, 128, 177, 182, 207, 235, 237, 238, 247, 248, 249, 260, 261–263, 264, 265, 268, 271, 275, 292, 302, 307, 308
operate, 14, 35, 37, 76, 79, 93, 267, 355, 376
operated, 36, 58, 93, 119, 142, 157, 344
overdraft, 161, 385

P

- Pampas region, 56
panic, 4, 47, 48, 49, 50, 52, 133
pasta, 138
paying, 6–7, 21, 38, 69, 147, 178, 182, 193, 203, 347, 360, 361, 365, 370
pay, xi, xx, 28, 36, 38, 58, 60, 63, 67, 69, 71, 72, 80, 99n6, 102, 104, 125, 132, 169, 170, 172, 179, 182, 184, 190, 194, 197, 203, 205, 206, 212, 220, 222, 228, 239, 244, 246, 247, 260, 261, 262, 263, 266, 277, 290, 345, 355, 356, 362, 364, 365, 372, 377, 381, 386, 394, 397
paying with plastic, 6–7, 193n17, 195n20
payment, 1, 19, 23, 43, 58, 66, 78, 86, 96, 107, 117, 132, 141, 156, 167, 177, 187, 201, 227, 235, 259, 269, 283, 327, 341, 351, 359, 368, 379, 391
payment card, 7, 9, 110, 167, 168, 189, 191, 192, 195, 264, 353, 356, 358. *See also* plastic cards
payment method, 21, 39, 104, 112, 144, 260, 262, 285, 289, 356
payment systems, xxviii, xxx, 2, 3, 9–10, 21, 43, 44, 93, 113, 114, 115, 143–5, 169, 196, 207, 264–5, 267–8, 281, 284, 286, 290, 291, 292, 293, 341, 350, 352, 393
peso, 28, 36, 51, 67, 68, 68, 71, 72
phone, 93, 177, 178n2, 205, 236, 239, 241, 243, 244, 248, 250, 254, 259, 260, 261, 262, 264,

- 265, 266, 267, 270, 271, 272, 273, 275, 279, 293, 316, 317, 320, 321, 327, 333, 361, 362
- phones, xi, 104, 142, 177, 179, 184, 239, 248, 260, 265, 266, 267, 269, 271, 272, 275, 280, 325, 330, 331, 333, 334, 336, 365, 385
- plastic cards, 104, 193, 205. *See also* payment card
- Point-of-sale (POS) terminals, 101, 103, 156, 178n1, 179, 267, 270, 354
- political uncertainty, 50, 279
- politics, xxx, 7, 45n9, 46, 56, 189n8, 193n17, 201–208, 287
- population, 58, 67, 69, 102, 121, 126, 141, 143, 146, 206, 213, 239, 240, 243, 245, 246, 250, 251, 252, 253, 259, 260, 266, 268, 284, 292, 297, 299, 302, 304, 310, 359, 360, 361, 368, 369, 375, 380, 398
- populated, 33, 63, 249
- pound, 49, 382, 388
- poverty, poor, 4, 13, 15, 69, 120, 127, 139, 307, 360
- private bankers, 45, 47
- private property, 14n1, 17, 18, 21
- private sector, xxiii, 70
- privatisation, 68
- problems, 2, 13, 15, 55, 80, 99n4, 119, 128, 137, 143, 148, 150, 174, 175, 280, 313, 392
- problem, 18, 20, 25, 34, 38, 40, 41, 44, 67, 81, 87, 89, 91, 99n4, 132, 138, 144, 148, 167, 168, 169–170, 171–172, 181, 184, 188, 193, 194, 201–208, 313, 314, 315, 319, 359, 379, 381
- process, xi, xxi, 3, 31, 35, 38, 56, 59, 76, 86, 91, 97, 99, 104, 112, 118, 119, 124, 144, 148, 156, 170, 179, 191, 194, 239, 261, 286, 309, 312, 327, 337, 344, 345, 353, 356, 361, 364, 385, 392, 393
- processed, 80, 99, 104, 114, 155, 354
- producer, 19
- product, xi, xxi, xxxi, 19, 50, 69, 77, 78, 81, 121, 122, 156, 158, 161, 162, 172, 180, 184, 195, 213, 239, 240, 242, 243, 261, 262, 263, 264, 271, 290, 301, 308, 309
- production, xix, 19, 35, 37, 39, 47, 49, 56, 59, 60, 93, 111, 138, 147, 206
- provincial currency, 71

Q

Qiwi, 202, 204

R

- receipts, 19, 21, 355, 371
- regulate, 20, 27
- regulated, 30, 68, 91, 157, 270, 297, 346
- regulation, xxxi, 25–27, 28, 31, 33, 38, 40, 41, 79, 89, 120, 191, 248, 253, 254, 273, 275, 342, 343, 344, 346, 347, 348, 352, 357, 399

- requirements, 25–7, 134, 207, 218, 241, 242, 243, 250, 254, 288, 293, 345, 346, 347
require, xxiv, 15, 121, 128, 203, 208, 264, 273, 330, 363, 374
required, xxii, 26, 28, 29, 50, 61, 72, 80, 157, 158, 159, 160, 161, 170, 179, 192, 193, 235, 253, 254, 262, 286, 288, 291, 308, 330, 344, 345, 347, 360, 364, 371, 382, 383, 392
restrictions, 26, 34, 38, 66, 133, 134, 136, 374
retail, ix, x, xxii, xxix, xxviii, xxix, xxx, 1, 2, 5, 19, 62, 97, 100n10, 104, 109, 115, 125, 135, 168, 178, 179, 181, 184, 202, 203, 208, 239, 241, 243, 260, 262, 278, 280, 284, 309, 327, 328, 337, 341, 342, 358, 368, 369, 370, 391–393, 394, 395, 396, 397, 399
retailer, 169, 180, 181, 241, 244, 370
rural, xxvi, 38, 55, 56, 57, 58, 59, 60, 61, 62, 63, 157, 217, 218, 219, 221, 223, 224, 226, 237, 240, 241, 242, 245, 246, 249, 250, 298, 300, 392
rural merchants, 55, 57, 58, 61, 62, 63
rural stores, 58
Russia, 7, 201, 202, 203–4, 206, 207, 208, 285, 287
- S**
salary, 68, 203, 215, 216, 218, 219, 220, 222, 225, 226, 360, 365
Sbercard, 205, 206, 207
sector, xxii, xxiii, xxix, xxv, 5, 33, 34, 35, 37, 38–40, 50, 57, 68, 69, 70, 72, 79, 109, 111, 118, 119, 132, 133, 135, 137, 138, 142, 220, 227, 236, 242, 243, 246, 247, 250, 252, 253, 254, 298, 297, 302, 337, 353, 388, 399
security
secure, 21, 169, 180, 182, 183, 190, 205, 254, 267, 274, 275, 280, 283, 322, 327, 346, 352, 388
secured, 239
seigniorage, 88, 89, 90
SEPA. *See* Single Euro Payments Area (SEPA)
services, 4, 18, 38, 45, 58, 66, 76, 103, 108, 118, 138, 142, 203, 211, 234, 259, 269, 283, 298, 325, 342, 352, 381
service, xix, xxiv, xxvii, xxviii, 9, 30, 60, 68, 77, 78, 81, 109, 111, 115, 120, 124, 126, 127, 142, 147, 148, 149, 150, 156, 157, 158, 159, 202, 204, 205, 206, 238, 239, 240, 242, 243, 244, 245, 247, 248, 249, 250, 252, 254, 262, 263, 264, 267, 270, 271, 273, 274, 275, 277, 280, 283, 285, 288, 290, 291, 292, 293, 298, 301, 325, 326, 330, 338, 341, 345, 346, 356, 357, 398
side channel attacks, 8, 311–322
silver, 14, 16, 20, 23, 24, 27, 30, 38, 39, 40, 44, 46, 50, 51, 88, 89, 90n9, 91, 399

- Single Euro Payments Area (SEPA), 342, 35
- social, x, xxiv, xxiii, xxix, xxvii, xxx, xxxi, 4, 6, 10, 13, 15, 58, 61, 67, 69, 70, 71, 96, 101, 110n3, 114n7, 115, 133, 136, 137, 138, 142, 143, 144, 145, 148, 150, 171, 189, 189n5, 189n7, 208, 247, 254, 263, 267, 287, 302, 310, 345, 369, 372, 373, 374, 375, 377, 379–388, 393
- socialism, 245
- society, v, ix, xi, xx, xxi, xxx, 2, 4, 5, 8, 9, 13–22, 23, 70, 75, 85–93, 95–105, 108, 113, 133, 139, 144, 167, 172, 183, 245, 247, 268, 270n2, 302, 303, 368, 377, 378, 380, 394
- South America, 46, 79, 97
- Spain, xx, xxix, xxvii, xxxi, 3, 9, 23–32, 100, 108, 109, 111, 112, 114, 351–358
- state, ix, xx, xxvii, 3, 18, 19, 24, 30, 31, 34, 35, 36, 44, 46, 47, 52, 66, 68, 69, 70, 72, 73, 88, 89, 90, 91, 93, 133, 135, 139, 169, 172, 173, 174, 175, 205, 206, 207, 233–254, 273n3, 278
- statute, 299n4, 302, 304, 305, 342, 348, 352. *See also* law
- sterling, 46, 49, 50
- success, 17, 25, 71, 80, 92, 120, 142, 150, 183, 184, 192, 236, 241, 242, 243, 244, 252, 253, 254, 273, 289, 308, 309, 338, 350, 387, 388, 393, 397
- successes, 6, 243, 252
- system
- T**
- Tarjeta*, 110, 112, 113
- technology
- technological, ix, x, 4, 85, 100n10, 102, 107, 109, 141, 156, 160, 162, 163, 169, 194, 238, 260, 268, 284, 376, 391, 392, 393
- technologically, 4, 85, 107, 162, 183, 365
- teleprocessing, 5, 107–115
- textiles, 45
- Thailand, xxvii, 8, 269–281, 349
- timing
- time, x, xi, xx, xxiv, xx, xxvii, 5, 7, 18, 21, 25, 26, 27, 30, 34, 36, 39, 40, 57, 58, 61, 64, 67, 70, 73, 76, 77, 80, 87, 93, 98, 99, 102, 103, 104, 105, 108, 109, 110, 111, 113, 114, 115, 119, 123, 128, 131, 132, 133, 135, 149, 155, 156, 158, 159, 160, 161, 162, 169, 170, 171, 173, 178, 179, 180, 182, 183, 184, 189, 190, 194, 203, 204, 205, 207, 208, 234, 239, 242, 243, 249, 267, 275, 283, 285, 290, 312, 316, 317, 319, 320, 322, 330, 342, 344, 345, 347, 349, 350, 351, 353, 355, 361, 362, 363, 370, 371, 372, 373, 376, 377, 380, 381, 382, 384, 387, 394, 395, 396, 399
- timely, 128
- Tradaq, xxix, 75–82

trade, x, xx, xxx, 3, 17, 20, 21, 25, 27, 35, 38, 44, 45, 46, 47, 50, 52, 59, 62, 63, 68, 70, 76, 77, 78, 79, 80, 81, 98, 101, 103, 161, 190, 233, 344, 349, 382, 384, 385, 386, 387
 transactions
 transact, 251, 309
 transaction, x, xxx, 8, 18, 19, 43, 65, 77, 89, 90, 93, 97, 100, 103, 114, 127, 138, 141
 transfer, xvii, xxii, 90, 97, 109, 113, 120, 121, 127, 156, 159, 178, 180, 183, 192, 193, 194, 195, 205, 236, 239, 241, 243, 246, 249, 250, 252, 254, 266, 270, 275, 302, 304, 305, 306, 308, 341, 342, 343, 347, 354, 374
 transferable, 20, 70, 91
 treasury, xxv, xxx, 46, 47, 49, 202
 trust, 88, 90, 148, 169, 208, 279, 285, 286, 290–291, 292, 293, 299, 300, 303, 307, 308, 364, 373, 375, 376, 377, 375, 376, 377, 385, 387. *See also* distrust
 Turkey, xix, xxii, 8, 259–268

U

unemployment, 4, 69, 71, 138, 139
 United States, US, USA, xx, 5, 37, 44, 49, 50, 52, 57n1, 58, 102, 174n4, 202n1. *See also* America
 unregulated, 33, 360. *See also* receipts, regulated
 Uruguay, xxx, 7, 211–228

users, 7, 8, 10, 25, 66, 73, 88, 109, 121, 127, 128, 143, 144, 147, 149, 150, 168, 171, 172, 175, 191, 193, 196, 197, 202, 204, 239, 240, 241, 242, 244, 246, 248, 249, 251, 254, 260, 264, 267, 275, 285, 287, 290, 291, 302, 304, 305, 306, 307, 315, 317, 319, 320, 333, 328, 344, 346, 352, 361, 362, 368, 369, 370, 372, 375, 376, 377, 382, 384, 385, 387, 398
 user, xxviii, 7, 81, 111, 115, 127, 128, 142, 147, 148, 149, 150, 158, 172, 196, 204, 206, 208, 244, 260, 261, 262, 303, 304, 305, 306, 307, 316, 317, 319, 320, 321, 322, 361, 365, 368, 369, 370, 371, 375, 376, 378, 383, 385, 387
 Utopian, 2, 13–22, 97, 364

V

value, x, xin2, xxiv, xxx, 2, 14, 15, 16, 17, 18, 20, 23, 25, 29, 30, 31, 38, 44, 46, 47, 48, 49, 50, 51, 66, 67, 69, 71, 72, 76, 78, 87, 88, 89, 90, 99n4, 104, 206, 113n5, 119, 124, 126, 156n2, 158, 159, 160n11, 164, 171, 178, 181, 182, 183, 184, 189, 191, 192, 192n14, 193, 194, 206, 208, 218, 222, 225, 234, 239, 245, 246, 248, 252, 263, 264, 265, 267, 272, 273, 274, 285, 286, 300, 317, 343, 349, 354, 355, 356, 358,

363, 369, 371, 375, 380, 381,
382, 383, 386, 387, 392, 393,
395, 399

virtual money, 93

Visa, 6, 7, 102, 103, 112, 113, 114,
121, 125, 155, 156, 159, 160,
161, 162, 163, 164, 175, 177,
178, 181–3, 184, 192, 201,
202, 207, 208, 242–4, 267,
330, 354, 357

VisaCash, 7, 177–184
voucher, xxi, 36, 242

W

wealth, 16, 18, 27, 89, 298n2, 380
western world, 18, 24, 87
western society, 21