

The Shadow Payment System

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Banking, derivatives, and structured finance may attract the lion's share of accolades and approbation in global finance—but payment systems are where the money is. Historically, payment systems in most jurisdictions have been legally and operationally intertwined with the conventional banking system. The stability of these payment systems has thus parasitically benefited from the unique prudential regulatory strategies imposed on deposit-taking banks. These strategies include emergency liquidity assistance or “lender of last resort” facilities, deposit guarantee schemes, and special bankruptcy or “resolution” regimes for failing banks. Importantly, these strategies have the practical effect of relaxing the strict application of corporate bankruptcy law, thereby enabling banks—and the payment systems embedded within them—to continue to perform their core payment and other functions even under conditions of severe institutional stress.

Recent years have witnessed the emergence of a vibrant, diverse, and rapidly growing shadow payment system. This system includes peer-to-peer payment systems such as PayPal, mobile money platforms such as M-Pesa, and crypto-currency exchanges such as Mt. Gox. The defining feature of this shadow payment system is that the financial institutions that populate it perform the same core payment functions as banks, but without benefiting from the prudential regulatory strategies that ensure bank-based payment systems can continue to function during periods of institutional stress. This Article examines the potential risks to both customers and broader financial and economic stability generated by this functional gap, along with the likely effectiveness of various strategies that institutions within the shadow payment system currently—or might in the future—employ to address these risks.

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I. INTRODUCTION

Banking, derivatives, and structured finance may attract the lion's share of accolades and approbation in global finance—but payment systems are where the money is. Effective payment systems are vital to the smooth and efficient operation of the modern economy. Whenever your employer deposits your salary into your bank account, whenever you use your debit or credit card to purchase goods or services, and whenever you write a cheque to your landlord or to pay a bill, you are invariably relying on one or more payment systems to complete the transaction. Collectively, these payment systems facilitate over \$400 trillion in non-cash transactions per year: roughly five times global gross domestic product.¹ Accordingly, while we often take for granted the important functions that payment systems perform within the global financial and economic system, there are few parts of this system that have a more direct impact on our daily lives.

Historically, payment systems in most jurisdictions have been legally and operationally intertwined with the conventional banking system. Banks accept deposits from households and firms in exchange for a promise to pay back deposited savings, along with any accrued interest, on demand. These deposits are credited to accounts that serve as the backbone of a complex institutional architecture that facilitates non-cash payments among and between households, firms, and governments. This architecture typically includes a network of correspondent accounts that banks hold with one another, along with one or more interbank clearing and settlement systems. Residing at the apex of this architecture is then a central bank such as the Federal Reserve, Bank of England, or European Central Bank that issues the ultimate settlement asset, oversees the functioning of the payment system and, importantly, stands ready to provide liquidity during periods of institutional or systemic stress.

The defining feature of banks is that they invest deposited savings in loans and other longer term investments.² The resulting mismatch between their short-term liquid liabilities

1. See STEFAN DAB ET AL., BOS. CONSULTING GRP., GLOBAL PAYMENTS 2014: CAPTURING THE NEXT LEVEL OF VALUE 5 (2014), http://image-src.bcg.com/Images/Global_Payments_2014_Next_Level_Value_Sep_2014_tcm9-82816.pdf (estimating global payment volumes for 2013 at \$410 trillion, excluding payments facilitated by non-bank intermediaries and payment systems). For a country-by-country breakdown of payment statistics in larger developed countries, see COMM. ON PAYMENTS AND MKT INFRASTRUCTURES, BANK FOR INT'L SETTLEMENTS, STATISTICS ON PAYMENT, CLEARING AND SETTLEMENT SYSTEMS IN THE CPII COUNTRIES – FIGURES FOR 2015 (2016), <https://www.bis.org/cpmi/publ/d152.pdf>.

2. This is reflected in the legal definition of a “bank” in most jurisdictions. In the European Union, for example, a “credit institution [bank] means an undertaking the business of which is to *take deposits* or other repayable funds from the public and to *grant credits for its own account*[.]” (emphasis added). European Parliament and Council Regulation 575/2013, art. 4.1(1), 2013 O.J. (L. 176) 1 (EU). There are several definitions of a “bank” under U.S. law. For example, a bank is defined as “an institution organized under the laws of the United States . . . which both—(i) accepts demand deposits or deposits that the depositor may withdraw by check or similar means for payment to third parties or others; and (ii) is engaged in the business of making commercial loans.” U.S. Bank Holding Company Act of 1956, 12 U.S.C. § 1841(c)(1)(B) (2016) (emphasis added). Section a(2)(A) of the Federal Deposit Insurance Act, in contrast, defines a state bank as “engaged in the business of receiving deposits, other than trust funds” without a corresponding requirement that they also be engaged in the business of making commercial loans. 12 U.S.C. § 1813(a)(2)(A) (2016). These definitions are typically accompanied by entry restrictions prohibiting all firms other than banks from issuing deposit liabilities. See, e.g., 12 U.S.C. § 378(a)(2) (2016). At the same time, of course, this conventional narrative of financial intermediation—pursuant to which banks fund loans through deposit liabilities—is at best incomplete (if not somewhat inaccurate) insofar as many deposits are actually created through the extension of loans by banks to

(demand deposits) and longer term and potentially illiquid assets (loans) renders banks susceptible to destabilizing runs by depositors and other short-term creditors.³ In order to minimize the risk of institutional and broader financial instability—and to effectively manage this instability should it arise—bank regulators have developed a range of prudential regulatory strategies.⁴ These strategies include emergency liquidity assistance or “lender of last resort” facilities, deposit guarantee schemes, and special bankruptcy or “resolution” regimes for failing banks. Importantly, these strategies often have the practical effect of relaxing the strict application of the general corporate bankruptcy law regimes that apply to virtually all other types of distressed firms; thereby enabling banks—and the payment systems embedded within them—to continue to perform their vital payment, investment, and other functions even under conditions of severe institutional stress. To address the resulting moral hazard problems, bank regulators then subject banks to intensive prudential supervision and impose capital, liquidity, and other regulatory requirements designed to constrain socially excessive risk-taking.⁵

Technological innovation is rapidly changing the way we make payments. To see how, you need only go to a grocery store, use public transit, or sell your old sofa on eBay. Perhaps most importantly, while banks and bank-based payment systems still dominate the financial landscape in most jurisdictions, recent years have witnessed the emergence of a vibrant, diverse, and rapidly growing *shadow* payment system. This shadow payment system includes peer-to-peer (P2P) payment systems such as PayPal, mobile money platforms such as Kenya’s M-Pesa, and crypto-currency exchanges such as Mt. Gox.⁶ Despite this diversity, the financial institutions that populate the shadow payment system share two core features. First, these institutions perform the same core payment functions as conventional deposit-taking banks: combining the acceptance of funds⁷ (*storage*) with

firms and households. See Michael McLeay et al., *Money Creation in the Modern Economy*, BANK OF ENG. Q. BULL. 14, 14 (2014), <https://www.bankofengland.co.uk/-/media/boe/files/quarterly-bulletin/2014/money-creation-in-the-modern-economy>.

3. Douglas W. Diamond & Philip Dybvig, *Bank Runs, Deposit Insurance, and Liquidity*, 91 J. POL. ECON. 401, 401 (1983) (discussing “risks which lead to a demand for liquidity” that can lead to bank runs). For a recent survey of the literature on the fragility of banks, see Franklin Allen et al., *Moral Hazard and Government Guarantees in the Banking Industry*, 1 J. FIN. REG. 30 (2015). For a description of how banks can be vulnerable to runs by short-term creditors other than depositors, see Gary B. Gorton & Andrew Metrick, *Securitized Banking and the Run on Repo*, 104 J. FIN. ECON. 425 (2012).

4. These regulatory strategies are described in greater detail later in this Article, see *infra* Part VI.

5. At the international level, the development of these prudential standards takes place under the auspices of the Basel Committee on Banking Supervision (BCBS); see, e.g., BCBS, BANK FOR INT’L SETTLEMENTS, BASEL III: A GLOBAL REGULATORY FRAMEWORK FOR MORE RESILIENT BANKS AND BANKING SYSTEMS (June 2011), www.bis.org/publ/bcbs189.pdf; BCBS, BANK FOR INT’L SETTLEMENTS, INTERNATIONAL CONVERGENCE OF CAPITAL MEASUREMENT AND CAPITAL STANDARDS: A REVISED FRAMEWORK COMPREHENSIVE VERSION, (June 2006), <http://www.bis.org/publ/bcbs128.pdf>. For a more detailed overview of these requirements, see JOHN ARMOUR ET AL., PRINCIPLES OF FINANCIAL REGULATION CH. 14–17 (2016).

6. This list is not intended to be exhaustive. There are many other elements of the shadow payment system, and new institutions and business models are emerging at a rapid pace. Given the differences between the business models used in the shadow payment system, there are clearly a range of taxonomies that could be used to organize or categorize system providers. These differences in business models will be important insofar as they have a bearing on the appropriateness of the strategies that may be used to enhance the credibility of a payment system provider’s commitment to provide storage and liquidity. For the purposes of this Article, however, it is not necessary to do more than note that the providers that we survey all perform the same core payment functions, and it is this common feature that attracts our interest. See *infra* Part II.

7. The nature of these “funds” varies across the payment systems we survey. They may be legal tender,

the promise to transfer⁸ or convert these funds on demand (*liquidity*).⁹ Second, these institutions reside outside the perimeter of the regulated banking system.¹⁰ As a result, these institutions do not directly benefit from the prudential regulatory strategies that ensure that bank-based payment systems can continue to function during periods of institutional stress. Accordingly, while these institutions may seem like potentially promising substitutes for bank-based payment systems, the conditions under which they can credibly commit to simultaneously provide their customers with both storage and liquidity are often limited by the strict application of general corporate bankruptcy law.

The rapid changes in the way we make payments have significantly outpaced our understanding of the potential risks stemming from the emergence and growth of the shadow payment system. This Article seeks to make up this lost ground by identifying and examining the risks that the shadow payment system poses to customers, along with those it may in the future pose to financial and economic stability. As we shall see, these risks are a product of the fundamental disconnect between the shadow payment system's core storage and liquidity functions (which generally resemble the payment functions of conventional deposit-taking banks outside periods of institutional stress) and its current legal and regulatory treatment in many jurisdictions (which in a great many cases does not). Just because we don't call something a "duck" doesn't mean we should eliminate the possibility that it might quack.

The risks that the shadow payment system poses to customers flow principally from the prospect of delayed conversion or transfer of funds (*illiquidity*) and the potential write-down of these funds where they are characterized as unsecured liabilities in the context of any bankruptcy proceeding (*loss of value*). These risks were vividly illustrated by the failure of the crypto-currency exchange Mt. Gox, which filed for bankruptcy protection in the United States and Japan in early 2014 with over \$USD470 million in missing assets.¹¹ While some of these assets have reportedly since been located, customers will still likely be required to wait until the conclusion of the bankruptcy process before receiving

currency, or other "base" money issued by central banks (e.g. notes, coins, and central bank reserves), demand and other short-term deposits held with conventional banks, or other privately-issued assets that are used as effective substitutes for base money and/or bank deposits (e.g. crypto-currencies). For the purposes of this Article, we refer to all of these assets as "funds" while acknowledging their diverse characteristics.

8. The mechanics of this "transfer" will again vary across payment systems. These differences reflect the variation in the nature of the asset being deposited, the terms of the relationship between customers and the system provider, and the law that governs these terms. In some systems, customers will be able to effect a transfer by assigning their claim to the return of the funds they have deposited to a third party, thereby effecting payment to that third party. In other systems, transfers may have to take effect through the system provider, for example by the customer instructing the provider to debit the customer's account (or "wallet") and to take steps to credit (or enable another system provider to credit) a transferee with a claim of equivalent value, such that in legal terms there is not strictly a "transfer" but instead the extinction of one claim and the creation of one or more new ones; see CHARLES PROCTOR, MANN ON THE LEGAL ASPECTS OF MONEY 189 (7th ed. 2012) (discussing bank transfer analogs). For the purposes of this Article nothing turns on these differences, except to the extent that they have a bearing on the question of whether claim holders have any proprietary interest in funds held by the payment system provider, or merely hold an unsecured claim to the payment of funds.

9. The core payment functions of bank-based and shadow payment systems are examined in greater detail in *infra* Part II.

10. There are of course many "alternative" payment systems that are authorized as banks in one or more jurisdictions (e.g. WorldPay). By definition, these systems do not qualify as "shadow" payment systems as we have defined this term.

11. The failure of Mt. Gox is chronicled in greater detail in Part V.

repayment—a process that has already taken several years and at this stage remains ongoing. It is also highly likely that customers will ultimately receive only a small fraction of the funds they originally entrusted to Mt. Gox.

While perhaps not an immediate threat, the emergence of the shadow payment system also poses potentially significant risks to financial and economic stability. These risks flow from three principal sources. First, as an increasing number of micro and small enterprises—from online merchants to Kenyan coffee growers—come to rely on the shadow payment system as their primary means of making and receiving payments, there is a corresponding risk that the failure of institutions within this system could jeopardize the liquidity and, ultimately, solvency of an important cross-section of firms within the real economy.¹² Through this channel, institutional instability within the shadow payment system could have an adverse impact on economic growth and employment. Second, as the shadow payment system continues to grow and evolve, the pressure to generate profits may drive institutions to bundle payment functions with more conventional forms of financial intermediation: combining their promise of storage and liquidity to customers with investments in longer-term and potentially illiquid assets.¹³ The resulting maturity and liquidity mismatches would raise the prospect of destabilizing runs by customers and other short-term creditors. Through this channel, correlated runs within the shadow payment system could lead to a contraction in the money supply, thereby driving a contraction in investment and economic growth. Finally, as an increasing proportion of funds become held by institutions outside the conventional banking system, this may undercut the ability of central banks to use existing monetary policy tools to manage the money supply in pursuit of price stability, financial stability, and other policy objectives.¹⁴ At present, each of these potential systemic risks is somewhat speculative: the shadow payment system has simply not achieved sufficient scale to pose a clear and present danger to financial or economic stability. Nevertheless, identifying potential risks at this early stage can enhance our understanding of how best to approach the design and regulation of this increasingly important component of the financial system.

Having identified the risks stemming from the emergence of the shadow payment system, this Article goes on to examine a range of strategies for minimizing their harmful effects. Given the functional parallels, it might seem tempting to subject institutions within the shadow payment system to the same prudential regulatory strategies that are currently imposed on conventional deposit-taking banks. Ultimately, however, the diversity of business models within the shadow payment system—combined with the absence of meaningful levels of financial intermediation in many cases—points in favour of a more nuanced approach. Just because something quacks doesn't mean that we should necessarily call it a duck.

For this reason, our examination proceeds on the basis of first principles. The strategies we examine include portfolio restrictions, third-party insurance, outsourcing the storage function to deposit-taking banks, and utilizing trusts to ring-fence customer funds. As we shall see, while these strategies are not without their potential merits, no one

12. As described in greater detail in Part V, this will especially be the case where firms use the shadow payment system for working capital purposes.

13. As described in greater detail in Part V, this trend can arguably already be observed in the case of PayPal and mobile money platforms.

14. These tools, along with their use within the context of the conventional banking system, are described in greater detail in Part V.

approach on its own is likely to fully address the risks generated by the bundling of storage and liquidity functions outside the regulated banking system. Moreover, in choosing between these strategies, market participants and policymakers face important trade-offs between consumer and systemic protection, financial innovation, and competition within the payment system. Accordingly, this Article also examines the effectiveness of a seemingly underappreciated strategy—the *structural separation* of payment functions from other business activities—as a way of minimizing the risks generated within the shadow payment system without undercutting its unique and potentially transformative benefits. Inevitably, however, even this strategy entails potentially significant trade-offs in terms of the ability of the shadow payment system to serve as a platform for other types of socially useful financial intermediation.

This Article holds out a number of important and related insights. First, the ability of banks to simultaneously provide both storage and liquidity—especially during periods of institutional and systemic stress—is a function of the unique prudential regulatory regimes to which they are subject. Historically, the stability of bank-based payment systems has thus parasitically benefited from the regulatory regimes designed to ensure the stability of banks. Second, and as a corollary, the recent emergence of institutions that provide storage and liquidity outside the perimeter of the regulated banking system—i.e. the shadow payment system—poses potentially significant risks to customers. While somewhat less immediate, the continued growth of the shadow payment system could also pose potential systemic risks. Third, while strategies exist that may serve to protect customers and reduce potential systemic risks, these strategies do not at present appear to be widely utilized within the shadow payment system. We should acknowledge, however, that it is often extremely difficult to obtain reliable information about the legal and other institutional features of these systems. This suggests that much work remains to be done to construct a more accurate map of the shadow payment system. Finally, and more broadly, this Article highlights the important role of law and legal institutions in supporting liquidity and stability within the financial system. Collectively, these insights provide us with a useful starting point for building a more effective and resilient shadow payment system.

It is also important to clarify from the outset some of the insights that this Article is *not* designed to yield. First and foremost, this Article does not examine whether the emergence and growth of the shadow payment system is socially desirable, or evaluate whether payment systems are in general better positioned within the perimeter of the regulated banking system or outside it. While these are undoubtedly important questions, we would expect the answers to be heavily dependent on the relevant business models, along with the patterns of financial development, the quality of legal and regulatory regimes and institutions, and the prevailing political systems within individual jurisdictions. What works in the United States may not work in Kenya and vice versa. Second, this Article does not provide policymakers with a detailed blueprint for how to design or regulate the shadow payment system. Rather, our objective is to identify a range of policy options or strategies that might be used to enhance the effectiveness and resilience of these systems, along with the associated trade-offs. Once again, the optimal approach to the design and regulation of the shadow payment system will ultimately depend on the specific business models and the prevailing economic, legal, and political environment within any one jurisdiction.

This Article proceeds as follows. Part II begins by identifying the core functions of modern payment systems, focusing specifically on the combination of storage and liquidity

offered by institutions within both the conventional banking and shadow payment systems. Part II also frames the fundamental legal and public policy challenge stemming from the simultaneous provision of storage and liquidity in the shadow of general corporate bankruptcy law. Part III traces the parallel origins of banking and payment systems in the United States, the United Kingdom, and Continental Europe, demonstrating that the historical development of payment systems in these jurisdictions has been legally and operationally intertwined with the development of banks. Bringing this historical analysis forward to the present day, Part IV describes the core features of modern payment systems in these jurisdictions. These features include a network of commercial banks and interbank clearing and settlement systems subject to sophisticated prudential regulatory regimes, along with a central bank that stands ready to provide liquidity to these institutions during periods of institutional or broader systemic instability. Part V then turns its attention toward the emerging shadow payment system: examining the business models of P2P payment systems, mobile money platforms, and crypto-currency exchanges, along with the risks stemming from the bundling of storage and liquidity functions outside the perimeter of the regulated banking system. Part VI concludes by identifying and examining the likely effectiveness of various strategies that institutions within the shadow payment system currently—or might in the future—employ to address these risks.

II. THE CORE FUNCTIONS OF MODERN PAYMENT SYSTEMS

Payment systems can be defined as the institutional arrangements that facilitate the transfer of funds from debtors (payors) to creditors (payees) in satisfaction of financial obligations.¹⁵ Broadly speaking, these institutional arrangements fall into two categories. The first category is comprised of *wholesale* payment systems that facilitate the flow of funds between banks and other financial institutions and, in some cases, between these institutions and their large commercial clients. The category of wholesale payment systems can be further broken down into: large value—typically interbank—clearing and settlement systems; foreign currency, derivatives, and other clearinghouses; and centralized securities depositories.¹⁶ The second category is comprised of *retail* payment systems that facilitate the flow of funds among and between businesses, households, and governments. Retail payment systems include those facilitating the use of debit and credit cards, automated teller machine (ATM) networks, cheques, and electronic fund transfers. While conceptually distinct, wholesale and retail payment systems are often highly interconnected from an operational perspective. As described in greater detail in Part IV, one of the most common points at which the operation of these systems intersect is within the conventional banking system.

Payment systems are often held out as performing a number of important and socially useful economic functions. Professor Hal Scott, for example, argues that effective retail

15. Bruce Summers, *The Payment System in a Market Economy*, in *THE PAYMENT SYSTEM: DESIGN, MANAGEMENT, AND SUPERVISION* 1 (1994) (“The payment system, which consists of the set of rules, institutions, and technical mechanisms for the transfer of money . . .”); MARK MANNING ET AL., *THE ECONOMICS OF LARGE-VALUE PAYMENTS AND SETTLEMENTS* 3 (2009) (“[A]ny organized arrangement for transferring value between parties can be defined as a payment system.”); ANDREW HALDANE ET AL., *THE FUTURE OF PAYMENT SYSTEMS* (2007).

16. For a more detailed overview of each of these subcategories of wholesale payment systems, see ARMOUR ET AL., *supra* note 5, at ch. 18.

payment systems exhibit several key features. These features include: universality (i.e. the ability to transfer funds at both point of sale and remotely); ease of use (including widespread acceptance by merchants); certainty of payment (subject to some degree of payment reversibility for mistaken payments); liquidity; recordkeeping; safety and security; and financial inclusion.¹⁷ While often articulated in somewhat different terms, these same features have been identified by a number of other scholars and policymakers.¹⁸

Ultimately, this list of features can be distilled down to two core economic functions: *storage* and *liquidity*.¹⁹ The storage function has two components. The first component is the protection of customer funds from loss, theft, and destruction in the period preceding their use to make a payment (*custodial* storage). While a bank vault is perhaps the archetypal example of a mechanism for ensuring custodial storage, the idea that funds are physically “stored” in a bank or other financial institution is increasingly antiquated.²⁰ Instead, most custodial storage today takes place on the electronic accounting systems of these institutions. The second component is the safe and secure transfer of stored funds to third parties (*transactional* storage). Like custodial storage, an increasing proportion of transactional storage today takes place electronically in the form of debit and credit card transactions, standing orders, and other electronic fund transfers.²¹

All payment systems provide some form of custodial and transactional storage. These payment systems then combine this storage with the promise of liquidity. As explained by Hal Scott, liquidity in this context refers to “the ability of an asset to be used immediately and without delay to perform basic economic activities such as purchases of products and services and repayment of debt.”²² Where an institution within the payment system accepts cash or other equivalent assets in exchange for a claim against the institution,²³ liquidity also encompasses the ability of the customer to *convert* that claim back into cash or cash equivalents upon demand.²⁴ The hallmark of perfect liquidity is thus the ability of a party

17. See Hal Scott, *The Importance of the Retail Payment System* (Dec. 16, 2014), (unpublished manuscript) https://papers.ssrn.com/sol3/papers.cfm?abstract_id=2539150.

18. See, Summers, *supra* note 15, at 2–7; Charles Kahn & William Roberts, *The Economics of Payment Finality*, 87 FED. RES. BANK OF ATLANTA ECON. REV. (2002), https://www.frbatlanta.org/research/publications/economic-review/2002/q2/vol87no2_economics-of-payment-finality.aspx; *Fighting Poverty, Profitably: Transforming the Economics of Payments to Build Sustainable, Inclusive Financial Systems*, GATES FOUND. (Sept. 2013), <https://docs.gatesfoundation.org/documents/fighting%20poverty%20profitably%20full%20report.pdf>.

19. With the exception of financial inclusion, the achievement of which is not inherent in the performance of core storage and liquidity functions. A payment system can offer storage and liquidity on terms that still exclude the poor.

20. Economist Milton Friedman notably disliked the use of the word “storage” to characterize this function for precisely this reason; see MILTON FRIEDMAN & ANNA J. SCHWARTZ, *A MONETARY HISTORY OF THE UNITED STATES, 1867–1960* (1971) [hereinafter FRIEDMAN & SCHWARTZ, *MONETARY HISTORY*].

21. For an overview of payment trends in the United States, see BD. OF GOVERNORS OF THE FED. RESERVE SYS., *THE FEDERAL RESERVE PAYMENTS STUDY 2016* (Dec. 22, 2016), <https://www.federalreserve.gov/newsevents/press/other/2016-payments-study-20161222.pdf>.

22. Scott, *supra* note 17, at 40; see also Summers, *supra* note 15, at 2 (referring to this function as “timeliness”).

23. This will typically be the case for both mobile money platforms and proprietary P2P payment systems. See Part V. The position in relation to crypto-currency exchanges is more complex, as these institutions may be designed to serve as mere conduits for the transfer of currencies/crypto-currencies, such that the customer (rather than the exchange) is the (intended) owner of the crypto-currency held within the system.

24. Indeed, in many cases we would expect this convertibility to be a prerequisite to the willingness of third parties to accept the transfer of the claim on the institution as payment. Simultaneously, of course, it is also

to transfer or convert an asset rapidly and for full value.²⁵ Illiquidity, then, arises whenever a party experiences a delay in transferring or converting an asset or where transferring or converting that asset within a short timeframe requires the party to accept a price below its full value.

The simultaneous provision of storage and liquidity is the essence of what banks promise to their depositors. As we shall see, this same promise resides at the heart of the shadow payment system. Importantly, however, the combination of these core payment functions presents a fundamental legal and public policy challenge. This challenge stems from the treatment of assets stored within these payment systems in the event that one or more of the institutions through which the systems perform these functions enters into bankruptcy. The bankruptcy of an institution within the payment system will, in many cases, trigger the commencement of a formal bankruptcy process. While there is obviously significant variation in corporate bankruptcy law regimes around the world, two common features of these regimes are a *procedural rule* suspending enforcement action against assets held by the debtor²⁶ and a *substantive rule* under which unsecured creditors share in any subsequent distribution of the debtor's assets on a *pro rata* basis.²⁷ All other things being equal, we would expect the application of these procedural and substantive bankruptcy rules to have an impact on both the *timeframe* within which claim holders can expect to receive repayment and, insofar as they are treated as unsecured creditors, the *value* that they ultimately receive. Importantly, even customers who enjoy a proprietary interest in assets held by the debtor—who we might otherwise expect to escape the impact of the substantive bankruptcy rule—may suffer significant delays in accessing these assets during the bankruptcy process by operation of the procedural rule. In other words, the legal treatment of stored funds in the event of an institution's bankruptcy will have a direct impact on the credibility of its commitment to provide liquidity during periods of institutional stress.

In Parts IV and VI, respectively, we examine the legal and regulatory strategies utilized within both the conventional banking and shadow payment systems to address this fundamental challenge. First, however, we must seek to better understand why this fairly basic insight regarding the impact of corporate bankruptcy law on the credibility of a payment system's commitment to perform its core economic functions has been largely unexplored within the existing academic and policy literature. In our view, the answer stems at least in part from the fact that the development of modern payments systems in many jurisdictions has been deeply intertwined with the development of the conventional banking system. In order to lay the groundwork for our subsequent analysis, we therefore begin by tracing the parallel development of modern banking and payment systems.

possible to imagine a “cashless” society in which all payments were made electronically within the payment system itself. For a description of the potential benefits of a (near) cashless payment system and a proposal for how to go about achieving it, see KENNETH S. ROGOFF, *THE CURSE OF CASH* (2016).

25. For an in-depth discussion of liquidity more generally, see Markus Brunnermeier & Lasse Pedersen, *Market Liquidity and Funding Liquidity* (Nat'l Bureau of Econ. Research, Working Paper No. 12939, 2007), <https://www.nber.org/papers/w12939.pdf>.

26. PHILIP WOOD, *PRINCIPLES OF INTERNATIONAL INSOLVENCY* § 9–051 (2d ed. 2007). The inclusion of secured creditors within the stay may be necessary to facilitate a value-maximising deployment of the debtor's assets; see THOMAS H. JACKSON, *THE LOGIC AND LIMITS OF BANKRUPTCY LAW* 182–83 (1986).

27. Except to the extent that they enjoy some priority or preferential status under the applicable law; WOOD, *supra* note 26, at § 29–039.

III. THE HISTORICAL DEVELOPMENT OF BANK-BASED PAYMENT SYSTEMS

The history of payment systems in the United States, the United Kingdom, and Continental Europe is the history of banking and banks. The deeply intertwined development of these systems has meant that scholars and policymakers have been able to effectively disregard the fundamental legal and policy challenge described in Part II, safe in the knowledge that prudential regulatory strategies designed to enhance the stability of banks would also necessarily enhance the credibility of a bank's commitment to perform its core payment functions. This Part traces the parallel development of these systems. In the process, it not only provides us with the historical backdrop to the recent unbundling of the conventional banking and payment systems, but also an explanation for why we have yet to fully grapple with the risks stemming from the emergence and growth of the shadow payment system.

The origin of modern payment systems is often traced back to the development of the Italian banking system in the early twelfth century.²⁸ Notarial records dating from 1200 describe Genoese bankers as enabling their wealthy clients to make payments by means of book transfers on the accounts of the bank.²⁹ A merchant could thus make payment by directing his bank to debit his account and credit that of his agents, suppliers, or other creditors—provided, of course, that these creditors held an account at the same bank. These records also suggest the existence of relatively informal *interbank* arrangements facilitating payments between accounts held at different banks.³⁰ This same basic system of accounts, book transfers, and informal interbank payment arrangements was subsequently adopted by the Venetian banking system of the thirteenth through fifteenth centuries,³¹ and eventually spread throughout much of Western Europe.³²

In reality, of course, the institutions of medieval Continental finance were not generally known as “banks.” Nor in many cases did these institutions perform all of the functions that we today associate with the business of “banking.” Instead, medieval financiers broadly fell into two categories: merchant bankers and money changers.³³ Merchant bankers were initially large commodity merchants—first of Italian and later German origin³⁴—with extensive correspondent networks throughout Europe. Amongst their many important functions, these bankers combined lending and remittance services: extending credit in one geographic location and currency with the expectation that it would

28. See BENJAMIN GEVA, *THE PAYMENT ORDER OF ANTIQUITY AND THE MIDDLE AGES: A LEGAL HISTORY* 354 (2011); Robert Lopez, *The Dawn Of Medieval Banking*, in *THE DAWN OF MEDIEVAL BANKING* (UCLA ed., 1979); Jean-François Bergier, *From the Fifteenth Century in Italy to the Sixteenth Century in Germany: A New Banking Concept?*, in *THE DAWN OF MEDIEVAL BANKING* (UCLA ed., 1979). At the same time, there is a strong case to be made that these practices may have been imported from the Middle East and Asia.

29. See ROBERT REYNOLDS, *A Business Affair in Genoa in the Year 1200: Banking, Bookkeeping, a Broker and a Lawsuit*, in *STUDI DI STORIA E DIRITTO IN ONORE DI ENRICO BESTA* (1938).

30. *Id.*; GEVA, *supra* note 28, at 359. As described in greater detail below, these interbank payments were essentially handled through accounts that bankers held with one another.

31. See *id.*; Reinhold Mueller, *The Role of Bank Money in Venice, 1300-1500*, 3 *STUDI VENEZIANI* 47 (1979).

32. GEVA, *supra* note 28, at 359.

33. *Id.* at 355. A third category—pawnbrokers—played little or no role in the payment system. In practice, these categories were not mutually exclusive, with many institutions acting as both money changers and merchant banks. *Id.*

34. See Bergier, *supra* note 28.

be repaid in another location and in another currency.³⁵

The principal instrument through which these services were provided was the *cambium* or letter of payment. Letters of payment were a written acknowledgement by a borrower of funds received, and a corresponding direction to the borrower's foreign agent to repay these funds to the lender's foreign agent at a specified time, location, and denominated currency. The borrowed funds were typically used by the borrower to purchase goods locally that were then destined for export and sale by the borrower's foreign agent at the location stated in the letter of payment. Upon receipt, the lender's foreign agent would present the letter to the borrower's foreign agent for acceptance and, upon maturity, repayment.³⁶ The borrower's agent would then discharge the repayment obligation out of the proceeds generated from the sale of the goods. The lender's agent could then remit the repaid amounts back to the lender by entering into a *reverse* letter of payment with a local merchant looking to purchase goods for export to the location at which the original lender was resident. Merchant bankers could also settle outstanding obligations at *exchange* or *payment* fairs often held in parallel with the Champagne and other fairs at which the goods were sold and, later, at commercial centers such as Florence, Bruges, Geneva, and London.³⁷ In effect, medieval merchant bankers combined trade financing, foreign exchange, and payment services.³⁸ In this and other important respects, merchant bankers were thus the forerunners of modern investment banks.³⁹ The institutional arrangements through which merchant banks provided these services—namely, letters of payment and exchange fairs—were also the precursors of modern bills of exchange and formal interbank clearing and settlement systems.⁴⁰

Medieval money changers, in contrast, were engaged in the business of accepting deposits and investing deposited funds.⁴¹ As part of the deposit-taking process, money changers would assess the quality—i.e. the authenticity and metal content—of deposited coins and other currency and then credit the deposit holder's account with an amount based on their assessment of its intrinsic value.⁴² Money changers then enabled deposit holders to execute book transfers from their accounts to those of other deposit holders.⁴³ Book transfers between deposit holders with accounts at different money changers, meanwhile, were settled through networks of accounts that money changers held with other money changers.⁴⁴ Medieval money changers thus performed an important custodial and transactional storage function in an age where coins and other physical payment instruments were vulnerable to counterfeiting and debasement.

Following several high-profile scandals involving money changers during the sixteenth century, public confidence in these institutions began to ebb, and authorities in

35. GEVA, *supra* note 28, at 356.

36. *Id.* at 379–80.

37. *Id.* at 382.

38. *Id.* at 356.

39. See generally ALAN MORRISON & BILL WILHELM, INVESTMENT BANKING: INSTITUTIONS, POLITICS, AND LAW (2007) (describing how these medieval institutions evolved into modern day investment banks).

40. See GEVA, *supra* note 28, at 387–417 for a more in-depth discussion of the historical development and legal issues surrounding both letters of payment and bills of exchange.

41. *Id.* at 356.

42. Mueller, *supra* note 31, at 48.

43. For this reason, money changers were often called “transfer bankers.” GEVA, *supra* note 28, at 356.

44. *Id.* at 359–61.

many European countries intervened in the marketplace.⁴⁵ In many cases, this intervention involved the creation of a public bank to provide deposit and other payment services. One of the first such public banks was the Bank of Amsterdam. The Bank of Amsterdam was created in 1609 with a public guarantee from the City of Amsterdam.⁴⁶ Coins and bullion deposited in the Bank were credited to the account of the depositor in *banco florin*—a unit of account representing the value of a standardized light coin.⁴⁷ The Bank would then facilitate book transfers between florin-denominated accounts, with settlement taking place daily and on a multilateral basis.⁴⁸ Similar public banks were established throughout western Europe during the sixteenth and seventeenth centuries, gradually squeezing many private money changers out of the marketplace.⁴⁹ These public banks would play an important role in the continental payment system until the end of the eighteenth century, before being supplanted by a series of institutional innovations that would together lay the foundations for the modern payment system.

If continental Europe is the birthplace of the modern bank, the United Kingdom is the birthplace of the modern banking system. The origins of this system can be traced back to the activities of a small community of London goldsmiths. Prior to the English Civil War (1642–51), the business of these goldsmiths consisted mainly of the manufacture of gold and silver plate and jewelry, along with the purchase and sale of precious jewels.⁵⁰ In this capacity, goldsmiths were often called upon to assess the purity of gold and silver coins. During the Civil War, the business of goldsmiths expanded to include the storage of this coinage for safekeeping.⁵¹ By the late seventeenth century, the role of goldsmiths in providing for the safety and security of deposited funds had evolved into one in which they enjoyed full legal authority to use these funds to extend credit to the public.⁵² This small community of London goldsmiths had thus stumbled upon the business model that would eventually become synonymous with the business of banking: combining deposit-taking with the extension of loans to businesses and households.

This *Goldsmiths' system*, as it came to be known, combined several features of the Continental system of merchant banks and money changers. First, as just described, goldsmiths accepted deposits of coins and precious metals. They were also engaged in the business of discounting bills of exchange and promissory notes.⁵³ Goldsmiths would then

45. Raymond de Roover, *New Interpretations of the History of Banking*, in BUSINESS, BANKING AND ECONOMIC THOUGHT IN LATE MEDIEVAL AND EARLY MODERN EUROPE: SELECTED CASE STUDIES OF RAYMOND DE ROOVER 219 (Julius Kirshner ed., 1974) [hereinafter de Roover, *New Interpretations*]. Public authorities also intervened out of concerns that the deposit-taking activities of money changers threatened the integrity of ducal mints and coins. GEVA, *supra* note 28, at 365.

46. The creation of the Bank of Amsterdam was accompanied by a prohibition against money changers; GEVA, *supra* note 28, at 364. While the prohibition was lifted in 1621, money changers were henceforth required to be licensed and maintain accounts with the Bank. *Id.*

47. *Id.* at 366.

48. *Id.* at 367.

49. de Roover, *New Interpretations*, *supra* note 45, at 223.

50. J. MILNES HOLDEN, THE HISTORY OF NEGOTIABLE INSTRUMENTS IN ENGLISH LAW 71 (1955); GEVA, *supra* note 28, at 473.

51. JAMES ROGERS, THE EARLY HISTORY OF THE LAW OF BILLS AND NOTES: A STUDY OF THE ORIGINS OF ANGLO-AMERICAN COMMERCIAL LAW 119 (1995); GEVA, *supra* note 28, at 474.

52. RICHARD RICHARDS, THE EARLY HISTORY OF BANKING IN ENGLAND 37 (1965); GEVA, *supra* note 28, at 475.

53. Bills of exchange evolved out of the letters of payment utilized by medieval Continental merchant bankers. See generally RAYMOND DE ROOVER, L'ÉVOLUTION DE LA LETTRE DE CHANGE: XIVE-XVIIIÈ SIÈCLES

issue receipts—or *notes*—to their depositors as documentary evidence of their deposits. These bank notes were payable either to the payee or to the bearer of the receipt.⁵⁴ In both cases, the notes represented the goldsmiths' undertaking to repay deposited funds on demand when presented with the receipt.⁵⁵ Depositors could also request drafts in any amount up to the full value of their deposit made payable to either the bearer or an identified payee. These drafts were the predecessors of modern cheques.⁵⁶ Both bank notes and cheques were payment instruments enabling the transfer of payment from debtors to creditors. In the case of bank notes, these instruments also came to possess a relatively high degree of transferability, thus enabling the holder of a note to exchange it for other goods and services. Final settlement would then take place when the provider of the goods and services, or a subsequent transferee, returned the note to the issuing bank—in effect demanding that the bank honor its obligation to deliver the deposited funds. These privately-issued bank notes were the precursor to modern fiat currency issued by central banks.⁵⁷

A second important feature of the Goldsmiths' system was its network of correspondent relationships facilitating the clearing and settlement of payments *between* banks.⁵⁸ Initially, this network consisted of little more than individual banks maintaining a record of cheques drawn and cashed with other banks.⁵⁹ Settlement would then take place periodically on a bilateral basis, with the net debtor paying the net creditor in coins or other specie.⁶⁰ Over time, however, this network took on a more formal institutional structure.⁶¹ In the early 1770s, a number of large London banks rented a room on Lombard Street in the City of London where their clerks would meet to clear and settle payments.⁶² By 1775, clearing and settlement were taking place on Lombard Street on a daily basis.⁶³ In 1841, the bilateral system was replaced with a multilateral one, thereby reducing the overall volume and size of payments.⁶⁴ And in 1888, member banks officially established the London Clearing House.⁶⁵ These and other developments would be replicated in New

(Armand Colin ed., 1953); GEVA, *supra* note 28, at 369–418. The Goldsmiths' system enabled the payee of a bill to obtain finance by endorsing the bill in exchange for its present value. GEVA, *supra* note 28, at 475.

54. *Id.* at 476.

55. *Id.*

56. *Id.* at 476–77; HOLDEN, *supra* note 50, at 206–10.

57. The transferability of bank notes was initially contentious as a matter of law. On the one hand, courts often took notice of the fact that these notes “could pass freely from hand to hand in payment of debts.” *Tassell & Lee v. Lewis* (1701) 91 Eng. Rep. 1397–98 (KB). On the other, the application of the “conditional payment” principle under English law meant that these notes were not in all cases accepted as final payment of a debt. *Ward v. Evans* (1702) 92 Eng. Rep. 120 (KB). This problem would not be fully resolved until the creation of the Bank of England (see Quinn, *infra* note 58).

58. See generally Stephen Quinn, *Balances and Goldsmith-Bankers: The Co-ordination and Control of Inter-Banker Debt Clearing in the Seventeenth-Century*, in *GOLDSMITHS, SILVERSMITHS, AND BANKERS* 53–76 (David Mitchell ed., 1995).

59. GEVA, *supra* note 28, at 494.

60. *Id.*

61. See WILLIAM LAWSON, *THE HISTORY OF BANKING* 215 (2d ed. 1885) (providing a more detailed description of the transition to a more formal structure); PHILLIP MATTHEWS, *THE BANKERS' CLEARING HOUSE: WHAT IT IS AND WHAT IT DOES* 9 (Pitman & Sons ed. 1921); *id.* at 494–95.

62. GEVA, *supra* note 28, at 495.

63. *Id.*

64. *Id.*

65. The London Clearing House survives to this day as LCH, although it no longer serves as a cheque clearing and settlement system. LCH, <http://www.lchclearmetch.com> (last visited Feb. 3, 2018).

York, Paris, and other financial centers over the course of the nineteenth century.⁶⁶

The third, and in some respects most important, institutional innovation of the Goldsmiths' system was the creation of what was arguably the world's first modern central bank.⁶⁷ Established in 1694, the Bank of England was originally incorporated by statute in order to facilitate the extension of a loan to the government for the purpose of financing its war against France.⁶⁸ By the end of the seventeenth century, the Bank of England was the United Kingdom's only joint-stock bank and had been appointed as banker to the government.⁶⁹ By the early eighteenth century, it had also been appointed as the principal agent for the issuance and circulation of short-term government securities.⁷⁰ The Bank modeled itself on the operations of the goldsmiths: accepting deposits of coin and other specie and issuing notes to depositors. Given its status as a joint-stock bank and close relationship with the government, however, Bank of England notes gradually overtook Goldsmiths' notes as a source of paper money.⁷¹

The Bank of England also came to play a central role within the evolving clearing and settlement system. By 1770, Bank of England notes had supplanted coin and other specie as the preferred settlement asset within the interbank clearing and settlement network.⁷² Beginning in May of 1854, settlement of payments through what would become the London Clearing House took place via the accounts of member banks held with the Bank of England.⁷³ By the end of the nineteenth century, the Bank of England was thus firmly entrenched at the heart of the United Kingdom's money, banking, and payments systems.

The Goldsmiths' model was replicated across Western Europe, largely supplanting the system of public banks such as the Bank of Amsterdam. This model also had a significant influence on the development of banking and payment systems in The New World. Elements of the Goldsmiths' model appeared in the United States as early as 1690.⁷⁴ These first proto-banks issued promissory notes to depositors, typically secured against real property or precious metals.⁷⁵ As in the United Kingdom, these notes ultimately came to possess a degree of transferability and circulated widely as a form of paper money (although typically at a discount to their par value).⁷⁶ The first conventional

66. GEVA, *supra* note 28, at 496.

67. While the Sveriges Riksbank is older, its operations did not initially resemble those of a modern central bank. For example, the Riksbank was not permitted to issue notes until 1701.

68. RICHARDS, *supra* note 52, at 132–88; HOLDEN, *supra* note 50, at 87–88.

69. GEVA, *supra* note 28, at 486.

70. *Id.*

71. *Id.* at 485; HOLDEN, *supra* note 50, at 87–88. The Bank of England's advantage was compounded by the fact that the ability of private bankers to issue notes was temporarily revoked between 1708 and 1826 and then permanently revoked in 1844; GEVA, *supra* note 28, at 489. The last private note issuing firm lost its power to issue notes in 1921; *Id.* at 490. Bank of England notes were made legal tender under the Bank of England Act, 1833, 3 & 4 Will. IV c. 98 § 6. This was reaffirmed under the Currency and Bank Notes Act, 1954, 2 & 3 Eliz. II, c. 12.

72. GEVA, *supra* note 28, at 495.

73. *Id.* The clearinghouse would then distribute amounts to individual creditors by way of a cheques drawn on its account at the Bank of England.

74. William Sumner, *A History of Banking in Leading Nations*, 1 J. COM. & COM. BULL. 4 (1896) (citing Trumbull Proc. Am. Antiq. Soc. 1884).

75. *Id.*

76. For a more detailed description of these systems, see Charles Calomiris & Larry Schweikart, *The Panic of 1857: Origins, Transmission and Containment*, 51 J. ECON. HIST. 807 (1991); Gary Gorton, *Free Banking, Wildcat Banking and the Market for Bank Notes* (Wharton Fin. Dep't., Working Paper, 1989); Charles Calomiris

deposit-taking, note-issuing bank was likely the Bank of Pennsylvania, created in 1780 to raise finance for the American Revolutionary War (1775–83).⁷⁷ This was quickly followed by the creation of the first Bank of North America, which received the first federal bank charter on May 26, 1781.⁷⁸ Robert Morris, the United States Superintendent of Finance at the time, advocated for the creation of the Bank of North America on the grounds that it would help stimulate investment in the real economy and, thereby, enhance government tax revenues.⁷⁹ Future Secretary of the United States Treasury Alexander Hamilton, meanwhile, saw the Bank of North America as an opportunity to create what he described as “a sufficient medium” of exchange.⁸⁰ Put differently, Hamilton sought to develop a banking system in order to support the development of a more robust system of money and payments.

As Hamilton had hoped, federal and state chartered banks came to play an important role in the nascent payment system. The Suffolk banking system offers an illustrative example. Beginning in the early nineteenth century, notes issued by rural “country” banks in New England circulated as currency in Boston alongside notes issued by local “city” banks.⁸¹ Given the information, transportation, and other costs of redeeming these country notes, they predictably circulated at a discount to their par value.⁸² Eventually, many Boston banks simply refused to accept these notes. This presented a problem for Boston merchants, who accepted country notes in the course of their trade but were then unable to deposit them in their local Boston bank. Merchants were instead forced to exchange these country notes for city notes through brokers, often at a considerable discount.⁸³

Established in 1818, the Suffolk Bank was created by a group of influential Boston merchants in order to address this problem.⁸⁴ The Suffolk Bank committed to purchase the notes issued by country banks at par. In exchange, country banks were required to maintain permanent interest-free deposits with the bank, which in turn sorted deposited notes and credited and debited the accounts of its member banks. Member banks were also required to keep specie—gold and silver—with the Suffolk Bank and subjected to very basic prudential supervision.⁸⁵ The creation of the bank had the desired effect: allowing city and country notes to enjoy par convertibility within New England.⁸⁶ By 1838, over 300 New

& Larry Schweikart, *Was the South Backward? North-South Differences in Antebellum Banking During Crisis and Normalcy*, (Fed. Reserve Bank of Chicago, Working Paper, 1988).

77. Although, unlike conventional banks, the Bank of Pennsylvania was incorporated with a limited life; Sumner, *supra* note 74, at 14.

78. *Id.* at 17. Sumner refers to the Bank of North America as the first “specie paying, convertible bank note bank” in the United States.

79. *Id.* at 15.

80. See Letter from Alexander Hamilton to Robert Morris 12 (Apr. 30, 1781), <https://founders.archives.gov/documents/Hamilton/01-02-02-1167>.

81. See GEORGE TRIVOLI, *THE SUFFOLK BANK: A STUDY OF A FREE-ENTERPRISE CLEARING SYSTEM* 6 (1979). Similar systems existed in New York, Philadelphia, and other important commercial centers.

82. *Id.*

83. *Id.*

84. *Id.* at 10.

85. David Whitney, for example, documents several cases where the Suffolk Bank intervened to warn member banks that they were extending too much credit or taking on too much debt. See DAVID WHITNEY, *THE SUFFOLK BANK* 35–38 (1878).

86. See Charles Calomiris & Charles Kahn, *The Efficiency of Self-Regulated Payment Systems: Learning from the Suffolk System*, 28 J.MONEY, CREDIT & BANKING 766, 780 (1996); Gorton, *supra* note 76.

England banks redeemed their notes through the Suffolk Bank.⁸⁷ During this same period, a number of other private interbank clearing and settlement systems emerged elsewhere in the United States.⁸⁸

The adoption of the National Banking Act, 1863⁸⁹ represented the beginning of the end of this system of privately-issued bank notes.⁹⁰ The principal objective of the National Bank Act and subsequent legislation implementing what came to be known as the National Banking System was to substitute private bank notes with a national currency “licensed, manufactured, and guaranteed by the federal government”⁹¹ and issued by national banks. National banks were licensed to issue a given quantity of notes backed by the full faith and credit of the United States, while state and local bank notes were subject to a 10% tax.⁹² The National Bank Act thus effectively unbundled the activities of bank lending from note issuance.⁹³ Henceforth, the principal payment liabilities of banks took the form of chequing accounts, with private interbank clearing and settlement systems emerging to facilitate this form of payment instrument.⁹⁴ The shift to the Goldsmiths’ system would be completed with the adoption of the Federal Reserve Act, 1913,⁹⁵ establishing the Federal Reserve System as the central bank of the United States, conferring upon it legal authority over note issuance, and thus firmly entrenching it at the apex of the banking and payment system. While the financial systems in the United States, United Kingdom, and elsewhere would continue to evolve over the course of the twentieth century, the high level of operational integration between banking and payment systems would remain essentially intact.

The key insight from this brief historical overview is that the emergence and development of the payment systems in the United States, the United Kingdom, and Continental Europe have been inextricably intertwined with the development of banks. Scholars and policymakers examining the functions and operations of modern payment systems have thus often taken for granted the fact that these systems are embedded within the unique institutional and regulatory environment that characterizes modern banking systems. In the next section, we describe how these deep historical connections are reflected in the current structure of payment systems in these jurisdictions. We also describe how deposit guarantee schemes, emergency liquidity assistance programs, special resolution regimes, and other prudential regulatory strategies have a direct and significant impact on the ability of bank-based payment systems to perform their important payment

87. TRIVOLI, *supra* note 81, at 11. The efficiency of the Suffolk banking system has been the source of considerable debate. Some viewed it as a powerful rent-seeking monopoly, others as lending stability to an otherwise chaotic system, thereby promoting greater trade. For a synthesis of this debate, see Calomiris & Kahn, *supra* note 86.

88. This included systems in Indiana, Ohio, Iowa, and the Antebellum South, although the institutional features and functions of these systems varied widely. See Calomiris & Kahn, *supra* note 86, at 4–5; Calomiris & Schweikart, *supra* note 76.

89. 12 U.S.C. § 38 (1874).

90. For a detailed history of the composition of the United States’ money supply during the relevant period, see FRIEDMAN & SCHWARTZ, *MONETARY HISTORY*, *supra* note 20.

91. Calomiris & Kahn, *supra* note 86, at 5.

92. For a contemporaneous discussion of the impact of the establishment of the National Banking System, see SIMON NEWCOMB, *A CRITICAL EXAMINATION OF OUR FINANCIAL POLICY DURING THE SOUTHERN REBELLION 199–222* (1865). See also FRIEDMAN & SCHWARTZ, *MONETARY HISTORY*, *supra* note 20, at 18–19.

93. Calomiris & Kahn, *supra* note 86.

94. *Id.*

95. 12 U.S.C. §§ 221–522 (1913).

functions. This then enables us to turn our attention in Part V to the emerging shadow payment system: its operations, current legal and regulatory treatment, and the potential risks arising from the combination of storage and liquidity functions outside the perimeter of the regulated banking system.

IV. THE STRUCTURE OF MODERN BANK-BASED PAYMENT SYSTEMS

Reflecting their historical roots in the development of the conventional banking system, the structure of modern payment systems in most jurisdictions revolves around three core institutions. The first institution is a central bank such as the Federal Reserve, Bank of England, or European Central Bank. These central banks are endowed with the exclusive authority to issue liabilities—bank notes, coins, and central bank reserves (often referred to as “base”⁹⁶ money)—that serve as the ultimate settlement asset within the domestic banking and payment system. Deposit-taking banks then hold accounts with the central bank, thereby enabling interbank payments to be cleared and settled via book transfers on its accounts denominated in base money. As explained by Bruce Summers: “The central bank is the logical final settlement authority because of its unique status as an institution that does not pose credit or liquidity risks to its accountholders.”⁹⁷

Residing directly beneath the central bank in most modern payment systems is a network of private deposit-taking banks. As described above, some or all of these banks will typically maintain accounts directly with the central bank for settlement purposes. Others, however, may elect to settle interbank payments through correspondent accounts held with banks that maintain an account with the central bank. Banks play several related roles within these “tiered” banking systems. First, banks provide the basic account architecture through which businesses, households, and governments make and receive most payments. Second, they facilitate “in bank” payments from payors to payees with accounts at the same bank.⁹⁸ Where payors and payees hold accounts at different banks, meanwhile, banks can clear and settle payments through the correspondent accounts they hold with one another.⁹⁹ Third, banks provide businesses and households with various instruments for making non-cash payments. These payment instruments include debt and credit cards, cheques, bank drafts, and various forms of electronic fund transfer.

Technological advances over the course of the last several decades have resulted in an enormous increase in the volume of interbank payments.¹⁰⁰ As the volume of payments has increased, so too have the demands on the technological and administrative infrastructure of both central banks and private bank correspondent networks. As a result, a large proportion of interbank payments are now cleared through automated clearinghouses before being routed to a central bank or private settlement agent for final

96. See N. GREGORY MANKIW, *MACROECONOMICS*, (9th ed., 2015). This “base” money can be contrasted with “near” money, which includes the deposit liabilities of conventional banks; *id.*

97. Summers, *supra* note 15, at 5.

98. Ultimately, this form of payment is little more than a series of book transfers on the bank’s internal accounting system.

99. Although, as described below, institutionally separate clearing and settlement systems have also developed to facilitate interbank transfers.

100. For annual payment statistics collected by the CPMI, see *Payment, Clearing and Settlement Statistics*, BANK INT’L SETTLEMENTS, https://www.bis.org/statistics/payment_stats.htm?m=3|16|385 (last visited Mar. 20, 2018).

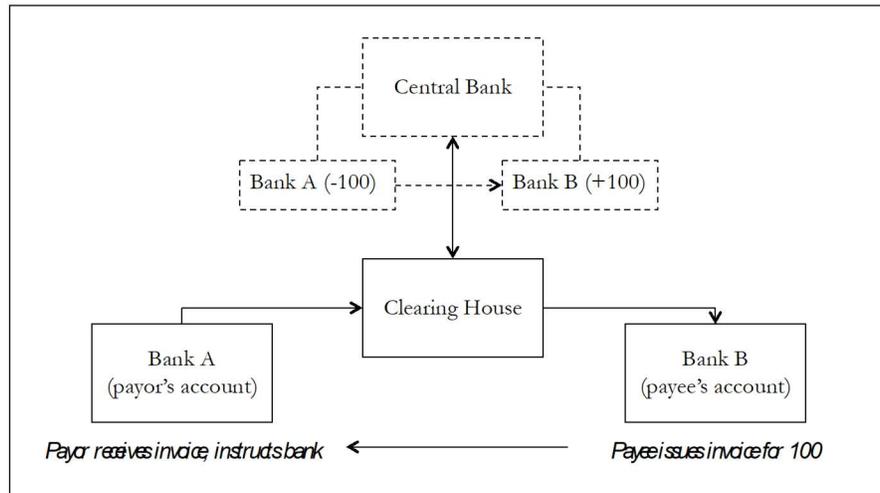
settlement.¹⁰¹ In these systems, banks periodically transmit batches of payment instructions to a clearinghouse which, after sorting them and aggregating payments destined for the same bank, then transmit information to each participating bank regarding the details of payments to be made to their accountholders. As part of this process, the clearinghouse may also calculate and transmit net positions to the central bank or private settlement agent. Important clearinghouses include the Federal Reserve Wire Network (Fedwire), Clearing House Interbank Payments System (CHIPS), and Automated Clearing House (ACH) in the United States, the Clearing House Automated Payment System (CHAPS) and Bankers' Automated Clearing Systems (BACS) in the United Kingdom, and TARGET2 in the European Union.

Figure 1 depicts the flow of funds within a stylized bank-based payment system, with a central bank residing at the apex of a network of deposit-taking banks linked by an interbank clearing and settlement system. In this example, the accountholder at Bank A (the payor) receives an invoice for \$100 and instructs her bank to pay an accountholder at Bank B (the payee).¹⁰² This instruction is communicated to the clearinghouse, which aggregates these payment instructions and communicates the net position as between Bank A and Bank B to the central bank. For the sake of simplicity, we assume that the \$100 is the only payment between accountholders at Bank A and Bank B over the relevant period. As both Bank A and Bank B in our example hold accounts at the central bank, the \$100 is transferred from Bank A to Bank B through their respective accounts held with the central bank. The transaction is then completed when Bank A debits \$100 from the payor's account and Bank B credits the payee's account the corresponding amount.

Figure 1: The Stylized Structure of a Modern Payment System

101. Likewise, the increasing volume of payments cleared through clearinghouses has helped spur technological advancements in clearinghouse design. Perhaps most importantly, it has helped spur the shift from deferred net settlement to real-time gross settlement (RGTS) and, more recently, to hybrid RGTS systems; see Morten Bech & Bart Hobjin, *Technology Diffusion within Central Banking: The Case of Real-Time Gross Settlement*, 3 INT'L J. CENT. BANKING 147 (2007) (discussing the increased use of RGTS systems).

102. This is a prototypical *push* payment. This form of payment can be contrasted with so-called *pull* payments initiated by the payee.



Viewed from this perspective, banks play a pivotal role within most modern payment systems: providing businesses and households with both custodial and transactional storage and liquidity. Indeed, in a very real way, a bank account has historically been a prerequisite to gaining access to the payment system in many jurisdictions.

Crucially, the reliance of banks on *short-term, liquid* liabilities (e.g., deposits) to finance the acquisition and holding of *longer-term, potentially illiquid* loans and other financial assets renders these institutions vulnerable to destabilizing runs by depositors and other short-term creditors.¹⁰³ This vulnerability is typically framed in one of two ways. The first views runs as a multiple equilibrium (or coordination) problem amongst short-term creditors.¹⁰⁴ Pursuant to this account, each creditor's decision about whether to run is a function not only of their demand for liquidity and evaluation of the issuer's creditworthiness but also—and crucially—their subjective perception of whether *other creditors* are likely to run.¹⁰⁵ The second views runs as a product of the realization by short-term creditors that assets that they previously believed to represent reliable stores of nominal value—or *moneyness*¹⁰⁶—are in fact sensitive to the revelation of new information about the creditworthiness of the issuer, the quality of any underlying collateral, or other variables.¹⁰⁷ Pursuant to this second account, rather than investing the

103. See Diamond & Dybvig, *supra* note 3; Allen et al., *supra* note 3; Gorton & Metrick, *supra* note 3. Notably, “liquidity” in this context—often referred to as “funding” liquidity—is different than that typically used in the payment context. In the context of a liquidity mismatch, funding liquidity refers to the ability of a financial institution to obtain funding for a given portfolio of assets. See Brunnermeier & Pedersen, *supra* note 25.

104. See, e.g., Diamond & Dybvig, *supra* note 3.

105. *Id.*

106. MILTON FRIEDMAN & ANNA SCHWARTZ, MONETARY STATISTICS OF THE UNITED STATES: ESTIMATES, SOURCES, METHODS, AND DATA 151–52 (1970); JOHN HICKS, VALUE AND CAPITAL 163 (2nd ed. 1946).

107. See, e.g., GARY GORTON, SLAPPED IN THE FACE BY THE INVISIBLE HAND: THE PANIC OF 2007 (2010); Bengt Holmstrom, *Understanding the Role of Debt in the Financial System* (Bank for Int'l Settlements, Working Paper No. 479, 2015), <https://www.bis.org/publ/work479.pdf>. The key difference between this and multiple equilibrium views of run-like behavior is the absence of a coordination problem, i.e. creditors in this second view do not switch in anticipation of the decisions of other creditors.

time and energy necessary to incorporate this new information into the price of these assets, creditors may simply prefer to shift to less informationally sensitive substitutes that, in effect, possess a higher degree of moneyiness.¹⁰⁸

The prudential regulatory regimes governing banks in most jurisdictions include a range of strategies designed to minimize the probability and potential impact of institutional instability stemming from this mismatch between a bank's short-term, liquid liabilities and its longer term, illiquid investments. Three strategies in particular stand out.¹⁰⁹ The first is *emergency liquidity assistance*. Emergency liquidity assistance—or *lender of last resort*—facilities exist as a backstop for banks that find themselves unable to raise capital on private debt markets. Following Bagehot's dictum, these facilities empower central banks to extend secured loans to solvent but illiquid banks in order to enable these institutions to continue to meet their short-term liabilities to depositors and other creditors during periods of institutional or broader financial instability.¹¹⁰ These programs typically enable banks to shift relatively illiquid loans and other assets to the central bank in exchange for more liquid assets, such as government securities.¹¹¹ These securities can then be sold into the market to raise cash for the purposes of funding the bank's ongoing liabilities—including, importantly, its liabilities to depositors.

The second strategy is *deposit insurance*. Deposit guarantee schemes come in a number of different shapes and sizes. The basic strategy is to have a third party guarantee a pre-determined fraction of depositors' funds in the event of bank failure. This third party thus effectively steps into the shoes of the bank, honoring the bank's commitment to provide depositors with both storage and liquidity during periods of institutional stress.¹¹² In order to make this commitment credible, the third party guarantee is typically provided by the government in the jurisdiction in which the bank is established through institutions such as the U.S. Federal Deposit Insurance Corporation (FDIC). To make this commitment truly effective, a deposit guarantee scheme must also commit to pay depositors on a timely basis—ideally within a matter of days.¹¹³

The third strategy is the creation of *special bankruptcy or resolution regimes* for failing banks. Whereas emergency liquidity assistance facilities are designed to support

108. *Id.*

109. While not discussed in any detail here, central banks may also provide intra-day and other liquidity assistance to clearinghouses. See generally ARMOUR ET AL., *supra* note 5, at ch. 18.

110. See WALTER BAGEHOT, LOMBARD STREET: A DESCRIPTION OF THE MONEY MARKET 56 (1873) (discussing periods of internal panic and external demand on the money market). Bagehot's dictum also prescribes that this lending be extended at a penalty rate of interest and against adequate collateral. *Id.* at 57. The mechanics of these facilities vary widely in practice. For a brief history of the development of these facilities, see generally Thomas Humphrey, *Lender of Last Resort: The Concept in History*, FED. RES. BANK OF RICHMOND ECON. REV. (1989) (outlining the third prong of the theory of the lender of last resort: accommodating sound but temporarily illiquid institutions); Mark Carlson & David Wheelock, *The Lender of Last Resort: Lessons from the Fed's First 100 Years* (Fed. Reserve Bank of St. Louis, Working Paper No. 2012-056B, 2013) (highlighting some challenges that face a lender of last resort); ROSA LASTRA, INTERNATIONAL FINANCIAL AND MONETARY LAW §§ 4.08-4.36 (2d ed. 2015) (explaining public international law and the role of central banks alongside other institutions).

111. The central bank can also simply credit new central bank reserves to the account(s) held by the relevant bank(s) with the central bank.

112. The third party then steps into the shoes of the depositor in order to seek redress from the estate of the bank.

113. In this very important respect, some deposit guarantee schemes are more effective than others. For a comparison of the pre-crisis schemes in the United States and United Kingdom, for example, see ARMOUR ET AL., *supra* note 5, at 316-19.

solvent but illiquid banks, special resolution regimes are designed to restructure or wind down the operations of banks that are at the risk of crossing—or have already crossed—over the threshold into bankruptcy.¹¹⁴ Special resolution regimes provide bank regulators with powerful tools in pursuit of this objective. These tools typically include the ability to write-down specified bank liabilities, convert a bank's outstanding debt into equity, and transfer some or all of a bank's assets to a public sector bridge bank or private sector purchaser. Armed with these tools, the expectation is that regulators will trigger the resolution process after the close of business on Friday, with the restructured bank then able to open its doors for business as usual on Monday morning. Importantly, one of the principal rationales underpinning the introduction of special resolution regimes has been to ensure that banks can continue to perform their core payment functions during the resolution process.¹¹⁵

The combination of emergency liquidity assistance facilities, deposit guarantee schemes, and special resolution regimes enable banks to continue to perform their socially useful storage, liquidity, and other functions in a way that the application of corporate bankruptcy law would not generally permit. This extraordinary treatment—not generally available to other commercial enterprises—is typically justified on the basis of the unique vulnerability of bank balance sheets to destabilizing runs, the externalities associated with bank failure, and the risk that conventional bankruptcy proceedings may transmit or magnify financial shocks.¹¹⁶ Importantly, it is also justified on the basis that these strategies help ensure the smooth and efficient operation of bank-based payment systems during periods of institutional or systemic distress.¹¹⁷ This leads inexorably to the question: what happens when institutions provide core payment functions outside of the unique legal and regulatory environment imposed on conventional deposit-taking banks? It is to this important question that we now turn.

V. THE EMERGENCE AND RISKS OF THE SHADOW PAYMENT SYSTEM

Payment systems in the United States, the United Kingdom, and continental Europe have undergone a series of significant institutional innovations over the course of the past 800 years. The pace of this innovation has accelerated in recent decades as a result of technological advancements in data storage, analysis, and transmission. Amongst other important developments—from ATMs, to chip and pin technology, to the hybrid RGTS payment systems that facilitate billions of interbank payments—these technological advancements have spurred the emergence and growth of a vibrant shadow payment system.

The shadow payment system encompasses a diverse range of payment institutions. These institutions share two core features. First, they perform the same basic payment functions as conventional deposit-taking banks: providing customers with custodial and

114. For a more detailed examination of the development and functions of special resolution regimes, see generally John Armour, *Making Bank Resolution Credible* (ECGI, Working Paper No. 244/2014, 2014).

115. See, e.g., Council Directive 2014/59/, art. 5, 2014 O.J. (L 173), 190, 190 (EU) (establishing a framework for the recovery and resolution of credit institutions and investment firms) [hereinafter BRRD]; BANK OF ENG., THE BANK OF ENGLAND'S APPROACH TO RESOLUTION 7, (Oct. 2014) [hereinafter BANK OF ENGLAND'S APPROACH], (describing frameworks to resolve failing banks, building societies, and some types of investment firms).

116. See ARMOUR ET AL., *supra* note 5, at 456–59.

117. See, e.g., BRRD, *supra* note 115 (establishing a framework for the recover and resolution of credit institutions and investment firms); BANK OF ENGLAND'S APPROACH, *supra* note 115, at 7.

transactional storage and liquidity. While some of these institutions also engage in credit, liquidity, and maturity transformation similar to conventional deposit-taking banks—thereby also making them part of the shadow banking system¹¹⁸—this is ultimately irrelevant to the question of whether they should also be considered part of the shadow payment system. Simultaneously, of course, the extent to which the balance sheets of these institutions exhibit credit, liquidity, or maturity mismatches will have a bearing on the risk of institutional bankruptcy, and on the suitability of different strategies that might be employed to ensure the continued performance of payment functions during periods of institutional distress. Second, these institutions perform these functions outside the perimeter of the regulated banking system. As a result, they do not directly benefit from the emergency liquidity assistance facilities, deposit guarantee schemes, special resolution regimes, or other prudential regulatory strategies designed to ensure that bank-based payment systems can continue to function during periods of institutional or systemic stress, unencumbered by the strict application of corporate bankruptcy law. This Part briefly describes three of the most important and high-profile shadow payment systems: crypto-currency exchanges, P2P payment systems, and mobile money platforms. It also identifies and examines the key risks that arise from the bundling of storage and liquidity functions outside the regulated banking system.

A. Crypto-Currency Exchanges

One of the most noteworthy developments in global finance within the past decade has been the emergence and proliferation of so-called *crypto-currencies*. Far and away the most popular crypto-currency is Bitcoin, with a market capitalization of under \$152 billion as of May 1, 2018.¹¹⁹ The backbone of the Bitcoin payment system is an open source protocol known as *blockchain*. Blockchain is a decentralized—or “distributed”—public ledger shared amongst a P2P network comprised of all Bitcoin users. Whenever a Bitcoin is transferred from one user to another, network participants verify settlement of the transaction using sophisticated algorithms as part of a process known as Bitcoin *mining*.¹²⁰ Once verified, the transaction is then permanently added to the distributed ledger, thus creating a single historical record of all transactional activity.¹²¹ The growth potential of Bitcoin itself as a means of making and receiving payments is somewhat limited due to its relatively small and strictly controlled supply.¹²² Nevertheless, the broader growth potential of crypto-currencies built around the blockchain protocol is enormous, as

118. See Zoltan Pozsar et al., *Shadow Banking*, 19 FED. RES. BANK OF N.Y. ECON. POL'Y 1 (2013).

119. See COINMARKETCAP, <http://www.coinmarketcap.com>. (last visited May 1, 2018) By way of comparison, the market capitalization of the second most popular crypto-currency, Ethereum, is just under \$65 billion. *Id.*

120. In exchange for verifying transactions, these “miners” are rewarded with newly created Bitcoins. See generally SATOSHI NAKAMOTO, *BITCOIN: A PEER-TO-PEER ELECTRONIC CASH SYSTEM*, BITCOIN (Nov. 8, 2008), <http://bitcoin.org/bitcoin.pdf>.

121. See Mohit Kaushal & Sheel Tyle, *The Blockchain: What It Is and Why It Matters*, BROOKINGS INST. (Jan. 13, 2015), <https://www.brookings.edu/blog/techtank/2015/01/13/the-blockchain-what-it-is-and-why-it-matters/>.

122. The Blockchain protocol contemplates that the reward for verifying transactions will decrease over time, reaching zero when the total number of outstanding Bitcoins reaches 21 million; see NAKAMOTO, *supra* note 120.

arguably reflected by the fact that Bitcoin is now accepted by over 100,000 retailers, including Expedia, Dell, Microsoft, PayPal, and Amazon.¹²³

The emergence of Bitcoin and other crypto-currencies has spurred the development of an entirely new species of financial intermediary: crypto-currency *exchanges*.¹²⁴ Crypto-currency exchanges facilitate the conversion of crypto-currencies into conventional fiat currencies such as the U.S. dollar, pound sterling, and euro. The first generation of crypto-currency exchanges performed this function in two operationally distinct stages.¹²⁵ In the first stage, the exchange performs essentially the same function as a conventional stock exchange: matching buyers and sellers of Bitcoin and other currencies. In the second stage, the prospective seller transfers the Bitcoin to the exchange for sale. The buyer is then responsible for ensuring that it provides the exchange with sufficient funds, denominated in the appropriate currency, to complete the purchase. Once both the Bitcoin and other funds have been successfully transferred to the exchange, the trade is then cleared and settled, with the Bitcoin transferred to the buyer and the corresponding funds to the seller. In this important respect, the first generation of crypto-currency exchanges employed a payment-versus-payment (PvP) system similar to the Continuous Linked Settlement (CLS) system through which a large proportion of the foreign exchange transactions in the world's major currencies flow.¹²⁶

Until recently, the world's largest crypto-currency exchange was Mt. Gox. Founded in Tokyo in 2009 as a platform for exchanging trading cards based on the game *Magic: The Gathering*.¹²⁷ Mt. Gox quickly evolved to become one of the cornerstones of the nascent Bitcoin payment system.¹²⁸ At its peak in 2013, it has been estimated that Mt. Gox accounted for approximately 70% of global Bitcoin trading activity.¹²⁹ In retrospect, however, this success masked a number of significant institutional problems. In June 2013, Mt. Gox was forced to temporarily suspend U.S. dollar conversion amidst widespread rumors that the exchange was on the verge of bankruptcy.¹³⁰ In November 2013, *Wired* magazine reported that customers were experiencing delays of weeks, and in some cases months, before they were able to withdraw their funds.¹³¹ Then, on February 28, 2014, Mt.

123. See Anthony Cuthbertson, *Bitcoin Now Accepted by 100,000 Merchants Worldwide*, INT'L BUS. TIMES (Feb. 4, 2015), <http://www.ibtimes.co.uk/bitcoin-now-accepted-by-100000-merchants-worldwide-1486613>. At the same time, there is very little publicly available information regarding the volume of Bitcoin-denominated payments processed by these retailers.

124. This is, in some respects, ironic given that one of the most frequently cited benefits of blockchain is that it does not rely on (conventional) financial intermediaries. See, e.g., Kashual & Tyle, *supra* note 121.

125. While operationally distinct, these stages do not necessarily occur sequentially: i.e. the seller may transfer the Bitcoin to the exchange *before* a buyer is identified. See Marcel Rosner & Andrew King, *Understanding and Regulating Twenty-First Century Payment Systems: The Ripple Case Study*, 114 MICH. L. REV. 649 (2016) (discussing foreign payment systems that do not rely on a sequential mechanism).

126. See ARMOUR ET AL., *supra* note 5, § 18.2.3 (providing further information regarding the mechanisms of PvP settlement systems such as CLS).

127. See Paul Vigna, *5 Things About Mt Gox's Crisis*, WALL ST. J. (Feb. 24, 2014), <https://blogs.wsj.com/briefly/2014/02/25/5-things-about-mt-goxs-crisis/> (detailing important facts about the Mt. Gox crisis).

128. *Id.*

129. See Robert McMillan & Cade Metz, *The Rise and Fall of the World's Largest Bitcoin Exchange*, WIRED (Nov. 6, 2013), <https://www.wired.com/2013/11/mtgox/> (describing the progression of technical issues faced by Mt. Gox).

130. *Id.*

131. *Id.*

Gox filed for bankruptcy protection in Tokyo, reporting liabilities of approximately ¥6.5 billion (\$USD64 million) against assets of approximately ¥3.84 billion (\$USD38 million). As part of the bankruptcy filing, the firm reported that about 750,000 Bitcoins belonging to customers, along with another 100,000 belonging to Mt. Gox itself, were unaccounted for and had likely been stolen.¹³² On the basis of Bitcoin's market price as of the date of the bankruptcy filing, this translated into over \$470 million in missing assets.¹³³

Two subsequent events are noteworthy.¹³⁴ First, on March 14, 2014, Mt. Gox filed for Chapter 15 bankruptcy protection in the U.S.¹³⁵ in order to invoke an automatic stay that would prevent enforcement by aggrieved customers against assets situated in the United States.¹³⁶ Second, on August 5, 2015, an action by a customer against the Japanese bankruptcy trustee for the recovery of Bitcoin that remained within the control of the exchange failed, the District Court finding that under the applicable Japanese law customers could not remain owners of Bitcoin once it had been transferred to the exchange.¹³⁷ The end result appears to be that customers who held Bitcoin with Mt. Gox will be treated as unsecured creditors whether or not the Bitcoin remains within the control of the exchange, and will be barred from enforcing these unsecured claims by procedural restrictions imposed by both United States and Japanese bankruptcy law. Understandably, many customers have already sold their unsecured claims in the estate of Mt. Gox at a steep discount¹³⁸, and it remains unclear what percentage of their claims remaining customers should ultimately expect to recover.

The bankruptcy of Mt. Gox vividly illustrates the risks that the shadow payment system can pose to customers. These risks flow from two principal sources. The first is the prospect of delayed transfer or conversion during the bankruptcy process (*illiquidity*). This risk will be especially problematic where customers store assets within a shadow payment

132. See Robin Sidel et al., *Almost Half a Billion Worth of Bitcoins Vanish: Mt. Gox Says it Lost 750,000 of Customers' Bitcoin to Fraud*, WALL ST. J. (Feb. 28, 2014), <https://www.wsj.com/Articles/mt-gox-to-hold-news-conference-1393579356> (explaining the events up to the bankruptcy of Mt. Gox).

133. *Id.*

134. A third event has been the subsequent (and meteoric) rise in the price of Bitcoin since the bankruptcy filing. Crucially in this regard, one of the consequences of characterizing a customer claim as unsecured is that the claim holder will not necessarily enjoy the full benefit of any increase in the value of Bitcoin that remains with the exchange, with the value instead potentially fixed by reference to the Bitcoin-USD conversion rate as at the commencement of proceedings; Nikhilesh De, *Mt Gox Creditors Want Bitcoin Exchange Taken Out of Bankruptcy*, COINDESK (Dec. 12, 2017), <https://www.coindesk.com/mt-gox-creditors-want-bitcoin-exchange-taken-bankruptcy>. A similar issue arose in relation to the conversion of foreign currency claims in the recent and controversial decision of the English Supreme Court in *Re Lehman Bros International (Europe) (in administration)* [2017] UKSC 38, [2017] 2 WLR 1497.

135. See Motion for Protective Order, *In re Mt Gox Co.*, No. 14-31229-sgj15, (Bankr. N.D. Tex. Mar. 10, 2014) (requesting provisional relief).

136. See Amended Complaint, *Greene et al. v. Mt Gox Inc.*, No. 1:14-cv-01437 (2014 WL 1101996 N.D.Ill.).

137. See Tōkyō Chihō Saibansho (Tokyo Dist. Ct.) Aug. 5, 2015, Hei 26 (wa) no. 33320, 2015WLJPCA08058001. The applicants in the case had relied on the right to segregation provided in Art. 62 of the Japanese Bankruptcy Act. See also Kyodo, *Bitcoins Lost in Mt. Gox Debacle 'Not Subject to Ownership' Claims: Tokyo Court*, JAPAN TIMES (Aug. 6, 2015), <https://www.japantimes.co.jp/news/2015/08/06/national/crime-legal/bitcoins-lost-in-mt-gox-debacle-not-subject-to-ownership-claims-tokyo-court-rules/#.WnzOH5Opn2Q>.

138. Bitcoin Builder, for example, offered to buy customers' Mt. Gox Bitcoin at 0.11 per Bitcoin in 2015. See JP Buntinx, *The Mt. Gox Post-Bankruptcy Claims: A Detailed Guide*, BITCOINIST (May 8, 2015), <http://bitcoinist.com/mtgox-post-bankruptcy-claims-detailed-guide/>.

system with a view to eventually making payments for essential goods and services such as food and shelter. This risk will also arise where customers rely heavily on these systems to make or receive day-to-day payments, or where they maintain positive balances for extended periods of time. The second risk is the potential write-down of customers' funds arising from their treatment as unsecured liabilities in the context of any bankruptcy proceeding (*loss of value*). Indeed, in many cases, unsecured claimants can expect to recover little if anything following the conclusion of the bankruptcy process. These risks can then intersect—as they did in the case of Mt. Gox—inssofar as the need for liquidity compels customers to liquidate their claims at a significant discount to their nominal value.

B. P2P Payment Systems

While the failure of Mt. Gox provides us with useful insights into the potential risks that the shadow payment system poses to customers, crypto-currency exchanges ultimately exist on the fringes of the modern payment system. Somewhat closer to the center of this system are a growing number of P2P payment systems. P2P payment systems utilize the internet to convey payment information and execute electronic fund transfers. In a typical P2P transaction, the payor initiates a fund transfer by entering the payee's email address and payment instructions via a secure website. The system then generates an email informing the payee of the in-bound payment.

There are two different types of P2P payment systems, distinguished by the nature of the accounts through which the funds are stored and transferred. In *bank-based* P2P systems, the system facilitates the direct transfer of funds between demand deposit or other accounts held by the payor and payee with conventional banks.¹³⁹ Thus, for example, when you use Apple Pay to buy a triple shot, no foam, soy latte at Starbucks, the technology embedded in your iPhone uses near field communication technology to send encrypted payment information to the store's card reader. The funds are then transferred directly from your bank account to Starbucks, without ever passing through Apple's hands. Bank-based P2P systems thus do not perform any custodial or transactional storage function. Accordingly, these systems are perhaps best understood as technology platforms that merely facilitate retail interbank transfers.

Proprietary account P2P systems, in contrast, facilitate the transfer of funds via book transfers between customer accounts held and administered by the shadow payment system itself.¹⁴⁰ These accounts can be funded using a debit or credit card, or from the proceeds of previous in-bound fund transfers. Importantly, payees can either choose to transfer paid-in funds to a conventional bank account or, alternatively, store the funds in the system's proprietary accounts for the purpose of making future payments. Unlike bank-based P2P systems, proprietary account P2P systems are thus designed to provide customers with transactional and custodial storage and liquidity. These systems thus fall within the perimeter of the shadow payment system.

P2P payment systems offer a number of potential advantages relative to other forms of electronic fund transfer. These advantages are best understood in the context of online auction sites such as eBay.¹⁴¹ Many sellers on eBay are private individuals looking to sell

139. Kenneth Kuttner & James McAndrews, *Personal On-Line Payments*, 7 FED. RES. BANK OF N.Y. ECON. POL'Y REV. 35, 37 (2001).

140. Payors, and in most cases, payees are thus required to open an account with the system as a precondition to its use. *Id.*

141. *See id.* at 35; Ronald Mann, *Regulating Internet Payment Intermediaries*, 82 TEX. L. REV. 681, 681–82

a particular article—e.g. an old sofa, unloved musical instrument, or Star Wars™ collectibles—but who are not otherwise engaged in the business of manufacturing or selling these articles. For these individuals, the costs of merchant banking services enabling them to accept credit card payments, for example, are often prohibitively high. Moreover, given the anonymity of online auctions, buyers are understandably hesitant to provide sensitive financial information to sellers. Accordingly, as Ronald Mann explains: “purchasers in the early days of eBay had to use cashier’s checks or money orders. Typically, sellers waited to ship products until they received the paper-based payment device in the mail.”¹⁴² The development of P2P payment systems solved both of these problems: offering a fast, easy, affordable, and secure way of making payments between anonymous buyers and sellers.

There are currently a number of different P2P payment systems, including Apple Pay, Google Wallet, Venmo, Dwolla, and AliPay by Alibaba. By far the most ubiquitous P2P payment system, however, is PayPal.¹⁴³ PayPal was acquired by eBay in 2002 as a replacement for its own, far less popular, P2P payment system.¹⁴⁴ In July 2015, eBay then spun off PayPal into an independent publicly-listed company.¹⁴⁵ As of September 30, 2016, PayPal had approximately 192 million active accounts supporting payments in over 100 currencies.¹⁴⁶ The total volume of payments processed through PayPal in 2015 was approximately \$USD282 billion—roughly \$USD8,942 every second.¹⁴⁷

PayPal is a proprietary account P2P payment system. Purchasers are able to fund their accounts using debit or credit cards, electronic fund transfers from their bank, or with any positive balance they maintain in their PayPal account. Interestingly, recent data suggests that many customers maintain positive balances in their PayPal account, thus using the system as a mechanism for custodial storage. According to a recently filed Form 8-K, PayPal’s funds receivable and customer accounts totaled over \$18 billion.¹⁴⁸ Even more interesting is PayPal’s stated policy regarding these balances. As explained in PayPal’s U.S. terms and conditions: “Any PayPal balance you hold represents an unsecured claim against PayPal . . . and is not insured by the . . . FDIC . . . PayPal will not voluntarily make these balances available to its creditors in the event of bankruptcy.”¹⁴⁹ The corresponding language in PayPal UK’s user agreement reads: “If you hold a Balance you will not receive interest or any other earnings on the Balance because European law forbids paying interest

(2003).

142. *Id.* at 683–84.

143. While AliPay technically has more active accounts (approximately 400 million as of December 2016), the vast majority of these accounts are held by customers in China.

144. See Nick Wingfield & Jathon Sapsford, *eBay Plans to Buy PayPal In \$1.4 Billion Stock Deal*, WALL ST. J. (July 9, 2002), <https://www.wsj.com/Articles/SB102613018741609120>.

145. See Press Release, PayPal, PayPal Celebrates Listing on Nasdaq and Completes Separation from eBay Inc., (July 20, 2015), <https://www.paypal.com/stories/us/paypal-celebrates-listing-on-nasdaq-and-completes-separation-from-ebay-inc>.

146. PayPal Holdings, Inc., Quarterly Report (Form 10-Q) 40 (Sept. 30, 2016), <https://investor.paypal-corp.com/secfiling.cfm?filingID=1633917-16-243&CIK=1633917>.

147. PayPal Holdings, Inc., Annual Report (Form 10-K) 1 (Dec. 31, 2015), <https://investor.paypal-corp.com/secfiling.cfm?filingID=1633917-16-113&CIK=1633917>.

148. PayPal Holdings, Inc., Current Report (Form 8-K) (Jan. 31, 2018), <https://investor.paypal-corp.com/secfiling.cfm?filingID=1633917-18-18&CIK=1633917>.

149. User Agreement, PAYPAL, <https://www.paypal.com/us/webapps/mpp/ua/useragreement-full> (last visited, Apr. 14, 2018)

on e-Money, as it is a cash-equivalent and not a deposit.”¹⁵⁰ The U.K. user agreement goes on to define e-Money as: “monetary value, as represented as a claim on PayPal, which is stored on an electronic device, issued on receipt of funds, and accepted as a means of payment by persons other than PayPal.”¹⁵¹

PayPal’s customer documentation in both the United States and United Kingdom makes it reasonably clear that customer balances will be treated as unsecured liabilities in the event of PayPal’s bankruptcy. As a result, customer funds held within PayPal’s proprietary accounts are vulnerable to delayed transfer and conversion, along with potential loss of value, in the context of any bankruptcy process. Viewed from this perspective, the risks to PayPal customers are broadly similar to those that ultimately materialized in the case of Mt. Gox.¹⁵²

C. Mobile Money Platforms

If P2P systems such as PayPal represent the current state of the shadow payment system in places like the United States, the United Kingdom and Europe, mobile money platforms represent one of its many potential futures—especially in emerging markets. The term “mobile money” is used to describe a number of different institutional platforms through which mobile phone companies offer custodial and transactional storage and liquidity. Mobile money platforms enable customers to deposit and withdraw funds through a network of local agents, including post offices, corner stores, petrol stations, and other retail establishments.¹⁵³ These platforms then enable customers to use their mobile phones to transfer deposited funds—so-called “e-money”—via SMS text messages to their friends, family, merchants, and public authorities. Initially, many mobile money platforms were limited to facilitating payments between customers of the same mobile network. Increasingly, however, mobile providers have coordinated in the development of interoperable platforms facilitating payments between customers of different networks.¹⁵⁴

One of the first—and arguably most successful—mobile money platforms, M-Pesa, was launched by Safaricom in Kenya in 2007. By the beginning of 2016, there were more than 270 mobile money platforms, operating in 93 countries, with approximately 134

150. UK User Agreement for PayPal Service, PAYPAL § 2.1 (Feb. 28, 2018), <https://www.paypal.com/uk/webapps/mpp/ua/useragreement-full>.

151. *Id.* at § 16.

152. Of course, should PayPal ultimately meet a similar fate, its broader customer base and considerably higher transaction volume could potentially mean that its failure had a far more significant and widespread market impact. However, this is by no means a certainty. If, for example, the current \$13 billion is widely dispersed amongst its retail customers, then it may very well be the case that the bankruptcy of PayPal would have little or no impact on either customer wealth or the operation of the wider (shadow) payment system.

153. As of December 2015, Groupe Speciale Mobile Association (GSMA), a leading industry association, estimated that mobile money platforms collectively encompassed approximately 3.2 million of these local agents; *see* GSMA, 2015 STATE OF THE INDUSTRY: MOBILE FINANCIAL SERVICES FOR THE UNBANKED 22 (2016), https://www.gsma.com/mobilefordevelopment/wp-content/uploads/2016/04/SOTIR_2015.pdf.

154. *See* GSMA, 2014 STATE OF THE INDUSTRY: MOBILE FINANCIAL SERVICES FOR THE UNBANKED 5, 16 (2015) https://www.gsma.com/mobilefordevelopment/wp-content/uploads/2015/03/SOTIR_2014.pdf. Notably, this development echoes the establishment of the London Clearing House and other clearinghouses in the context of bank-based payment systems. *See supra* Part III.A; “transfer” of funds in an interoperable network of this kind appears to take effect by the customer instructing the provider to debit the customer’s account (or “wallet”) and to take steps to credit (or enable another system provider to credit) a transferee with a claim of equivalent value (less any fees incurred), such that in legal terms there is not strictly a “transfer” but rather the extinction of one claim and the creation of one or more new ones; *see* Proctor *supra* note 8, at 189.

million active accounts.¹⁵⁵ In terms of geographic dispersion, by far the largest number of mobile money platforms are located in Sub-Saharan Africa, with Latin America and South and East Asia also contributing significantly to global growth in terms of the number of new platforms.¹⁵⁶ Given the large unbanked populations in many countries in these regions, mobile money is often presented as a promising means of promoting greater financial inclusion.¹⁵⁷

The commercial viability of mobile money platforms such as M-Pesa turns on their ability to attract a critical mass of customers within a relatively short span of time. Mobile money platforms are thus subject to pronounced network effects,¹⁵⁸ with the attractiveness of a platform to potential customers depending on the number of existing customers within the network. The viability of these platforms is also a function of the speed and cost of depositing and withdrawing cash—i.e. exchanging cash for e-money and vice versa—and transferring e-money to third parties.¹⁵⁹ The use of mobile phone technology makes transferring e-money relatively straightforward. It also helps ensure that the technology itself is widely disseminated amongst prospective customers. In the case of M-Pesa, Safaricom was then able to establish and entrench its platform by recruiting a large number of local agents, thus ensuring that customers were able to deposit and withdraw cash in a wide variety of locations across Kenya. These agents transact with M-Pesa customers on their own account, using a float of cash and e-money held in their own name to fund transactions.¹⁶⁰ When the cash or e-money component of an agent's float is exhausted, the agent must seek to replenish its float by exchanging cash or e-money with another (typically larger) agent.¹⁶¹ At the top of this chain are then a small number of large wholesale agents with whom Safaricom¹⁶² transacts directly for the issue of new e-money or the conversion of existing e-money into cash or other funds.¹⁶³

The reliance of mobile money platforms on networks of local agents, wholesale agents, and ultimately mobile phone companies to provide both storage and liquidity raises what

155. *The Mobile Economy: Africa 2016*, GROUPE SPECIALE MOBILE ASS'N, <https://www.gsaintelligence.com/research/?file=3bc21ea879a5b217b64d62fa24c55bdf&download> [hereinafter *The Mobile Economy*].

156. *Id.* at 13.

157. Indeed, the objective of promoting financial inclusion permeates the GSMA annual state of the industry reports; *see id.*

158. *See* David S. Evans & Alexis Pirchio, *An Empirical Examination of Why Mobile Money Schemes Ignite in Some Developing Countries But Flounder in Most 5* (Coase-Sandor Working Paper Series in Law and Econ., Paper No. 723, 2015); Paul Klempner, *Network Goods (Theory)*, in *THE NEW PALGRAVE DICTIONARY OF ECONOMICS* (Durlauf & Blume eds., 2008).

159. Evans & Pirchio, *supra* note 158. *See also* Janine Aron, *Leapfrogging: A Survey of the Nature and Economic Implications of Mobile Money* 9.1 (CSAE Working Paper Series, Paper No. 2017-02, 2017).

160. As Colin Mayer and Michael Klein have emphasized, this means that agents do not perform the same function that a bank branch performs when it accepts deposits and offers withdrawals to its customers, for in doing so the branch acts on behalf of the bank. Michael Klein & Colin Mayer, *Mobile Banking and Financial Inclusion: The Regulatory Lessons 7–8* (World Bank Policy Research, Working Paper No. 5664, 2011).

161. Frederik Eijkman et al., *Bridges to Cash: the Retail End of M-PESA*, 34 *SAVINGS & DEV.* 219 (2010).

162. Or, more precisely, a trustee corporation in respect of which Safaricom acts as agent. *See infra* Part VI.

163. Eijkman et al., *supra* note 161, at 224. Other than transactions between Safaricom and these highest level wholesale agents, transactions in this system do not appear to involve Safaricom directly, and (correspondingly) do not appear to involve the issue of new e-money or the redemption of existing e-money. *Id.* Instead, system participants simply transfer e-money to each other in what appears to be an assignment of the contractual rights against Safaricom that a holder of e-money enjoys in exchange for cash. *Id.*

should by now be a familiar question: how can these firms credibly commit to perform these functions during periods of institutional stress? As with crypto-currency exchanges and P2P payment systems, the provision of these functions outside the regulated banking system poses two principal risks. The first risk is that customers will experience delays in converting their e-money into cash during any bankruptcy process. To put this risk into perspective, the World Bank's 2017 *Doing Business* survey estimates that the average length of a corporate bankruptcy process in Sub-Saharan Africa—measured by reference to the time between default and the distribution to a senior secured creditor in full or partial satisfaction of their claim¹⁶⁴—is approximately 2.9 years.¹⁶⁵ The second risk is that the entitlement to the conversion of e-money into cash or other funds will be characterized as an unsecured claim in the bankruptcy process, such that any customer funds received and retained by the debtor in exchange for the issuance of e-money are available for distribution to the firm's general body of creditors—with whom customers would then be forced to compete.¹⁶⁶ In this respect, it is worth observing that the World Bank has estimated that the mean recovery rate in Sub-Saharan Africa for *secured* creditors is approximately 20.3 cents on the dollar.¹⁶⁷ On average, in other words, unsecured creditors of bankrupt firms in Sub-Saharan Africa receive *nothing* at the conclusion of the bankruptcy process.¹⁶⁸

The most immediate risks stemming from the emergence of the shadow payment system are those that this system poses to customers. Looking forward, however, the continued growth of the shadow payment system may also pose potentially significant risks to economic and financial stability. These risks flow from three principal sources. The first stems from the prospect that large numbers of micro and small enterprises will come to rely on the shadow payment system as a conduit for working capital purposes, i.e. as an “account” into which the day-to-day receipts of the business flow and out of which payments are made to creditors, suppliers, and employees.¹⁶⁹ The jurisdictions in which

164. See *Resolving Insolvency Methodology*, THE WORLD BANK: DOING BUSINESS, <http://www.doingbusiness.org/methodology/resolving-insolvency#time> (last visited Feb. 22, 2018) [hereinafter WORLD BANK, *Resolving Insolvency*]. The survey presents a hypothetical case involving an insolvent and illiquid incorporated debtor with a medium sized (hotel) business and one secured (bank) creditor, and invites participants to, *inter alia*, estimate the time from default to payment of some or all of the bank debt, assuming the commencement of bankruptcy or foreclosure proceedings. *Id.*

165. *Id.* Of course, where a customer enjoys an *absolute* proprietary interest, they may be able to access assets before secured creditors are able to enforce against them. This could include, for example, the circumstance where a customer enjoys a beneficial interest under a trust. See *infra* Part VI. Inevitably, however, there will be some delay while a customer's interest is verified. If there is any dispute as to the scope or validity of this interest, these delays may be significant. See ROBERT HANTUSCH, TRUST CLAIMS AND CLIENT MONIES: LEFT HIGH AND DRY OR SCOOPING THE POOL? 4 (2010), http://clients.squareeye.net/uploads/3sb/events/211010_hantusch.pdf. Reflecting on the *Farepak* litigation in the English courts, Hantusch observes: “It is instructive to note the extremely limited benefit that was received from even the successful trust claims in the *Farepak* case. In late 2009, 3 years after the onset of insolvency and only after considerable costs had been incurred . . . [a distribution was made] in settlement of trust claims.” *Id.*

166. The holders of e-money would typically hold a bundle of contractual rights against the system provider, including the right to call for the convertibility of their e-money. In the event of breach by the system provider, these rights would entitle the customer to sue for damages or, depending on the nature of the relevant conversion rights, in debt. In either case, the customer would be ranked as an unsecured creditor and thus liable to compete (typically on a *pro rata* basis) with other such creditors.

167. WORLD BANK, *Resolving Insolvency*, *supra* note 164.

168. Unsecured creditors may enjoy some preferential status vis-à-vis secured creditors. *Id.*

169. While medium-sized and larger enterprises could also theoretically be exposed to this risk, they are also likely to have more reliable access to both the conventional bank-based payment system and sources of credit

this is most likely to occur include many countries in Sub-Saharan Africa, South East Asia, and elsewhere, where the conventional banking systems have traditionally underserved the small business community.¹⁷⁰

In the event that businesses were to use the shadow payment system in this way, there is a risk that the bankruptcy of one or more payment institutions would result in customer assets being trapped for the duration of the bankruptcy process—thereby starving these businesses of the working capital needed to pay creditors, suppliers, and employees. In addition to jeopardizing the solvency of these businesses, the knock-on effects stemming from the delayed repayment of creditors and suppliers could also jeopardize the solvency of a broader cross-section of firms within the real economy. Through this channel, institutional instability within the shadow payment system could generate significant negative externalities, ultimately leading to a contraction in economic activity and employment.

The second risk stems from the prospect that, as the shadow payment system continues to grow and evolve, the pressure to generate profits may drive institutions to bundle payment functions with more conventional forms of financial intermediation: combining their promise of transactional and custodial storage and liquidity to customers with investments in longer term and potentially illiquid assets. These pressures can already be observed in connection with the evolution of mobile money platforms, where governments and industry lobby groups have invested considerable time and effort in identifying ways to make platforms commercially sustainable.¹⁷¹ PayPal, meanwhile, now offers a range of credit products to its customers.¹⁷² It also invests customer funds in “highly liquid, highly rated instruments” not protected by deposit guarantee schemes.¹⁷³ As these and other institutions continue to expand into more conventional forms of financial intermediation,

enabling them to withstand any liquidity shock.

170. See RESERVE BANK OF INDIA, REPORT OF THE COMMITTEE ON COMPREHENSIVE FINANCIAL SERVICES FOR SMALL BUSINESSES AND LOW INCOME HOUSEHOLDS (2014), <https://rbidocs.rbi.org.in/rdocs/PublicationReport/Pdfs/CFS070114RFL.pdf> (describing the gap between the supply of and demand for financial services amongst small businesses in India).

171. The pressures to make these platforms profitable is particularly evident in the outputs of the GSMA. For an overview of its policy work and resources in relation to the commercial aspects of mobile money, see *Mobile Money Program*, GSMA, <https://www.gsma.com/mobilefordevelopment/programme/mobile-money/>, (last visited Feb. 8, 2018). A representative example is the GSMA’s analysis regarding the commercial sustainability of so-called “payments banks” in India: “To become profitable, payments banks will need to drive digital transactions through accounts at scale. However, unlike traditional mobile money players, it is unlikely that payments bank will be able to live off transaction revenues alone—and without a growing ecosystem and adjacent revenue streams (e.g., digital credit, micro insurance and merchant payments), the road to profitability will be difficult.” GSMA, THE BUSINESS CASE FOR PAYMENTS BANKS IN INDIA 6 (2016), https://www.gsma.com/mobilefordevelopment/wp-content/uploads/2016/12/GSMA_The-business-case-for-payments-banks-in-India_2016-1.pdf.

172. For an overview of PayPal’s consumer credit products, see PAYPAL, <https://www.paypal.com/us/webapps/mpp/paypal-credit> (last visited Feb. 8, 2018).

173. See PayPal Holdings, Inc., General Form for Registration of Securities (Form 10) F-14 (Feb. 25, 2015), <https://investor.paypal-corp.com/secfiling.cfm?filingID=1193125-15-62742&CIK=1633917>. For media commentary on this point, see Izabella Kaminska, *Is it a Bank, a Money Transmitter, or a Silicon Valley Shadow Financier? No, It’s Just PayPal!*, FIN. TIMES ALPHAVILLE (Aug. 6, 2015), <https://ftalphaville.ft.com/2015/08/06/2136828/is-it-a-bank-a-money-transmitter-or-a-silicon-valley-shadow-financier-no-its-just-paypal/?se=body&so=cu>; David Bergendahl, *Your PayPal Balance Isn’t FDIC Insured: The Case for a New Model of Financial Startups*, MEDIUM (Sept. 21, 2014), <https://medium.com/@dbrgndl/paypal-isnt-fdic-insured-non-banks-being-bankish-and-a-new-model-for-financial-startups-df6d16c2d4b>.

the resulting credit, maturity, and liquidity mismatches will introduce the risk of destabilizing runs by customers and other short-term creditors.

It is at this point that the stark differences in the legal and regulatory treatment of institutions within the conventional banking and shadow payment systems may become particularly salient. As we have seen, while the shadow payment system may appear to be an effective substitute for conventional bank-based payment systems, the unique prudential regulatory regimes to which banks are subject enhances the credibility of their commitment to perform their core storage and liquidity functions during periods of institutional or systemic stress. In effect, these regulatory regimes enhance the moneyness of a bank's deposits and other short-term liabilities relative to the otherwise functionally equivalent liabilities issued by institutions within the shadow payment system.¹⁷⁴ During periods of market turmoil or uncertainty, therefore, we might expect to observe pronounced outflows of customer funds from the shadow payment system and into conventional deposit-taking banks.¹⁷⁵ In jurisdictions where large numbers of customers do not have access to banks, meanwhile, we would likewise expect to observe spikes in the demand for the conversion of customer funds held within the shadow payment system into cold hard cash. Through this latter channel, correlated runs within the shadow payment system could conceivably lead to a broader contraction in the money supply, thereby driving a contraction in investment and economic growth.¹⁷⁶

Finally, as an increasing proportion of customer funds become held by institutions outside the conventional banking system, there is a risk that this may undercut the ability of central banks to effectively manage the money supply. Two of the most important policy tools that central banks currently use to manage the money supply are reserve ratios and the discount rate.¹⁷⁷ Reserve ratios impose a minimum fraction of deposits that banks must hold in the form of cash or non-interest bearing central bank reserves—thus effectively limiting the proportion of a bank's short-term funding that it can use to make loans and other longer term investments.¹⁷⁸ Discount rates, meanwhile, represent the interest rates that central banks charge in connection with short-term loans to member banks. By raising—or lowering—the reserve ratio and discount rate, central banks can thus increase

174. See Part IV, discussing the vulnerability of banks to destabilizing runs by depositors and other short-term creditors.

175. *Id.*

176. For the canonical description of how the correlated failure of banks can precipitate a contraction in the money supply, see FRIEDMAN & SCHWARTZ, *MONETARY HISTORY*, *supra* note 20. For a modern formulation of this problem incorporating the shadow banking system, see MORGAN RICKS, *THE MONEY PROBLEM: RETHINKING FINANCIAL REGULATION* (2016). Of course, the risk that the correlated failure of institutions within the shadow payment system would precipitate a material contraction in the money supply would ultimately hinge on the extent of the credit, maturity, and liquidity transformation taking place within these institutions and the overall share of financial intermediation being performed within the shadow payment system.

177. The third core policy tool consists of open market operations whereby central banks purchase and sell government and other debt securities on the open market in order to influence supply and demand dynamics within private debt markets and, ultimately, prevailing interest rates. For an overview of how the Federal Reserve uses these and other tools, see BD. OF GOVERNORS OF THE FED. RESERVE SYS., *THE FEDERAL RESERVE SYSTEM: PURPOSES AND FUNCTIONS* 20–53 (10th ed. 2016.), https://www.federalreserve.gov/aboutthefed/files/pf_complete.pdf.

178. More recently, these reserve ratios have been supplemented by liquidity coverage ratios designed to ensure that banks hold a sufficient stock of high quality liquid assets to be able to meet expected outflows in the event of a hypothetical 30-day stress scenario. See generally BCBS, *BANK FOR INT'L SETTLEMENTS, BASEL III: THE LIQUIDITY COVERAGE RATIO AND LIQUIDITY RISK MONITORING TOOLS* (2013), <https://www.bis.org/publ/bcbs238.pdf> (describing the LCR).

or decrease the supply of money and credit, thereby increasing—or decreasing—the cost of capital and stimulating—or dampening—the levels of investment and spending in the real economy. Viewed from this perspective, banks can be understood as the primary transmission mechanisms through which central banks seek to promote price stability, financial stability, and other policy objectives. In a world where the shadow payment system grew to rival or supplant the conventional banking system, we would thus expect this to undermine the ability of central banks to use existing monetary policy tools in pursuit of these important objectives.

At present, each of these potential systemic risks is somewhat speculative. The shadow payment system has simply not achieved the scale necessary to pose a clear and present danger to financial or economic stability. In Kenya, where mobile money has become an important part of the financial ecosystem, the total stock of e-money is still likely only a small fraction of the aggregate money supply.¹⁷⁹ The \$13USD billion sitting in PayPal's customer accounts is similarly only equivalent to approximately one tenth of one per cent of FDIC insured bank deposits.¹⁸⁰ Moreover, few if any shadow payment systems appear to currently engage in meaningful levels of credit, maturity, or liquidity transformation. Simultaneously, however, there was a time in the development of all important economic institutions when they were a relatively small, unimportant, and misunderstood curiosity. Perhaps more importantly, while these systemic risks may not presently appear that significant, identifying them at this early stage can enhance our understanding of how best to approach the design and regulation of this increasingly important component of the financial system.

Together, the case studies of Mt. Gox, PayPal, and M-Pesa provide us with important insights into the potential risks stemming from the simultaneous provision of storage and liquidity outside the perimeter of the regulated banking system. From the perspective of customers, these risks flow principally from the prospect of delayed repayment, along with the potential write-down of customer funds arising from their treatment as unsecured claims in the context of any bankruptcy proceeding. From a macroeconomic perspective, these risks flow from the potential knock-on effects stemming from the failure of one or more institutions within the shadow payment system, the prospect of destabilizing runs, and constraints on the ability of central banks to effectively manage the money supply. In the next Part, we identify and examine the likely effectiveness of four strategies that have been—or might in future be—employed to address these risks. We also examine a fifth strategy—structural separation—that may ultimately provide a more effective means of addressing these risks without undercutting the perceived benefits of these systems and thus their potential desirability as substitutes for conventional bank-based payment systems.

179. Because payments are typically measured and reported in *flows*, whereas the money supply is inherently a *stock* measure, it is difficult to determine how big the e-money float is relative to the broader money supply. However, with Kenya's current M2 money supply—which includes notes and coins, central bank reserves, and bank deposits—at over 2.3 trillion KES (or 53,000 KES for every man, woman and child in the country), it seems highly unlikely that e-money is equivalent to anything more than a small fraction of the money supply. For official figures of the money supply in Kenya, see *Monetary and Finance Statistics*, CENT. BANK OF KENYA <https://www.centralbank.go.ke/statistics/monetary-finance-statistics/> (last visited April 15, 2018). The Kenyan government also has an ownership stake in Safaricom, the operator of M-Pesa.

180. On the basis that the total value of U.S. dollar deposits insured by the FDIC was approximately 11.3 trillion U.S. dollars at the end of 2015. See *Value of Deposits of FDIC-Insured Commercial Banks in the United States from 2000 to 2016 (In Trillion U.S. Dollars)*, STATISTA, <http://www.statista.com/statistics/193621/fdic-insured-commercial-bank-liabilities-through-deposits/> (showing value of FDIC deposits) (subscription required).

VI. REGULATING THE SHADOW PAYMENT SYSTEM

Having identified the risks stemming from the emergence and growth of the shadow payment system, we now turn our attention to the range of strategies that might be used to address these risks. This section examines four strategies drawn from those currently employed within various components of the shadow payment system: portfolio restrictions, private third party insurance, outsourcing the storage function to deposit-taking banks, and trusts. While these strategies are not without their prospective benefits, they each focus primarily on ensuring the secure *storage* of customer funds while neglecting to fully account for the impact of the application of corporate bankruptcy law on the credibility of the commitment to provide customers with *liquidity*. Perhaps unsurprisingly given the current size of the shadow payment system, these strategies also do very little, if anything, to address potential systemic risks. For these reasons, we go on to examine a fifth strategy—the structural separation of payment functions—as a potentially more desirable strategy for ensuring effective storage and liquidity during periods of institutional and systemic stress.

Rather than engaging in an in-depth evaluation of the relevant business models and regulatory regimes in specific jurisdictions, our examination proceeds on the basis of first principles—distilling these strategies down to their fundamental features. We adopt this approach for several reasons. First, the shadow payment system represents a new frontier in institutional design and regulation. While several jurisdictions have proposed or adopted regulatory regimes targeting institutions within the shadow payment system, most of these regimes either attempt to shoehorn institutions into conventional banking regulation or give them extremely wide latitude to design institutional features to protect customers and minimize potential systemic risks. An example of the former approach is the U.S. Office of the Comptroller of the Currency’s proposed fintech charter,¹⁸¹ while an example of the latter is the European Union’s Payment Services Directive (PSD2).¹⁸² Ultimately, the emergence of new institutions, posing new policy challenges, demands new and creative thinking. Second, as described in Part V, there is enormous diversity in the business models of the institutions that comprise the shadow payment system. The same is true of the regulatory regimes to which they are currently subject. This diversity demands that our descriptions of the available strategies remain necessarily somewhat abstract. Third, each of the strategies examined in this section could theoretically be implemented by means of private contracting, industry self-regulation, public regulatory intervention, or some combination of the three.¹⁸³ We are agnostic about which is likely to be most effective in practice and, intuitively, would expect the answer to depend heavily on the specific business models, along with the prevailing legal, political, and institutional environment. Finally, as stated at the outset, our primary objective in identifying these strategies is not to determine which is most socially desirable—either relative to each other or in relation to the regulatory strategies governing conventional bank-based payment systems. Instead,

181. See OFFICE OF THE COMPTROLLER OF THE CURRENCY, EXPLORING SPECIAL PURPOSE NATIONAL BANK CHARTERS FOR FINTECH (Dec. 2016), <http://www.occ.gov/topics/responsible-innovation/comments/special-purpose-national-bank-charters-for-fintech.pdf> (discussing the OCC’s proposed fintech charter). This proposal specifically seeks to incorporate fintech businesses involved in the payments industry.

182. European Parliament and Council Directive 2015/2366, art. 10(1)(a), 2015 O.J. (L 337/35) (EU). The other two strategies—third party insurance and piggy banking—are discussed in greater detail below.

183. For a discussion of network governance models, see Bruce J. Summers & Kristin E. Wells, *Governance of Payment Systems: A Theoretical Framework and Cross-Country Comparison*, 3 J. FIN. MKT. INFRASTRUCTURES 1, 1 (2014).

our principal objective at this stage is simply to evaluate whether these strategies are likely to effectively address the risks stemming from the bundling of storage and liquidity functions outside the perimeter of the regulated banking system and, where necessary, to identify potential tradeoffs.

A. Do Nothing

Any thorough examination of the universe of available policy alternatives must necessarily begin with an evaluation of the consequences of doing nothing.¹⁸⁴ In this context, “doing nothing” essentially involves the decision not to adopt any measures designed to enhance the credibility of a shadow payment system’s commitment to continue to perform its core storage and liquidity functions in the event of bankruptcy, thereby passing the risk of illiquidity and loss of value on to its customers and generating potential systemic risks. This strategy is considerably more than a stalking horse for other more realistic or attractive alternatives. It was the strategy implicitly adopted by Mt. Gox. It is also the strategy more consciously and—to its credit—transparently adopted by PayPal in the U.S. and U.K.. From the perspective of the shadow payment system and its customers, the short-term benefits of this strategy stem from the potential cost savings relative to the other more interventionist strategies described below, along with the possibility of using customer funds as an additional source of investment capital and revenue. Inevitably, however, these benefits must be weighed against both the direct costs to customers in the event of an institution’s bankruptcy, along with the potential externalities stemming from the inability of customers to pay creditors, suppliers, and employees. Where doing nothing foments potential systemic risks, the resulting costs to society would obviously also need to be taken into consideration.

B. Portfolio Restrictions

One frequently identified strategy for protecting shadow payment system customers is the imposition of portfolio restrictions. Portfolio restrictions impose limits on the types of assets in which shadow payment systems can invest customer funds, typically restricting them to cash and low risk, highly liquid securities. For example, mobile money platforms in many jurisdictions are required to maintain a 1:1 ratio of deposit liabilities to liquid assets available to fund customer conversion demands.¹⁸⁵ These requirements are then often combined with a prohibition against comingling customer funds with the firm’s other assets.¹⁸⁶ In Europe, the PSD2 similarly identifies investments in “secure, liquid low-risk assets” as one of three possible mechanisms by which regulated “payment institutions” are permitted to safeguard customer funds.¹⁸⁷

Portfolio restrictions are designed to ensure that shadow payment systems maintain a sufficient stock of highly liquid assets that can be used to fund customer conversion

184. This follows from the Coasian observation that the costs of intervention may ultimately outweigh the resulting benefits. See Ronald H. Coase, *The Problem of Social Cost*, 3 J. L. & ECON. 1 (1960), <http://www.jstor.org/stable/pdf/724810.pdf?refreqid=excelsior:c18fd650c5c7a35eedd907edb7b173> (discussing “actions of business firms which have harmful effects on others”).

185. See, e.g., The National Payment System Act, No. 39 (2011) Cap. 493E § 25 (Kenya).

186. *Id.* As described in greater detail below, this prohibition often results in the use of piggy banking strategies.

187. The other two strategies—third party insurance and piggy banking—are discussed in greater detail below.

demands, thereby ensuring that these demands do not themselves trigger firm-level liquidity problems—i.e. runs. In this respect, portfolio restrictions can be viewed as reducing the marginal probability of institutional distress and bankruptcy. On their own, however, these restrictions do little to ameliorate the negative repercussions for customers in the event that other aspects of a firm’s business—its mobile phone operations, for example—drive it into bankruptcy. Absent other complimentary strategies, these assets will still form part of the bankrupt firm’s estate. As a result, customers will still be vulnerable to the risks of illiquidity and loss of value stemming from the bankruptcy process. Importantly, by limiting the range of assets in which institutions are permitted to invest, portfolio restrictions also constrain the ability of these institutions to use customer funds as a foundation for engaging in other socially useful forms of financial intermediation.

C. Private Third Party Insurance

Another frequently identified strategy for protecting customers is the provision of insurance by an independent third party. The New York State Department of Financial Services Virtual Currency Regulation, for example, identifies a surety bond as one of the mechanisms that licensed crypto-currency exchanges can utilize to protect customer funds.¹⁸⁸ The PSD2 similarly envisions that payment institutions may protect customer funds by way of an insurance policy or guarantee from a non-affiliated bank or insurance company, payable to customers in the event that the institution is unable to meet its financial obligations.¹⁸⁹ In the U.K., customers would also potentially receive (however inadvertently) protection under section 75 of the Consumer Credit Act 1974, which renders credit card companies joint and severally liable in the event that a supplier is unable to honor its contractual commitments.¹⁹⁰ Thus, PayPal customers who funded their accounts using their credit card and were subsequently prevented from converting or transferring those funds could conceivably seek redress from their credit card company—in effect rendering the credit card company a third party guarantor of PayPal’s contractual obligations.¹⁹¹ Ultimately, the rationale for the provision of third party insurance in this context is to ensure that there is a party contractually obligated to provide customers with liquidity in the event that the shadow payment system itself is unable to do so by virtue of, for example, the strict application of corporate bankruptcy law. In this respect, this strategy can be understood as a form of *private* deposit guarantee scheme.

In theory, private third party insurance can help insulate customers from the illiquidity and loss of value stemming from a shadow payment system’s bankruptcy. Intuitively, however, the effectiveness of this insurance is likely to depend on the probability of correlated default by the shadow payment system and private insurer. This joint probability of default is likely to be a function of at least two variables. The first is the *size* of the shadow payment system (as measured by the quantum of insured customer funds) relative to that of the insurer. The larger the system, the more likely that its bankruptcy will place

188. N.Y. COMP. CODES R. & REGS. tit. 23, ch. §200.9(a). As a substitute, a licensed exchange can also maintain a trust account with a third party custodian (*see* discussion regarding trust accounts below).

189. N.Y. COMP. CODES R. & REGS. tit. 23, § 10(1)(b).

190. *See* Consumer Credit Act 1974, c. 39 § 75 (Eng.). Section 75 places a number of conditions on the right to seek redress. To our knowledge, section 75 has not been employed to seek redress against a supplier that would fall under the definition of a shadow payment system.

191. Although in this example it seems doubtful that customers would be using PayPal for the purposes of custodial storage.

demands on the insurer that might threaten its own liquidity and, ultimately, solvency. The second is the *interconnectedness* of the shadow payment system with the broader financial system. The higher the level of interconnectedness, the higher the probability that the shadow payment system and insurer will simultaneously come under pressure in the context of a more *systemic* liquidity crisis. Accordingly, as the size and interconnectedness of shadow payment systems increases, we would expect a corresponding decrease in the credibility of the private insurer's commitment to provide the necessary liquidity insurance. This, in turn, highlights the comparative advantage of sovereign states—given their large balance sheets, the absence of binding solvency or liquidity constraints, and the legal authority to print money—as credible providers of emergency liquidity assistance during periods of broader financial instability. It also highlights the potential Achilles' heel of this strategy: the bigger the shadow payment system becomes, the less effective we would expect third party insurance to be as a mechanism for protecting consumers or insuring against the materialization of potential systemic risks.

D. Piggy Banking

The term “piggy banking” refers to a third range of strategies pursuant to which shadow payment systems outsource the custodial storage function to conventional deposit-taking banks, thereby piggy backing off the prudential regulatory strategies described in Part IV. There are at least two types of piggy banking strategies. The first—*intermediated*—strategy involves the storage of customer funds in an omnibus bank account held in the name of the shadow payment system. This first strategy is expressly envisaged by the PSD2 as one of the mechanisms by which payment institutions can protect customer funds.¹⁹² It also appears to be the strategy employed by several mobile money platforms.¹⁹³ The second—*direct holding*—strategy involves the storage of customer funds in bank accounts held directly in the name of customers. This second strategy, which is the essence of bank-based P2P payment systems, effectively moves customer funds out of the shadow payment system and into the conventional banking system.

The potential benefits of piggy banking flow from the prudential regulatory regimes governing deposit-taking banks. As we have seen, these regimes include deposit guarantee schemes designed to protect depositor funds and provide them with liquidity during periods of institutional stress, along with emergency liquidity assistance facilities and special resolution regimes designed to prevent or contain potential systemic risks. For these reasons, direct holding strategies pose relatively few risks to customers beyond the narrow case where a shadow payment system is in the zone of, or enters into, bankruptcy during any period of time after funds have entered the payment system but before they have been safely deposited in the customer's bank account.¹⁹⁴

However, where customer funds are comingled in a bank account held in the name of the shadow payment system itself, customers may still be exposed to a number of

192. Directive 2015/2366, art. 10(1)(b), 2015 O.J. (L. 337)(EU)

193. See The National Payment System Regulations, L.N. 109 (2014), Kenya Gazette Supplement No. 119 § 25(3)(f), (Kenya). See, e.g., *Are Customer Funds Properly Safeguarded?*, GSMA, <https://www.gsma.com/mobilefordevelopment/programmes/mobile-money/policy-and-regulation/guide/are-customer-funds-properly-safeguarded/> (Last visited Apr. 18, 2018), Table 1; Jonathan Greenacre & Ross P. Buckley, *Using Trusts to Protect Mobile Money Customers* 10 (Singapore J. Legal Stud., Working Paper No. 2015-27, 2014).

194. Although where customers do not have easy access to banking services—as is the case with money mobile money customers—this may still cause problems.

potentially significant risks. First, insofar as the customer's contract is with the shadow payment system and not the bank, customers may find it difficult to secure timely access to their funds in the event of the shadow payment system's bankruptcy. This may be particularly problematic where the bank has taken security over the funds in these accounts. Second, in the event that the bank was to fail, it is not necessarily clear that the shadow payment system or its customers would be adequately protected. Many deposit guarantee schemes, for example, are capped at relatively low levels and may not apply to commercial deposits. In recognition of this risk, Kenya, for example, recently proposed an amendment to its deposit insurance scheme that would provide pass-through protection to mobile money customers.¹⁹⁵

More broadly, piggy-banking strategies may distort the competitive structure of the payment system. To the extent that shadow payment systems come to rely on banks to secure the performance of core functions, this places banks in an advantageous position to influence the development of what are, in effect, emerging competitors in the payments industry. Perhaps most importantly, these strategies run the risk of embedding bank accounts as largely non-substitutable intermediate products, thus exposing shadow payment systems to potentially acute hold-up problems.¹⁹⁶ Under these circumstances, we might expect banks to extract most of the commercial benefits generated by piggy banking strategies. Over the longer term, meanwhile, we might expect to see high levels of vertical integration: with banks acquiring shadow payment systems and integrating them into their existing business lines.¹⁹⁷ This outcome would be problematic insofar as we think that banks are poor incubators for socially desirable financial innovation. It would also be problematic insofar as one of the reasons for the emergence of at least some shadow payment systems (mobile money platforms, for example) has been the perceived deficiencies with the conventional banking system.

E. Trust in Trusts

Perhaps the most frequently identified strategy for protecting customer deposits within the shadow payment system—and especially mobile money platforms—is the use of trusts. Trusts are used to partition assets in a wide range of commercial contexts.¹⁹⁸ As Jonathan Greenacre and Ross Buckley explain in the context of mobile money platforms, trusts can be used to ring-fence customer funds, thereby rendering them unavailable for distribution to creditors in the event of a firm's bankruptcy.¹⁹⁹ In the case of mobile money platforms, institutions performing payment functions could declare themselves a trustee over funds received in exchange for e-money, with the funds then held for the benefit of customers

195. See Kenya Deposit Insurance Act, No. 10 (2012) § 29. Although, as examined in the next Part, this protection may ultimately prove illusory.

196. See Oliver E. Williamson, *Transaction-Cost Economics: The Governance of Contractual Relations*, 22 J. L. & ECON. 233 (1979).

197. *Id.*

198. See John H. Langbein, *The Secret Left of the Trust: The Trust as an Instrument of Commerce*, 107 YALE L.J. 165, 179 (1997).

199. Greenacre & Buckley, *supra* note 193, at 17. Under English law, assets held by a bankrupt debtor on trust for others are treated as assets unavailable for distribution to creditors in the event of the debtor's bankruptcy, for the reason that they are owned beneficially—that is, in equity though not in law—by the beneficiaries of the trust. ROY GOODE, *PRINCIPLES OF CORPORATE INSOLVENCY LAW* 212–13 (4th ed. 2011).

and thus available to meet their demands for convertibility even in the event of the institution's bankruptcy.²⁰⁰

For this strategy to be effective, the trust must be validly constituted as a matter of general law.²⁰¹ It must also be respected under applicable corporate bankruptcy law. On the former point, some jurisdictions may also require the segregation of funds so that they are not commingled with the assets of the institution performing payment functions.²⁰² On the latter point, the most obvious basis on which an otherwise valid trust would *not* be respected in bankruptcy proceedings is where the trust's creation is contrary to the relevant transaction avoidance rules. Where the trust is created by a declaration on the part of the institution (to the effect that it holds funds it has received on trust for e-money holders), there may be some risk that the declaration will be susceptible to avoidance as a preference,²⁰³ since the effect of the declaration is to convert the position of e-money holders from that of creditors to that of absolute (equitable) owners.

A potential solution to this problem is to ensure that cash received in exchange for the issuance of e-money never becomes the beneficial property of the institution: i.e. it is at all times held on trust for customers. In the case of M-Pesa, this appears to have been achieved by a more sophisticated trust arrangement than that which could have been achieved by a simple declaration of trust by the system provider, Safaricom. Under this arrangement, liquid assets equivalent to the total stock of outstanding M-Pesa are held on trust not by Safaricom, but by a separately incorporated corporation, M-Pesa Holding Co. Limited. Safaricom then transacts with upper-tier agents in connection with the issuance and redemption of M-Pesa *as agent for the trustee corporation* rather than on its own account,²⁰⁴ with the effect that all funds received are impressed with the trust from the outset.

Importantly, while a trust may be effective in shielding assets from the creditors of a shadow payment system provider, this will not in itself be sufficient to ensure that these assets can be made available quickly to the trust's beneficiaries in the event of a payment institution's bankruptcy. Put differently: while trusts may be an effective strategy for

200. Greenacre & Buckley, *supra* note 193, at 17.

201. There is of course an *a priori* question as to whether a "trust" (or an equivalent mechanism, under which assets held by a debtor can be validly ring-fenced from creditors) is available at all under the applicable law.

202. The position under English law on this question has arguably been relaxed by a series of recent decisions arising out of the Lehman bankruptcy; for a summary, see THOMAS LEWIN, LEWIN ON TRUSTS 34-40 (19th ed. 2015). Whether the same approach would be taken in other common law systems, or (for trusts or functional equivalents to trusts) in civil law systems, is an open question; see, e.g., Dorothy Gruyaert & Sander van Loock, *UK Supreme Court Decision on Lehman Brothers Client Money: Equity or Lottery?*, 22 EUR. REV. PRIV. L. 217 (2014).

203. See, e.g., *Re Farepak Food and Gifts Ltd (in administration)* [2006] 2 BCLC 1 (U.K.); cf. *Re Kayford Ltd (in liquidation)* [1975] 1 WLR 279 (U.K.). The declaration will only be susceptible to avoidance as a preference if it is made at the relevant time prior to the commencement of bankruptcy proceedings, i.e. during the period of time governed by the applicable preference rule. There is considerable variation across jurisdictions on the length of this "suspect period." See, e.g., BOB WESSELS ET AL., INTERNATIONAL COOPERATION IN BANKRUPTCY AND INSOLVENCY MATTERS 24 (2009). The other elements of the applicable preference rule must also be satisfied. These may include a requirement that the debtor is bankrupt at the time of, or in consequence of, making the declaration.

204. M-PESA, Declaration of Trust in Favour of all M-Pesa Account Holders of Safaricom Limited § 7, (Feb. 23, 2007), https://www.safaricom.co.ke/images/Downloads/Terms_and_Conditions/M-PESA_Trust_Deed_23.02.2007.pdf.

ensuring the storage of customer funds,²⁰⁵ they are unlikely, in and of themselves, to ensure that customers have adequate liquidity during any bankruptcy process. There will be a particular risk of delay where the shadow payment system is itself the legal owner of the assets held in trust for its customers. In many jurisdictions, the effect of the commencement of bankruptcy proceedings is that the debtor's managers are displaced (or at least restrained from exercising their management powers). In their place, a bankruptcy practitioner may be appointed to marshal and preserve the debtor's assets and exercise powers of management and sale. The applicable corporate bankruptcy law may well recognize the substantive entitlement of beneficiaries to look (to the exclusion of all others) to assets held on trust for them by the debtor, but it may also impose a range of procedural obstacles to the exercise of beneficiary entitlements while the bankruptcy process is pending. The most obvious of these is a stay or moratorium on enforcement action. Yet even where the interests held under a trust are not subject to a stay or moratorium, beneficiaries are likely to suffer delays while the bankruptcy practitioner confirms the existence of a valid trust, along with the identity and entitlements of beneficiaries.²⁰⁶ Moreover, the costs of the bankruptcy practitioner's work in doing so may be chargeable to trust assets.²⁰⁷ Again, the M-Pesa trust arrangement offers a possible solution to this problem. As described above, Safaricom is *not* the trustee of the assets representing funds received in exchange for the issue of M-Pesa. Instead, a separately incorporated entity performs this function. This structural separation should avoid the risk that the bankruptcy of Safaricom could delay the distribution of trust assets to M-Pesa customers.²⁰⁸

F. Structural Separation

The structure of M-Pesa points to a final and seemingly neglected strategy that shadow payment systems might employ to protect customers: structural separation. While structural separation could take many forms, the basic idea is that core payment functions would be performed by a dedicated bankruptcy remote legal entity, thereby ring-fencing customer funds from any distribution of assets to other creditors in the event of the parent

205. Assuming, of course, that the trust assets have been properly preserved, and that the cost of the administration of these assets in the event of bankruptcy are either not significant or not borne by the trust beneficiaries.

206. In the event that these issues are disputed, the delays may be significant. As the Financial Conduct Authority (FCA) observed in its post-Lehman review of the operation of the client assets sourcebook (CASS) regime in the U.K., there may be a trade-off between making a distribution speedily and making an accurate distribution; *PS14/9. Review of the client assets regime for investment businesses*, FCA (Oct. 6, 2014), <https://www.fca.org.uk/publications/policy-statements/ps14-9-review-client-assets-regime-investment-business>; See also Jo Braithwaite, *Law After Lehmans* (London Sch. Econ., Working Paper No.11/2014, 2014) (examining the impact of the various Lehmans bankruptcy decisions on principles of contractual interpretation and trust and bankruptcy law).

207. See *Re Berkeley Applegate (Investment Consultants) Ltd (No 3)* [1989] 5 BCC 803 (Ch). *Re Berkeley Applegate* turned on the construction of the remuneration rules for English liquidation proceedings, but has been applied by analogy in other forms of English insolvency proceedings. The approach to this question varies across common law jurisdictions; see e.g., the review of Australian authorities *In re AAA Financial Intelligence Ltd* (in liquidation) ACN 093 616 445 (No 2) 2014 NSWSC 1004 13, <http://www8.austlii.edu.au/cgi-bin/viewdoc/au/cases/nsw/NSWSC/2014/1004.html>.

208. A possible alternative, one in fact contemplated by the proposed Kenyan regulations, is to allow the state to step into the shoes of the trustee. However, this may be less attractive than structural separation insofar as the trustee is the debtor, as there will be negotiations between the bankruptcy practitioner appointed and the state over the proper conduct of the debtor's affairs and the distribution of its assets.

firm's bankruptcy. This entity could then be subject to basic forms of prudential regulation including, for example, portfolio restrictions, private third party insurance, or mandatory trusteeship. It could also be subject to prudential regulation and supervision by public regulatory authorities.

Structural separation can be viewed as potentially superior to other strategies for protecting customer funds in at least three respects. First, where a firm performs core payment functions in combination with other business activities, structural separation eliminates the need for customers, other creditors, or prudential supervisors to monitor these other aspects of the firm's business. It also makes it more straightforward to impose other prudential regulatory strategies without unnecessarily impacting on the firm's other business activities. Second, because the ring-fenced entity would be able to continue to meet its commitments in the event of its parent's bankruptcy, customers would face little or no risk of illiquidity or loss of value. As a result, there would also be little or no risk of destabilizing runs or externalities stemming from the inability of customers to pay creditors, suppliers, or employees. Finally, unlike the simple trust strategy, there is limited risk of *ex post* avoidance claims under corporate bankruptcy law. Structural separation is thus likely to be more effective than trusts as a means of partitioning assets. Together, these features enhance certainty for customers and promote greater confidence in the credibility of these systems' commitment to provide storage and liquidity during periods of institutional and systemic stress. Like portfolio restrictions, however, the ring-fencing of customer funds envisioned by structural separation necessarily limits the ability of institutions to engage in other socially useful forms of financial intermediation.

This survey of available strategies reveals a number of potentially significant tradeoffs. First, while private law strategies based on contract and trusts are likely to give market participants the most flexibility in designing and updating institutional arrangements in response to market developments—thereby fostering financial innovation—these strategies are particularly vulnerable to the strict application of corporate bankruptcy law. Second, while strategies that rely on banks and bank regulation may offer a high level of protection to customer funds and insulate the shadow payment system from potential systemic risks, these strategies run the risk of stifling innovation and competition within the payments industry. Third, many of the strategies that are likely to prove most effective in protecting customer funds and ensuring liquidity during periods of institutional stress—e.g. portfolio restrictions and structural separation—constrain the ability of institutions to use these funds to make loans and other longer term investments in the real economy. These trade-offs drive home the reality that there are no free lunches in the design and regulation of the shadow payment system.

VII. CONCLUSION

When scholars and policymakers examine the functions, operations, and regulation of modern payment systems they often take for granted that the institutional structure of these systems is deeply intertwined with the conventional banking system. One of the most important—and least appreciated—implications of this historical intertwining is that the unique prudential regulatory regimes governing banks generate important benefits for the stability of bank-based payment systems. Most importantly, the practical effect of these regimes is to relax the strict application of general corporate bankruptcy law, thereby enabling banks and bank-based payment systems to continue to perform their important economic functions under conditions of severe institutional stress. The emergence of payment systems that reside outside the perimeter of the regulated banking system thus

raises an important question: how credible is the commitment of these institutions to continue to perform their core payment functions under the same conditions? This Article has started the process of mapping the diverse range of institutional arrangements that make up this shadow payment system. It has identified the risks that this system poses to customers, along with the risks it may in future pose to financial and economic stability. It has also examined the effectiveness of some of the strategies that have or might be used to strengthen the credibility of the commitment to provide storage and liquidity during periods of institutional and systemic stress. This examination suggests that while these strategies may provide some degree of protection, there is considerable scope for further improvement. It also suggests that we have only just started to understand how the shadow payment system works, how resilient it is likely to be under stress and, thus, how effective it may prove as a potential substitute for conventional bank-based payment systems.