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Introduction

WE NEED TO TALK ABOUT MONEY

When I was young I thought that money was the most important thing in life. Now that I am old, I know it is.

—OSCAR WILDE

We want it. We need it. We work ourselves to the bone for it. We scrimp and we save it, use it to buy our groceries, pay our bills, put our kids through school, and save for our retirements. Whether we have any of it or not, money plays a profoundly important role in all our lives—both as a central institution of modern society and as something we experience on a unique and deeply personal level each and every day. Yet, for something so fundamental to the fabric of our lives and society, most of us spend remarkably little time thinking about what money is, where it comes from, and why we use *this* as money but not *that* as money.

The fact that we ask so few questions about the nature, sources, or design of our money is not simply a product of apathy, time constraints, or an aversion to complex, highly technical subjects. Our parents didn't talk to us about monetary institutions at the dinner table. We didn't miss that day at school. Believe it or not, the fact that most of us do not think about the institutional design of money is itself more or less *by design*. In fact, our money is legally engineered so that we can go about our daily lives without caring two cents about what makes our two cents worth two cents.

Today, the vast majority of the money in circulation in virtually all advanced economies exists in the form of bank deposits. These deposits represent the liabilities—the contractually enforceable *promises*—of your

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bank to accept, transfer, and return your money to you in accordance with your instructions. In the United States, these demand, time, savings, and other deposits account for roughly 85 percent of the total money supply—over \$21 trillion.¹ This figure dwarfs the value of all the other sources of money combined, including paper notes and coins (\$2.3 trillion) and retail “money market” funds (\$1.4 trillion).² And the United States is not alone. From the United Kingdom to Canada, Singapore to Australia, one of the defining features of the financial systems in most developed countries is their overwhelming reliance on bank deposits as a source of money. Accordingly, while the iconography of money often depicts it as a physical object printed, forged, and stamped by the machinery of the state, the reality is that most of our money consists of fundamentally intangible, electronically recorded IOUs made by what are, in theory at least, private firms.

So why do we trust these private firms with so much of our hard-earned money? The answer is that banks are not just any private firms. Nor are bank deposits just any contracts. In fact, banks and bank depositors benefit from some of the most sophisticated legal engineering the world has ever seen. Most importantly, the law provides banks with a public safety net not generally available to other types of private firms. This safety net includes access to central bank emergency lending facilities and special resolution frameworks for struggling banks. In almost 150 countries, banks and their depositors also benefit from deposit insurance schemes designed to ensure that banks can continue to honor their promises to depositors even during periods of severe financial distress—under conditions where most other firms would be forced to shut their doors and declare bankruptcy.³ Collectively, these privileges and protections give banks an enormous comparative advantage in the creation of the promises that we call money. They also place banks at the center of a vast and sprawling electronic payment network in which this money constantly flows between households, businesses, and governments.

1. See Federal Reserve Bank of St. Louis, Money Stock Measures—H.6 (July 2023), reporting bank M2 (deposits minus currency in circulation) of \$18.445 trillion and total reserve balances of \$3.178 trillion.

2. Federal Reserve Bank of St. Louis, Money Stock Measures; see also Investment Company Institute, “Money Market Fund Assets” (September 28, 2023), <https://www.ici.org/research/stats/mmf>.

3. International Association of Deposit Insurers, “Deposit Insurance Systems Worldwide” (October 2, 2023), <https://www.iadi.org/en/about-iadi/deposit-insurance-systems/dis-worldwide/>.

Yet this system is in the process of undergoing an important and potentially destabilizing period of technological disruption. New technology is rapidly expanding the frontier of what is possible in the realm of money and payments. Spurred by a dramatic leap forward in computer storage capacity and processing power, along with the emergence and widespread adoption of the internet, social media platforms, and smartphones, entrepreneurs all over the world have sought to harness new technology to challenge the long-entrenched position of banks at the apex of our systems of money and payments. These efforts have already yielded popular payment platforms such as PayPal, Venmo, and Wise, China's Alipay and WeChat Pay, and Kenya's M-PESA. They have also yielded a variety of new and still relatively untested payment instruments, such as Tether, USDC, and other so-called stable-coins. And on the horizon, it is probably only a matter of time before we see Amazon, Google, and other big tech platforms officially enter the race for our wallets. While the technological diversity of these new institutions, platforms, and instruments can be overwhelming, the defining feature of this emerging "shadow" monetary system is that it seeks to compete with banks in the lucrative markets for money and payments while remaining *outside* the perimeter of the public safety net that has historically served to protect banks and their depositors.

The emergence of the shadow monetary system is by no means a recent development. Varieties of shadow money—e.g., bills of exchange, commercial paper, repurchase agreements, and other wholesale money market instruments—have been around as long as the business of banking. This shadow monetary system has been at the root of many of the most destructive episodes in financial history: from the 19th century crises chronicled in Walter Bagehot's *Lombard Street*,⁴ to the Panic of 1907 that spurred the creation of the Federal Reserve System,⁵ to the global financial crisis.⁶ Yet, historically, this shadow monetary system has almost always been the domain of banks, broker-dealers, investment funds, and other sophisticated

4. See Walter Bagehot, *Lombard Street: A Description of the Money Market* (1873).

5. See Roger Lowenstein, *America's Bank: The Epic Struggle to Create the Federal Reserve* (2015); Hugh Rockoff, "It Is Always the Shadow Banks: The Regulatory Status of the Banks That Failed and Ignited America's Greatest Financial Panics," in Rockoff & Suto (eds.), *Coping with Financial Crises: Some Lessons from Economic History* (2018); Robert Bruner & Sean Carr, *The Panic of 1907: Lessons Learned from the Market's Perfect Storm* (2007); US National Monetary Commission, *Reports of the National Monetary Commission* (1909–1912), <https://fraser.stlouisfed.org/series/publications-national-monetary-commission-series-1493>.

6. See Morgan Ricks, *The Money Problem: Rethinking Financial Regulation* (2016); Gary Gorton & Andrew Metrick, *Slapped by the Invisible Hand: The Panic of 2007* (2010).

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financial institutions.⁷ Reflecting this sophistication, these institutions have often taken advantage of a wide variety of legal strategies—from contract and property, to corporate law and trusts—explicitly designed to replicate the safety and liquidity of conventional bank deposits.⁸ They have also successfully lobbied lawmakers from Washington, DC, to Beijing to enact laws that support their ability to enforce their contractual, property, and other legal rights in the event of their counterparty’s default, thus avoiding the harsh strictures of general corporate bankruptcy law. The end result is a system in which these sophisticated players are able to functionally re-create—at least to a point—the core legal privileges and protections enjoyed by banks and their depositors.

Understandably, these more sophisticated wholesale varieties of shadow money have long dominated academic and policy debates. Yet arguably the most important, promising, and yet frankly troubling feature of the emerging shadow monetary system of PayPal, Venmo, Alipay, and Tether is that new technology has enabled the sudden and dramatic expansion of this system to an entirely new universe of potential players: *the rest of us*. This raises a trillion-dollar question: Can we really trust these new financial institutions and platforms with our money? Do they take advantage of the same legal strategies that have long enabled more sophisticated players to sidestep the constraints of corporate bankruptcy law? If not, are they subject to regulatory frameworks that insulate their customers from the risks of contractual default and bankruptcy? And are the customers themselves even asking these important questions before making decisions about what to do with their money? As we shall see, the answer to all of these questions is very often a clear and resounding *no*.

There is a second trillion-dollar question that too often gets lost in the increasingly high-stakes debates over the future of money. That question is whether we can continue to trust banks with our payments. Given the comparative advantages that banks enjoy in the realm of money, it is something of a puzzle that they have not always been at the cutting edge of technological

7. A notable modern exception being US money market funds, which emerged in the high inflation environment of the 1970s to cater to retail and other investors frustrated by the imposition of caps on the amount of interest that banks could pay their depositors; see Alton Gilbert, “Requiem for Regulation Q: What It Did and Why It Passed Away,” 68 Federal Reserve Bank of St. Louis Review 22 (1986).

8. For foundational work on how law is used to construct money and other “safe assets,” see Anna Gelpern & Erik Gerding, “Inside Safe Assets,” 33 Yale Journal on Regulation 365 (2016). For a detailed treatment of how private law strategies are used as the basic code of capitalism, see Katharina Pistor, *The Code of Capital: How the Law Creates Wealth and Inequality* (2019).

advances in the realm of payments. Nor have banks in many countries been quick to adopt the new and potentially transformative payment technologies currently being developed outside the conventional banking system. In a world where banks typically own, control, or enjoy exclusive access to incumbent financial market infrastructure—the pipes through which payments flow—this raises the prospect that ongoing technological disruption may ultimately fail to yield meaningful benefits for customers looking to make cheap, fast, secure, convenient, and accessible payments.

This book is about the rapidly unfolding collision between money's past, present, and future: between the money of our parents and the money of our children. It is about the legal privileges enjoyed by conventional deposit-taking banks, and the significant barriers to entry they erect for potential new entrants. It is about the economic and technological forces driving the emergence of the new shadow monetary system, and the potential risks this system poses to customers, to incumbent banks, and to financial stability. It is about the comparative advantages of public policymakers and private enterprises in governing this system, and in providing both a stable medium of exchange and a fast, secure, convenient, and accessible means of payment. And, most importantly, it is about how the law should thread the incredibly difficult needle between promoting ongoing technological experimentation, competition, and innovation in payments and protecting the safety and stability of our core monetary institutions.

The story of the shadow monetary system will take us all over the world. This story begins in Continental Europe, the United Kingdom, and the United States, where centuries of legal and institutional experimentation gave birth to the banks, clearinghouses, and other financial market infrastructure at the heart of our conventional systems of money and payments. From there the story fast-forwards to the present day, where it expands to encompass the new generation of monetary experiments currently under way across the globe: from China, India, and Japan to Silicon Valley, Kenya, and Brazil. Accordingly, while this book is not strictly comparative in nature, its jurisdictional and temporal scope are specifically designed to draw out the potential insights these new experiments might hold for the future of money and payments. These insights are particularly salient for countries—like the United States—that, having once been at the forefront of the legal and institutional experiments that yielded the conventional banking system, now increasingly find themselves behind the technological and regulatory curve.

Before moving forward, it is also important to briefly explain what this book is *not* about. First, this book is not about the increasingly fraught

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politics of money. There is no doubt that monetary design is an inherently political project. Scholars, politicians, and economists from Aristotle to William Jennings Bryan to John Maynard Keynes have illuminated this essential truth. More recently, a rich vein of scholarship, including Christine Desan's *Making Money: Coin, Currency, and the Coming of Capitalism* (2015) and Stefan Eich's *The Currency of Politics: A Political Theory of Money from Aristotle to Keynes* (2022), has shed new light on the political choices underpinning our core monetary institutions.⁹ Nevertheless, even the most honorable political intentions—whether they be to “democratize” finance, promote greater financial inclusion, or address the “too-big-to-fail” problem—will inevitably fail to yield the desired results if they are not built on solid legal and institutional foundations. This book seeks to rediscover these foundations, and to use them as a basis for designing new monetary institutions that meet the unique challenges and opportunities of the digital age. Accordingly, while monetary design is inevitably an exercise in social and political engineering, this book focuses more narrowly on the legal and institutional engineering of money and payments.

Second, this book is not about international payment flows or the foreign exchange market. Once again, there is no doubt that the global macroeconomic, international trade, and geopolitical dimensions of money are extremely important. There is also an enormous and ever-growing literature exploring these dimensions¹⁰—one that has only grown since Russia's invasion of Ukraine in March 2022 and the subsequent imposition of economic sanctions designed to cut off Russia's access to the global payment system.¹¹ This book sidesteps the international and geopolitical dimensions of money to focus squarely on the microeconomic and legal foundations of monetary design. While “good money” and a “strong currency” often go hand in hand, they are ultimately two very different things.

Third, this book is not about crypto—although it does draw on some of the lessons stemming from the recent failure of several high-profile crypto intermediaries. While writing a book about bitcoin (BTC) and other digital

9. See also Jakob Feinig, *Moral Economies of Money: Politics and the Monetary Constitution of Society* (2022).

10. See, e.g., Eswar Prasad, *The Dollar Trap: How the U.S. Dollar Tightened Its Grip on Global Finance* (2015); Barry Eichengreen, *Exorbitant Privilege: The Rise and Fall of the Dollar and the Future of the International Monetary System* (2011) and *Globalizing Capital: A History of the International Monetary System* (1998).

11. For an excellent recent book on the interplay between economic sanctions and the structure of the global payment system, see Daniel McDowell, *Bucking the Buck: U.S. Financial Sanctions and the International Backlash against the Dollar* (2023).

assets would have probably sold more copies, the reality is that most of these assets—including BTC—currently bear few of the essential hallmarks of money. Nor are these assets widely used as a means of payment for goods and services outside the crypto ecosystem. This is not to say that so-called stablecoins or the distributed ledger technology on which they are built might not *someday* drive important improvements to our systems of money and payments.¹² Indeed, one of the central themes of this book is that this type of experimentation can be extremely valuable—if the risks are effectively managed. By the same token, this book is entirely agnostic about which extant or future technologies will eventually emerge to provide the foundations for the next generation of money and payments. What is more important for our purposes is that there inevitably will be a next generation, and that our laws and institutions should be designed to both nurture and support the resulting opportunities and effectively address the potential risks.

Finally, at the other end of the spectrum, this book is not about central bank digital currencies, or CBDCs. In the current policy environment, in which over one hundred countries have announced that they are exploring the prospect of developing a CBDC, this may seem like a curious choice.¹³ It is grounded in two intertwined observations. The first is that the development of CBDCs raises important consumer privacy and other concerns that have yet to be fully addressed and may ultimately serve to make them politically unpalatable. Second, and in part because of these concerns, the vast majority of CBDC models currently under consideration would be intermediated through the conventional banking system.¹⁴ As we shall see, these intermediated models blur the distinction between CBDCs, bank deposits, stablecoins, and other monetary IOUs. This makes the decision of whether or not to call something a “CBDC” more a question of marketing than fundamental design. In the end, the name on the tin matters far less than what’s inside.

This chapter introduces the conceptual building blocks that drive the rest of the book. It begins with Gresham’s law, the distinction between “good” and “bad” money, and the role of informationally insensitive debt contracts at the

12. Although there are a number of technical obstacles that would seem to undermine the potential for permissionless distributed ledgers to supplant our existing systems of money and payments; see, e.g., Frederic Boissay, Giulio Cornelli, Sebastian Doerr, & Jon Frost, “Blockchain Scalability and the Fragmentation of Crypto,” Bank for International Settlements Bulletin No. 56 (June 7, 2022).

13. See, e.g., Atlantic Council, Central Bank Digital Currency Tracker (March 2023), <https://www.atlanticcouncil.org/cbdctracker/>.

14. Atlantic Council, CBDC Tracker.

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heart of our current monetary system. It explains how the core features of general corporate bankruptcy law can destroy the function and value of these contracts, along with how conventional bank regulation and specifically the financial safety net serves to neutralize the application and destructive impact of bankruptcy law. The chapter also draws out the critical, yet often undertheorized, distinction between money and payments. This distinction then provides the springboard for articulating Gresham's *new* law: the observation that the technological advances that deliver faster, cheaper, and safer payments often far outpace the changes to our laws and institutions that deliver sound money. This in turn frames the fundamental policy challenge motivating this book: how to create a level legal playing field that encourages greater technological experimentation, competition, and innovation in the realm of payments, without simultaneously creating new threats to customer protection, to the safety and soundness of financial institutions, or to the stability of the wider monetary and financial system. The chapter concludes by laying out a more detailed road map for the book.

Gresham's Law

Sir Thomas Gresham was a Renaissance man. Born into a prominent English commercial family in the early sixteenth century, the Cambridge-educated Gresham was a lawyer, statesman, smuggler, and spy.¹⁵ Perhaps most importantly, Gresham was a shrewd foreign currency trader, arbitraging geographic and temporal differences in foreign exchange rates and advising a succession of kings and queens on matters of international finance. Armed with the profits and connections he acquired from these endeavors, Gresham would go on to found the Royal Exchange in London, which received a royal proclamation in 1571. Yet, for all his achievements, Gresham's legacy will forever be associated with a single and wholly unoriginal observation that he made to Queen Elizabeth I shortly after her accession to the English throne in 1558.

In Gresham's time, the bulk of the money circulating in England consisted of gold and silver coins. Two of Queen Elizabeth's predecessors, Henry VIII and Edward VI, had together overseen what has since come to be known as the Great Debasement.¹⁶ Designed to increase the revenue

15. See John William Burgon, *The Life and Times of Thomas Gresham* (1839).

16. See J. D. Gould, *The Great Debasement: Currency and the Economy in Mid-Tudor England* (1970).

generated by the Crown by reducing the cost of minting coins, the Great Debasement involved a gradual but significant reduction in the gold and silver content of English coinage. Nevertheless, by the time of Queen Elizabeth's accession, this debasement had eroded the real value of the government's other—nominally fixed—revenue sources, triggering a decline in the value of English coinage in foreign exchange markets and, predictably, undermining public confidence and trust in the currency of the realm.¹⁷ In a letter explaining to Queen Elizabeth why Her Majesty's coinage had thus descended into an "unexampled state of badness," Gresham observed that these debasements were the reason "that all your ffine goold was conveyd ought of this your realm."¹⁸

Gresham's statement has subsequently been interpreted in a variety of ways. Some argue that Gresham was criticizing so-called bimetallism—the use of both gold and silver coins as legal tender—as fundamentally unsustainable.¹⁹ Others have marshaled Gresham's law as an argument against private mints,²⁰ and in favor of replacing metallic coins with convertible paper currency.²¹ Still others have framed Gresham's law as a testament to the "unintended consequence of legislation"—namely, legal tender laws—"the intention of which is to force people to treat a money they view as inferior as if it were not so."²² But what we today know as Gresham's law is actually a reformulation of Gresham's original observation advanced by Henry Dunning Macleod almost three hundred years later, in 1858. In Macleod's view, the essence of Gresham's statement, and his enduring contribution to the field of monetary economics, was that "good and bad money cannot circulate together."²³ Over time, this reformulation has been further recast into the prosaic yet inscrutable aphorism that *bad money drives out good*.

So what exactly does this mean? One of the obvious properties of metallic coins is that they are subject to wear and tear, intentional shaving or

17. George Selgin, "Salvaging Gresham's Law: The Good, the Bad, and the Illegal," 28:4 *Journal of Money, Credit and Banking* 637, 644 (1996); Frank Fetter, "Some Neglected Aspects of Gresham's Law," 46:3 *Quarterly Journal of Economics*, 480–481 (1932), citing F. A. Froud, *History of England from the Fall of Wolsey to the Defeat of the Spanish Armada*, 471–472 (1870).

18. Letter from Gresham to Queen Elizabeth, headed "Information of Sir Thomas Gresham, Mercer, towching the fall of the exchange, MDLVIII," reproduced in Burgon, *Life and Times of Thomas Gresham*, 483–486.

19. See, e.g., Henry Dunning Macleod, *The Theory of Credit*, 421 et seq. (2nd ed., 1894).

20. See, e.g., Stanley Jevons, *Money and the Mechanism of Exchange*, 64, 82 (1875).

21. See discussion in George Selgin, "Gresham's Law," in Robert Whaples (ed.), *EH.Net Encyclopedia* (June 9, 2003), <http://eh.net/encyclopedia/greshams-law/>.

22. Selgin, "Gresham's Law."

23. Macleod, *The Elements of Political Economy*, 476–478 (1858).

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“clipping,” and other forms of physical debasement. With the passage of time, we would therefore expect to observe a divergence in the amount of metal contained in otherwise identical coins. At least as measured by the *market price* of the underlying metal—as opposed to the *face value* of the coins themselves—the result is that the coins with a higher metallic content will be more valuable than those with a lower metallic content. Importantly, where coins of both high and low metallic content are treated equally for the purposes of legal tender laws, thus requiring people and businesses to accept both at face value, this fixed equivalence can generate powerful incentive effects. Specifically, it compels holders to *hoard* the coins with a higher metallic content and *use* the coins with a lower metallic content to buy goods and services and pay their debts. It also encourages holders to export coins with higher metallic content to other countries in which they can engage in transactions that enable them to capture the higher intrinsic value of these coins (hence Gresham’s explanation to Queen Elizabeth about where all Her Majesty’s gold had gone). The result can be an equilibrium in which the universally preferred means of payment are coins with a lower metallic content and intrinsic value, which thereby come to dominate the money in circulation. Hence, bad money drives out good.

Over the decades, Gresham’s law has been debated, refined, and qualified. As economists Arthur Rolnick and Warren Weber rightly point out, once we take into account the transaction costs of actually using money—e.g., differences in storage, transportation, search, or verification costs—good money may very well drive out bad.²⁴ Consistent with this observation, there have been several historical episodes that on the surface appear to contradict the predictions of Gresham’s law, including the competing private mints that emerged during the California gold rush of 1848–1855.²⁵ Likewise, Nobel laureate Robert Mundell has observed that “strong” currencies tend to drive out “weak” ones in the context of international trade.²⁶ Yet it is worth noting that these observations tend to be drawn from historical episodes and contexts characterized by the absence of strict legal tender laws enforcing the fixed equivalence of good and bad money.²⁷ More importantly, these observations ultimately reinforce the fundamental insight at the heart of

24. Rolnick & Weber, “Gresham’s Law or Gresham’s Fallacy?,” 94:1 *Journal of Political Economy* 185 (1986).

25. Brian Summers, “Private Coinage in America,” 26:7 *Freeman* 436 (1976).

26. Robert Mundell, “Uses and Abuses of Gresham’s Law in the History of Money,” 2:2 *Zagreb Journal of Economics* 3 (1998).

27. See Selgin, “Salvaging Gresham’s Law,” 640–642.

Gresham's law: not all money is created equal, and differences in the quality, convenience, and, therefore, value of money can drive the patterns of how it is used in the real world.

Money, Good and Bad

Today, coins make up only a small fraction of the money supply in the United States, United Kingdom, European Union, and other advanced economies. Moreover, most of the coins that remain in circulation are no longer made of precious metals like gold or silver, but rather of highly engineered alloys of copper, nickel, and other less precious metals. But these changes in the economic importance and material composition of our coinage have not debased the relevance of Gresham's law in the twenty-first century. They simply demand that we further refine our understanding of the fundamental characteristics of "moneyness,"²⁸ and of the all-important distinction between good and bad money.

The standard textbook definition of money revolves around three core properties. As explained by economist Greg Mankiw in his influential textbook, "Money has three functions in the economy: It is a medium of exchange, a unit of account, and a store of value. The three functions together distinguish money from other assets."²⁹ Within this framework, an asset is a reliable *unit of account* if it can be used as a standardized benchmark—a yardstick for measuring the relative value of goods and services. As more artfully described by J. P. Koning, "The unit of account function of money refers to the fact that our economic conversations and calculations are couched in terms of a given monetary unit, whether that be the \$, ¥, or £."³⁰ Yet, in theory, literally any asset that can be counted can function as a unit of account: everything from apples to zebras. The reason we don't use apples or zebras as money is that their perishability presents us with a clear and obvious problem—the deterioration in their value over time. This points us toward the second core property of money: its function as a *store of value*. An asset is a reliable store of value if a given quantity of it can be used to buy

28. See Milton Friedman & Anna Schwartz, *Monetary Statistics of the United States: Estimates, Sources, Methods, and Data*, 151–152 (1970); John Hicks, *Value and Capital*, 163 (2nd ed., 1946) (both utilizing the term *moneyness* in relation to assets that are viewed as a reliable store of nominal value).

29. Mankiw, *Macroeconomics*, 314 (1998).

30. Koning, "A Simpler and More Accurate Way to Teach Money to Students," American Institute for Economic Research (December 10, 2020), <https://www.aier.org/article/a-simpler-and-more-accurate-way-to-teach-money-to-students/>.

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a roughly equivalent bundle of goods and services today, tomorrow, next week, and next year. Yet, once again, there are a great many assets—from real estate to diamonds to Birkin bags—that hold their relative value over time but that we do not generally use to buy food, make rent, or pay our taxes. This takes us to the third and final property of money. Specifically, an asset is a reliable *medium of exchange* if it is widely accepted within a society as an instrument for both buying goods and services and discharging debts.

This textbook definition of money has always been highly suspect. Perhaps most importantly, it's fairly clear that two of these three properties—the functions of money as a unit of account and a store of value—are neither necessary nor sufficient conditions for an asset to qualify as money. The citizens of Weimar Germany, who experienced triple-digit inflation *per month* in the early 1920s, continued to use Papiermarks in domestic transactions long after they ceased to represent a reliable store of value.³¹ There have also been several episodes—including Brazil in the early 1990s and Chile today—where the official unit of account in which many goods and services are priced does not actually circulate as a medium of exchange.³² In fact, as monetary economist George Selgin has observed, even William Stanley Jevons, the nineteenth-century economist who first advanced the standard tripartite definition of money, did not view these three functions as standing on equal terms.³³ Instead, Jevons saw money, first and foremost, as an asset “esteemed by all persons . . . and which, therefore, every person desires to have by him in a greater or lesser quantity, in order that he may have the means of procuring the necessities of life at any time.”³⁴ Put simply, the defining property of money is that it is widely embraced as a medium of exchange.

This insight enables us to focus more squarely on the properties of money that make it more or less desirable for this very specific purpose. Two properties stand out. First, money should have a stable *nominal* value. The standard textbook definition of money hinges on whether an asset is a reliable store of real value; i.e., whether that asset is able to maintain its purchasing

31. For a detailed history of this episode, see Gerald Feldman, *The Great Disorder: Politics, Economics and Society in the German Inflation, 1914–1924* (1997).

32. For a detailed description of the design and uses of these “indexed units of account,” see Robert Shiller, “Indexed Units of Account: Theory and Assessment of Historical Experience,” National Bureau of Economic Research Working Paper No. 6356 (January 1998).

33. See George Selgin, “A Three-Pronged Blunder, or, What Money Is, and What It Isn’t,” Alt-M blog (October 27, 2021), <https://www.cato.org/blog/three-pronged-blunder-or-what-money-what-it-isnt> (as Selgin notes, Jevons’s original taxonomy actually identified four functions of money).

34. Jevons, *Money and the Mechanism of Exchange*, 13.

power over time. In contrast, a stable nominal value means that when you go to spend one dollar, euro, or peso, it is accepted as representing that precise value and not, for example, 95 cents. Thus, when you order an espresso at Sant' Eustachio Il Caffè in Rome and the menu lists the price as €3.50, you can be confident that the three one-euro notes and 50c in your pocket will be sufficient to secure your caffeine fix for the day.

Paradoxically, the fundamental importance of this property is illuminated by proposals that envision a world in which new technology enables us to use assets with a floating nominal (and real) value to conduct day-to-day purchases.³⁵ As economist John Cochrane explains: “With today’s technology, you could buy a cup of coffee by swiping a card or tapping a cell phone, selling two dollars and fifty cents of an S&P 500 fund, and crediting the coffee seller’s two dollars and fifty cents to a mortgage-backed security fund.”³⁶ Putting aside the fact that the sale of the S&P 500 fund would trigger a taxable event every time you purchased an espresso, the real problem with this proposal stems from the fact the most of us face fairly strict budget constraints. Specifically, we get paid a fixed amount of money each paycheck, which we must then use to buy food, clothing, and Jevons’s other “necessities of life.” Importantly, we also use this money to pay nominally fixed debts like our rent, mortgage, utilities, and student loans.

In the presence of these nominally fixed budget constraints, holding an asset that exposes us to the volatility of something like the S&P 500 index—which tracks the prices of a basket of 500 publicly traded US stocks—leaves us vulnerable to short-term declines in this asset’s value. When this asset is then also used as a medium of exchange, these short-term declines leave us with less money in real terms and thus at risk of being unable to purchase the things we need to live or to meet our ongoing financial obligations. This risk is especially acute for those living paycheck to paycheck, who by definition lack the financial reserves needed to weather this type of volatility. Viewed from this perspective, ensuring that money has a stable nominal value is desirable because it means that households and businesses will be less likely to encounter short-term liquidity or solvency problems, while simultaneously putting them in a better position to engage in longer-term financial planning.

35. See John Cochrane, “Toward a Run-Free Financial System,” in Martin Baily & John Taylor (eds.), *Across the Great Divide: New Perspectives on the Financial Crisis* (2014).

36. Cochrane, 199.

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The second core property of money is that users should be able to quickly, easily, and securely use it within a relatively large network of individuals, households, businesses, and governments. This property—the role of money as a *means of payment*—exists on a multidimensional scale that incorporates variables such as cost, speed, convenience, security, accessibility, and the size of the relevant network. Almost inevitably, this property also depends greatly on context. While your euro notes and coins were useful at Sant’ Eustachio Il Caffè, they are completely useless when shopping for a new coffeemaker on Amazon. Importantly, where a given monetary system or instrument resides on this scale depends on a range of different factors: including the legal frameworks supporting money and payments, the prevailing technological environment, and the level of social acceptance enjoyed by core monetary institutions. Together, these factors combine to determine what Keynes described as the “liquidity-premium” of money: the confidence that users have in the ability to immediately, and without question, use an asset to purchase goods and services and discharge their debts.³⁷ This confidence is the essence of money’s moneyness.

This second property highlights the critically important, and yet often neglected, relationship between money and payments. It also frames how the two core properties of money as a medium of exchange serve to reinforce one another. Ultimately, the reason we want money to represent a reliable store of nominal value is because we use it every day to purchase the things we need. At the same time, the fact that we use money every day helps explain why we want it to have a fixed nominal value. As a consequence, a reliable store of nominal value that cannot easily be used to make everyday payments (like the Big Maple Leaf, a 220-pound, \$1 million coin issued by the Royal Canadian Mint) is of no more use than a technologically advanced payment system that can only be used to transfer unreliable stores of nominal value (like BTC). Over the long term, these twin properties thus play a pivotal role in shaping what society views as good and bad money.

Today, we tend to take both of these properties for granted. As we shall see, this complacency reflects the legally engineered homogeneity at the root of our current systems of money and payments. But as the very existence of Gresham’s law suggests, our ancestors would have been all too familiar with the acute problems created by pervasive heterogeneity in the quality of

37. John Maynard Keynes, *The General Theory of Employment, Interest and Money*, 142–144 (1936).

money as both a store of nominal value and a means of payment. This has an important upshot. As the rise of the shadow monetary system continues to reinject a significant and rapidly growing degree of diversity into our monetary system, we must rediscover the importance of these properties, how to use them to distinguish between good and bad money and, ultimately, how to design laws and institutions that can support this diversity without undermining confidence in our monetary system.

Money as a Promise

We have already observed that our money supply is no longer made up of gold and silver coins. Indeed, both logic and experience suggest that this type of “commodity” money poses unique challenges—especially in a dynamic and fast-growing economy. Most of these challenges stem from the natural supply constraints on the raw materials needed to mint this commodity money, and the fact that both the timing and quantity of the discovery and extraction of new supplies may not closely match the demand for money in the economy. Where the value of money is fixed relative to a specific commodity like gold or silver, this mismatch forces any changes in the prevailing supply and demand conditions for these commodities to be reflected in the prices of the goods and services we consume.³⁸ The net effect of this relationship is to tether the general rate of inflation to the rate at which these commodities can be found and extracted. Over the long term, where an economy is growing faster than these commodities can be discovered, mined, refined, and minted into money, the resulting imbalance between supply and demand can lead to economically damaging deflation as households, businesses, and governments hoard money rather than use it to purchase goods or services or make longer-term investments.

Further complicating matters, in a system based solely on commodity money, short-term constraints on the supply of these commodities can handcuff the ability of central banks and fiscal policymakers to expand the money supply in response to deflationary spirals, banking crises, or other macroeconomic shocks.³⁹ Thus, for example, the scale of the monetary and fiscal policy response to something like the COVID-19 pandemic would be dictated by the

38. See Ben Bernanke, “Origins and Mission of the Federal Reserve—the Gold Standard” (March 2012), <https://www.federalreserve.gov/aboutthefed/educational-tools/lecture-series-origins-and-mission.htm>.

39. See Barry Eichengreen, *Gold Fetters: The Gold Standard and the Great Depression* (1992); Liaquat Ahamed, *Lords of Finance: The Bankers Who Broke the World* (2009).

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amount of gold, silver, or other monetary commodities locked away in central bank vaults. Some view these “hard money” constraints as a feature rather than a bug—a natural check on inflation, expansionary monetary policy, and moral hazard. Yet, as the experience of the US under the gold standard during the late nineteenth and early twentieth centuries arguably demonstrates, the use of commodity money can contribute to relatively high volatility in both inflation and economic growth, along with an increase in the number and severity of banking crises.⁴⁰ Adding insult to injury, the inherent inelasticity of commodity money has also frequently led policymakers to abandon it—sometimes temporarily, other times permanently—in response to severe economic and financial shocks.⁴¹

Predictably, as both domestic and international economies have grown more dynamic, the gold standard and other systems based on commodity money have gradually been supplanted by more flexible and elastic systems of credit-based money. As this name implies, these systems are based on the issuance of *debt contracts*—monetary IOUs—that can be used as both a nominal store of value and a means of payment. Today, the most familiar and ubiquitous form of credit-based money is the bank deposit contract. Bank deposits represent the contractually enforceable promises of your bank to accept your money, credit it to your account, transfer these credits in accordance with your instructions, and return an equivalent amount of money to you within the time frame specified in the contract. These promises are created whenever you deposit money into your bank account. Importantly, they are also created whenever your bank makes a

40. See Stephen Cecchetti & Kermit Schoenholtz, “Why a Gold Standard Is a Very Bad Idea,” Money & Banking blog (December 19, 2016), <https://www.moneyandbanking.com/commentary/2016/12/14/why-a-gold-standard-is-a-very-bad-idea> (comparing the average and standard deviation of consumer price inflation and gross national product growth between 1882 and 1932 versus 1973 and 2016). For a competing view that both challenges the causal relationship between these variables and the gold standard and highlights the role of bad policy in contributing to the instability during this period, see George Selgin, “Ten Things Every Economist Should Know about the Gold Standard,” Alt-M blog (June 4, 2015), <https://www.alt-m.org/2015/06/04/ten-things-every-economist-should-know-about-the-gold-standard-2/#gold-supply-shocks>.

41. For example, as described in greater detail in chapter 2, the government of the United Kingdom repeatedly suspended the gold standard—as operationalized by the Bank Charter Act of 1844—in response to a succession of financial crises between 1847 and 1866; see Mike Anson, David Bholat, Miao Kang, & Ryland Thomas, “The Bank of England as Lender of Last Resort: New Historical Evidence from Daily Transaction Data,” Bank of England Staff Working Paper No. 691 (2017); Vincent Bignon, Marc Flandreau, & Stefano Ugolini, “Bagehot for Beginners: The Making of Lender-of-Last-Resort Operations in the Mid-Nineteenth Century,” 65 Economic History Review 580 (2012).

new loan, with the proceeds taking the form of new deposits credited to the borrower's account.⁴²

The widespread use of credit-based money poses profound challenges for monetary design. Unlike commodity money, bank deposits and other monetary IOUs have little or no intrinsic value. Instead, their value is a function of the expectation that the promises embodied in these contracts will be honored by the promisor—whether it be your bank, PayPal, M-PESA, or your cousin Greg. In theory, this means that the *identity* and *credibility* of the people or institutions making these promises should matter a great deal: with differences in risk appetite, wealth, revenue sources, debt levels, and overall creditworthiness all reflected in the value of monetary IOUs issued by different promisors. Intuitively, it also means that there should be some promisors that are so fundamentally lacking in credibility and creditworthiness that it would be foolish to accept their promises as representing either a reliable store of nominal value or an effective means of payment. As the late great Hyman Minsky once quipped, “Everyone can create money; the problem is to get it accepted.”⁴³

The challenges posed by the widespread use of credit-based money are compounded by the omnipresent threat of *bankruptcy*. In a nutshell, bankruptcy is a legal process whereby the assets and liabilities of firms that find themselves balance sheet insolvent, or otherwise unable to pay their debts as they fall due, are either restructured or wound down.⁴⁴ The substantive and procedural requirements of corporate bankruptcy law vary from jurisdiction to jurisdiction. However, once a firm enters into bankruptcy, bankruptcy law in most jurisdictions envisions the application of two foundational rules that dramatically interfere with the firm's ability to honor its outstanding contractual commitments, including its monetary IOUs. The first rule is a procedural requirement—an *automatic stay*—that suspends any enforcement action against the assets of the bankrupt firm by its creditors until the conclusion of the bankruptcy process. The second rule is a substantive requirement—the *pari passu rule*—that forces unsecured creditors to share

42. For a more detailed description of this process, see Michael McLeay, Amar Radia, & Ryland Thomas, “Money Creation in the Modern Economy,” Bank of England Quarterly Bulletin (Q1: 2014).

43. Minsky, *Stabilizing an Unstable Economy*, 228 (1986).

44. For a detailed description of the logic of corporate bankruptcy law, see Thomas Jackson, *Logic and Limits of Bankruptcy Law* (1986); Thomas Jackson & Douglas Baird, “Corporate Reorganizations and the Treatment of Diverse Ownership Interests: A Comment on Adequate Protection of Secured Creditors in Bankruptcy,” 51 University of Chicago Law Review 97 (1984).

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in any distribution of the bankrupt firm's assets on a pro rata basis. In effect, the application of the *pari passu* rule means that each claim made by an unsecured creditor against the bankrupt firm will be pooled together with those of all its other unsecured creditors, with each creditor then eventually paid on a proportionate basis out of any assets that remain after other, more senior, creditors have been fully repaid.

Together, these rules undermine the credibility of monetary IOUs in two critical ways. First, the automatic stay prevents any party holding these IOUs from transferring or withdrawing their money for the duration of the bankruptcy process. In a world where this process may last several years, the practical effect is to “freeze” this money within the estate of the bankrupt firm—thereby suspending its use and value as a means of payment. Second, insofar as the holders of these monetary IOUs are unsecured creditors, the *pari passu* rule may ultimately force them to write down the value of their contractual claims against the bankrupt firm. Indeed, in some cases, these holders may only get back pennies on the dollar—and perhaps even nothing at all. The fact that these creditors are exposed to potentially enormous losses is fundamentally inconsistent with the expectation that these IOUs represent a reliable store of nominal value. Viewed in this light, the automatic stay and *pari passu* rule are the kryptonite of credit-based money—robbing monetary IOUs of their essential moneyiness.

The Paradox of Good Money

Given the challenges posed by the widespread use of credit-based money in the shadow of bankruptcy, one might reasonably ask why depositors don't spend more time worrying about the creditworthiness of their banks. Indeed, we might ask why depositors entrust banks with their money, but typically not their local supermarket, hairstylist, or car dealership.⁴⁵ As a preliminary matter, bankruptcy law in countries like the United States explicitly exempts banks from the application of general corporate bankruptcy law, including the automatic stay and *pari passu* rule.⁴⁶ Bankruptcy law is then replaced with tailor-made bank resolution frameworks specifically designed

45. Although, in the absence of banks, other retail establishments have occasionally stepped into the breach. For example, in the thick of an industrial dispute that closed the Republic of Ireland's banks for several months in 1970, local pubs kept the nation's money and check clearing system afloat; see Antoin Murphy, “Money in an Economy without Banks: The Case of Ireland,” 46:1 *Manchester School* 41 (1978).

46. Bankruptcy Act of 1978, § 109.

to reduce the risk that depositors will have their money frozen or be forced to write down the value of their monetary IOUs. These frameworks work in tandem with deposit insurance schemes that enable the government to step into the shoes of a failing bank and honor its contractual commitments to return depositors' money. And even before banks find themselves on the brink of failure, central bank emergency lending—or “lender of last resort”—facilities permit banks to borrow money against their illiquid loans and other assets; money that can then be used to keep their promises to depositors and other creditors. This public safety net ensures that a bank's monetary IOUs continue to serve as a reliable store of nominal value and means of payment even during periods of severe institutional stress—thus reengineering otherwise risky deposit contracts into paragons of good money.

The practical effect of this legal engineering is to transform bank deposits into what economists Bengt Holmstrom, Gary Gorton, and others have labeled “informationally insensitive” debt contracts.⁴⁷ In a world dominated by the twenty-four-hour financial news cycle, the concept of an informationally insensitive debt contract may seem somewhat counterintuitive. Indeed, we would normally expect the value of bonds, loans, and other debt contracts to fluctuate in response to changes in the business prospects and creditworthiness of the issuer, prevailing macroeconomic conditions, market interest rates, and any other variables that have an impact on the opportunity cost of money or the probability that a lender will eventually get paid back. In an informationally efficient market, we would then expect the process of price discovery to ensure that these changes in value were rapidly incorporated into the market price of these contracts.⁴⁸ The prices of many publicly traded bonds, for example, rise and fall on a daily basis in response to new information. The prospect of acquiring and trading on this information *first*—and thus reaping the profits from any subsequent price changes—is ultimately what drives investors to undertake due diligence into the value of these contracts.

47. See, e.g., Holmstrom, “Understanding the Role of Debt in the Financial System,” Bank for International Settlements Working Paper No. 479 (January 2015); Gorton & George Pennacchi, “Financial Intermediaries and Liquidity Creation,” 45(1) *Journal of Finance* 49 (1990); Gorton, Chase Ross, & Sharon Ross, “Making Money,” National Bureau of Economic Research Working Paper No. 29710 (January 2022). For older work drawing on similar themes, see also Armen Alchian, “Why Money?,” 9:1 *Journal of Money, Credit and Banking* 133 (1977).

48. See Eugene Fama, “Efficient Capital Markets: A Review of Theory and Empirical Work,” 25 *Journal of Finance* 383 (1970). For a survey of the empirical literature testing Fama's efficient market hypothesis, see Burton Malkiel, “The Efficient Market Hypothesis and Its Critics,” 17 *Journal of Economic Perspectives* 59 (2003), and “The Efficient-Market Hypothesis and the Financial Crisis,” in Blinder et al. (eds.), *Rethinking the Financial Crisis*, 75 (2012).

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Informationally insensitive debt contracts stand this paradigm on its head. The defining feature of these contracts is that they are specifically designed to eliminate any incentive to undertake this type of costly due diligence. This is typically achieved by overcollateralizing the relevant debt: either by backing it with other assets that exceed the face value of the IOU, or by obtaining a guarantee from an institution—like the government—that is not subject to bankruptcy or liquidity constraints. By making buyers and sellers of this debt indifferent to the creditworthiness of the promisor, this overcollateralization is designed to serve as a substitute for costly investments in the acquisition of new information about the probability that they will get paid back. The net effect is what Holmstrom describes as a “blissful state of symmetric ignorance” between buyers and sellers.⁴⁹

This symmetric ignorance serves two important and self-reinforcing functions. First, it gives buyers and sellers confidence that, when engaging in transactions involving this debt, they will not be vulnerable to exploitation by counterparties who possess superior information. Second, by eliminating the process of price discovery, it ensures that the price of this debt will remain stable in every potential future state of the world. The net result is that both buyers and sellers are readily willing to accept this debt “no questions asked,”⁵⁰ without worrying about the identity or creditworthiness of the promisor. In theory, these traits combine to make informationally insensitive debt contracts an ideal species of monetary IOU.

In reality, of course, informationally insensitive debt contracts exist on a spectrum. Some monetary IOUs—like insured bank deposits—remain almost completely insensitive to new information in virtually all states of the world. But a great many others are exposed to the risk that, in some particularly volatile and uncertain states, their holders will start to question whether the promisor can continue to meet its contractual obligations. At this critical inflection point, the holders of these IOUs face a stark choice: either conduct the costly due diligence necessary to evaluate the probability and impact of the promisor’s default or simply head for the exits. Where a critical mass of holders chooses the second option, this can trigger a chain reaction whereby the resulting liquidity pressure on the promisor can undermine its solvency, and where the threat of insolvency can undermine the credibility and stability of its monetary IOUs. Inevitably, this risk of instability depends on features specific to each IOU: including the holder’s contractual and other

49. Holmstrom, “Understanding the Role of Debt,” 6.

50. Gorton, Ross, & Ross, “Making Money,” 2.

legal rights, the quantity and quality of any posted collateral, the correlation between the value of the collateral and the credit risk of the promisor, and the credibility and creditworthiness of any third-party guarantor. Understanding the variance in these features across different monetary IOUs is thus extremely important to successfully differentiating between good and bad money.

This presents us with something of a paradox. On the one hand, informationally insensitive debt contracts are designed to work in a world of symmetric ignorance—one in which neither buyers nor sellers undertake due diligence into the idiosyncratic features, credibility, or potential instability of monetary IOUs. On the other hand, this type of due diligence is precisely what is necessary to determine whether and to what extent a given monetary IOU is in fact informationally insensitive in each and every potential future state of the world, and thus whether the holders of these IOUs should view them as good money. After all, how else can we distinguish between good and bad money? Ultimately, *somebody* needs to ask these questions, or we are all very unlikely to be happy with the answers.

This paradox arguably presents few challenges in a world of completely static and homogeneous money. For well over a century, banks have been the dominant source of monetary IOUs in the United States, United Kingdom, Continental Europe, and many other jurisdictions. Over this span, financial policymakers and regulators have gradually developed and refined a variety of mechanisms for ensuring the credibility of bank deposits. These mechanisms include the various components of the financial safety net, along with sophisticated frameworks of prudential regulation and supervision.⁵¹ Whether by accident or design, the result has been the creation of a monetary system and regulatory apparatus built around Mark Twain's famous advice to "put all your eggs in the one basket and WATCH THAT BASKET."⁵² While this system and apparatus are far from perfect, they have nevertheless engendered a relatively high degree of public confidence in the idea—tested in the fires of thousands of bank failures—that we can accept and hold bank deposits, no questions asked.⁵³

51. See Lev Menand, "Why Supervise Banks? The Foundations of the American Monetary Settlement," 74 *Vanderbilt Law Review* 951 (2021).

52. Mark Twain, "Pudd'nhead Wilson," *Century Magazine* (April 1894).

53. See, e.g., Agustin Carstens, Stijn Claessens, Fernando Restoy, & Hyun Song Shin, "Regulating Big Techs in Finance," *Bank for International Settlements Bulletin* No. 45, 6 (August 2, 2021) (reporting the results of a consumer survey in which respondents reported far higher levels of trust in banks and other conventional financial institutions than either big tech platforms or governments).

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Importantly, the challenges presented by this paradox become far more evident and acute in a world of heterogeneous and fast-moving money. In particular, where there exists a diverse range of monetary IOUs, and where the universe of monetary IOUs is constantly expanding, policymakers face the herculean task of attempting to watch a thousand eggs in a thousand different baskets. Compounding matters, the general public—unaccustomed to asking questions about the design and credibility of its money—may fail to identify or fully comprehend the unique features of different monetary IOUs. In this more complex and dynamic world, Gresham’s law takes on newfound importance as both policymakers and the public struggle to distinguish between good money and bad.

Good Money versus Good Payments

One could be forgiven for thinking of money and payments as inextricably intertwined. Not only are payments baked into the very definition of money, this tightly bundled relationship is reinforced by our everyday experience. The paper notes and coins in our wallets and purses are both money and their own built-in payment system—with physical delivery of the object itself sufficient to transfer its ownership and value from one person to another. Banks similarly play a dual role as both the dominant source of monetary IOUs and the principal architects and custodians of the technological infrastructure through which these IOUs are electronically transferred between individuals, households, businesses, and governments. As a result, we can both hold and transfer money around the world without it ever leaving the balance sheets and computer servers of the conventional banking system. Yet, in both theory and practice, money and payments are ultimately two very different things. Whereas money is a representation of *value*, payment systems are *how this value is transferred* in satisfaction of our financial obligations. If money is the liquid that lubricates the machinery of economic life, payment systems are the pipes through which this liquid flows.

This distinction introduces a new and important dichotomy into our framework: one between good money and good payments. This distinction can be observed across at least three dimensions. The first dimension is purely definitional: whereas money is an asset (stock), a payment is a transaction (flow) (see figure I.1). The second dimension reflects their key determinants—what drives them. Whereas good money is primarily a product of laws and institutions that establish and maintain the credibility of monetary commitments, good payments are the product of decisions about the design, application, and governance of the technology at the heart

FIGURE I.1. Good Money versus Good Payments

Objective	Principal drivers	Key benchmarks
Good money	• Law • Institutions	• Stable nominal value • Widely accepted as a means of payment
Good payments	• Technology • Network design • Network governance	• Cost • Speed • Security • Convenience • Accessibility • Interoperability

of financial networks. The third dimension represents the benchmarks by which we measure their success. The question of whether an asset qualifies as good money is ultimately measured against whether it's a reliable store of nominal value and widely used as a means of payment. In contrast, whether a transaction qualifies as a good payment is a function of considerations like cost, speed, security, convenience, accessibility, and interoperability.

In recent decades, we have witnessed a growing disconnect between good money and good payments. It started innocently enough with money transmitters, like Western Union and MoneyGram, that enabled customers to send and receive money by telegraphic wire transfer rapidly and across vast distances. While these money transmitters were not banks, their customers were generally not concerned about the credibility and creditworthiness of their monetary IOUs because they existed for such a brief period of time—typically only as long as it took for the intended recipient to get to the nearest branch. The invention and popularization of the internet, followed by the development and proliferation of smartphones, then gave birth to peer-to-peer (P2P) platforms like PayPal and WeChat Pay. These P2P payment platforms offered customers benefits like greater speed, convenience, and the ability to send and receive money electronically without sharing their bank details and other confidential information with complete strangers. In notable contrast with earlier money transmitters, these web-based payment platforms have also evolved to hold tens of billions of dollars in customer funds for lengthy, and potentially indefinite, periods of time.⁵⁴ And then,

54. For example, as of December 31, 2023, PayPal reported holding “funds payable and amounts due to customers” totaling \$41.9 billion; PayPal Inc., Annual Report, page 58 (December 31, 2023): <https://investor.pypl.com/financials/annual-reports/default.aspx>. While reliable data is scarce, the customer balances held by the biggest Chinese platforms—WeChat Pay and Alipay—are thought to be considerably larger.

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almost overnight, Tether, USDC, and other stablecoins emerged to support the growing crypto ecosystem. Between January 2019 and September 2023, these stablecoins collectively attracted over \$100 billion in new customer funds.⁵⁵ While these figures are still a drop in the bucket compared to the outstanding stock of conventional bank deposits, the spectacular growth of these new monetary IOUs over such a short period of time has quite rightly made policymakers stand up and take notice.

This book explores whether these and other new monetary experiments should be viewed as good money. In many cases, it argues that they are not. Simultaneously, it is increasingly hard to deny that many of these new institutions and platforms hold out significant advantages over the incumbent bank-based payment systems they seek to compete with and, perhaps one day, supplant. Some offer greater speed or enhanced privacy. Others offer more convenience, like the ability to quickly and easily split a restaurant bill between friends. Still others offer greater interoperability, including the ability to cheaply and instantly send money overseas or connect to the rapidly expanding crypto ecosystem. And, last but not least, some provide basic access to an electronic payment network where both the government and conventional banking system have failed to build and maintain the necessary infrastructure. Accordingly, regardless of whether we think these new monetary IOUs are good money, it is increasingly hard to deny that they often represent very attractive ways to make good payments.

Clearly, the overarching policy objective should be to promote the development of financial institutions, platforms, and networks that combine good money and good payments. Some countries, like India, Sweden, and Australia, have taken great strides toward achieving this objective in partnership with the conventional banking industry. Others, like China and Brazil, have done so with far less initial support from incumbent banks. Yet for a great many countries—including the United States—the reality is a large and growing divergence between the sources of good money and good payments. The result is an equilibrium in which good and bad money increasingly circulate alongside one another, and where bad money enjoys a growing

55. See Gordon Liao & John Caramichael, “Stablecoins: Growth Potential and Impact on Banking,” Federal Reserve Board of Governors, International Finance Discussion Paper No. 1334, 3 (January 2022) (reporting the growth in stablecoins between 2019 and 2021). For the current market capitalization of major stablecoins, see <https://coinmarketcap.com/> (reporting a market capitalization of over \$110 billion for the two largest stablecoins, Tether, USDC, and DAI, as of January 2024).

comparative advantage in terms of fast, secure, convenient, accessible, and interoperable payments.

Shining a spotlight on this disconnect yields three important payoffs. The first is for consumer behavior. During periods of relative stability, we should expect consumers to shift toward the use of monetary IOUs that offer the cheapest, fastest, most convenient, and most accessible means of payment. The reason for this should be obvious: while customers experience the benefits of good payments *today*, the risk that the value of their monetary IOUs will be destroyed in bankruptcy is highly contingent, mind-numbingly technical, and thus extremely difficult to accurately predict. What's more, if this risk materializes at all, it will only do so at some indeterminate point in the *future*. Just as the paradox of good money suggests, consumers may therefore not even factor these risks into the equation when making important decisions about what to do with their money. At best, the result of this time inconsistency problem is a world in which consumers heavily discount the prospect that their money may one day no longer function as a reliable store of nominal value or means of payment—driving them to value good payments over good money. Over time, these collective decisions should then be reflected in the gradual expansion of the shadow monetary system, which is of course exactly what we are observing today.

The second payoff is for the nature and importance of the resulting policy challenge. If the problem was simply the emergence of bad money, the obvious solution would be to expand the perimeter of conventional bank regulation, along with the public safety net, to encompass the emerging shadow monetary system. Policymakers could also simply ban it: relegating this system to the dustbin of monetary history. Yet the problem is made significantly more complex by virtue of the fact that this system has yielded real benefits—benefits that the conventional banking system, despite all the advantages of incumbency, has often failed to deliver. This raises the prospect that forcing the shadow monetary system into the exquisitely tailored straitjacket of conventional bank regulation, ostensibly in order to promote good money, may ultimately come at the expense of good payments. Viewed in this light, the challenge for policymakers becomes how to ensure the safety and stability of the monetary system while simultaneously promoting ongoing experimentation, competition, and innovation in the realm of payments.

The final payoff is for the potential roles of both the public and private sectors in rising to meet this challenge. Scholars have long debated ontological questions around the nature of money: including whether it should

be viewed as an inherently public or private institution. Some view money as a spontaneous, market-driven response to the frictions of bartering and the so-called double coincidence of wants problem.⁵⁶ Others view money as a creature of the state—with its importance and value derived from its status as legal tender and the fact that it is accepted by the government in satisfaction of taxes and other public debts.⁵⁷

Yet by illuminating the fundamental distinction between good money and good payments, we can start to see that both accounts are woefully incomplete and that the hotly contested metaphysics of money are often less than helpful from a policy perspective. In reality, public and private actors often possess very different strengths when it comes to money and payments. Specifically, whereas the state often enjoys a unique comparative advantage in the legal and institutional construction of good money, private enterprise—by virtue of its collective expertise, powerful incentives, and the sheer number of experiments it is capable of conducting—often excels in the development of the new technology driving cheaper, faster, and more convenient payments. Similarly, while the state can play an important role in identifying emerging problems and challenges and in coordinating the subsequent policy response, private enterprise often possesses the technical knowledge, expertise, and other resources needed to design and implement effective solutions. As we shall see, these comparative advantages are far from universal. Nevertheless, they suggest that the best solutions are likely to be found when the public and private sectors work together, creatively and pragmatically, to deliver both good money and good payments.

Gresham's *New Law*

We now have all the pieces we need to reframe Gresham's law for the digital age. The foundations of Gresham's *new* law are built on three observations. First, we live in a world of increasingly heterogeneous money. Gone are the days when banks were the only game in town. Today, even though banks still typically reside at the apex of our systems of money and payments, they are facing mounting competitive pressure from technology-driven financial institutions and platforms that have emerged as part of the rapidly expanding and evolving “fintech” ecosystem. Second, for a variety of reasons, these new

56. See, e.g., Karl Menger, “On the Origin of Money,” 2:6 *Economic Journal* 239 (1892); Jevons, *Money and the Mechanism of Exchange*.

57. See, e.g., Georg Knapp, *The State Theory of Money* (1905); John Maynard Keynes, *A Treatise on Money* (1930); Minsky, *Stabilizing an Unstable Economy*.

institutions and platforms are often better positioned to invest in the development and application of new technology designed to improve the cost, speed, security, convenience, interoperability, and accessibility of payments. Third, despite the technological superiority of these new institutions and platforms, the public safety net and other unique privileges enjoyed by conventional deposit-taking banks continue to give them an enormous competitive edge in the creation of monetary IOUs that serve as both a reliable store of nominal value and a means of payment. The result is a monetary system in which good money increasingly circulates alongside bad, but where the harbingers of bad money are very often the catalysts of cheaper, faster, more secure, more convenient, and more inclusive payments.

Together, these observations take us back to the growing disconnect between good money and good payments. At the root of this disconnect is a mounting tension between the design of our laws and institutions and the seemingly relentless advance of new technology. Today, laws and institutions like the financial safety net play a central role in promoting the stability and credibility of monetary IOUs. Yet, at present, these laws and institutions often evolve far more slowly than the technology that drives good payments. Further complicating matters, the financial institutions and platforms that are best positioned to develop and apply this technology typically do not enjoy the privileges and protections afforded by the financial safety net. Accordingly, the financial institutions that issue the most credible monetary IOUs—banks—are generally not at the forefront of technological advances in payments, while the institutions and platforms at the cutting edge of payments—the shadow monetary system—struggle to establish and maintain the credibility of their monetary commitments. The upshot is a monetary system in which people and businesses are often forced to choose between good money and good payments and, ultimately, between good and bad money.

This disconnect is compounded by a time inconsistency problem: while people and businesses value cheaper, faster, and more convenient payments in good times, they also value stable and credible monetary IOUs during periods of heightened uncertainty and instability. When combined with the growing disconnect between good money and good payments, this time inconsistency problem enables us to make two tentative yet important predictions. First, during periods of institutional and systemic stability, where consumers are more sensitive to the benefits of good payments, *bad money will drive out good*. Second, during periods of institutional and systemic instability, where consumers are more sensitive to

the benefits of good money, the resulting flight to safety means that *good money will drive out bad*.

These predictions are the essence of Gresham's new law. Like Gresham's (old) law, they are grounded in the observation that differences in the quality of money determine the patterns of how it is used in the real world. The key difference reflects changes in the nature of money itself. In Gresham's time, the intrinsic value of English coinage was linked to its gold or silver content, along with the prices that the holder could obtain for it at domestic and foreign mints. Crucially, this intrinsic value was also what determined whether a particular coin was widely used as a means of payment: after all, this is why bad money drove out good. Today, the determinants of good money have fundamentally changed. Reflecting the ubiquity of credit-based monetary IOUs, laws and institutions like the financial safety net are what now give our money a stable nominal, if not strictly intrinsic, value. Moreover, these laws and institutions are entirely separate from the technology-driven financial networks that enable us to use these IOUs as a cheap, fast, secure, and convenient means of payment. This book is an attempt to update Gresham's old law for our credit-based, digital, and networked age, and to explore the complex and evolving relationship between law, institutions, and technology at the heart of our monetary system.

Like the design of money itself, the predictions of Gresham's new law have profound implications for individuals, for the economy, and for the fabric of our institutions and society. On an individual level, the expansion of the shadow monetary system as bad money drives out good increases the risk of financial ruin for households and businesses as the IOUs they thought were sound money turn into empty promises during periods of institutional and broader systemic instability. On a macroeconomic level, while it is perhaps difficult to imagine today, the shadow monetary system may one day grow to rival the conventional banking system in size and systemic importance. If this eventually happens, it would raise the troubling prospect that the correlated and uncoordinated bankruptcy of the institutions and platforms at the heart of this system could precipitate a severe contraction in the money supply, leading to damaging deflation, a reduction in investment and commercial activity, and undermining economic growth. While we might then expect policymakers to take extraordinary measures to prevent the resulting economic devastation, planning on these types of ad hoc and ex post bailouts of the shadow monetary system would itself represent a critical policy failure. And lastly, at the societal level, either the breakdown or bailout of the shadow monetary system could potentially trigger a broader crisis

of confidence in our monetary institutions—one that could spread beyond this system to banks, central banks, and even governments.

But it's not all doom and gloom. Gresham's new law also highlights the incredible opportunity that lies before us. The emerging problem of bad money is ultimately a by-product of the development of new technology that holds out the promise of a more efficient, effective, and equitable payment system. If this technology can be harnessed within a legal and institutional framework that delivers universally good money, the result would be a safer, more convenient, and more dynamic system of money and payments. Almost five hundred years ago, the young Queen Elizabeth I understood that tackling the malaise afflicting the English economy demanded that she fix the nation's money. This book describes the malaise afflicting our own monetary system and lays out a blueprint for how to fix it.

A Road Map for the Book

Every story has a beginning, and ours begins with a group of enterprising seventeenth-century London goldsmiths. Chapter 1 chronicles the emergence and evolution of a single, hearty, and rather peculiar species of financial institution—banks—on their winding path toward becoming both the dominant sources of money in the global economy and the gatekeepers of the modern payment system. It begins by tracing the historical development of banks in Europe and North America, the evolving legal treatment of their contractual promises to their depositors, and the increasing use of these promises as a form of money. It then traces the emergence, development, and functions of the specialized financial market infrastructure—*clearinghouses*—that banks established in order to ensure the safe, secure, and timely clearing and settlement of payments between banks. This chapter traces almost two centuries of sometimes radical experimentation, spanning changes in the common law, statutory reforms, and the development of entirely new public and private institutions. It also demonstrates how embedded banks have become within our systems of money and payments and, accordingly, why we cannot even begin to talk about the rise of the shadow monetary system without first understanding the important and fundamentally intertwined economic roles that banks currently play.

The story of how banks became so deeply entrenched at the heart of our systems of money and payments is long, complicated and, in many ways, still being written. It is a story about war, politics, economics, entrepreneurship, technology, and path dependence. Importantly, it is also a

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story about the law. Chapter 2 describes the unique privileges and protections that the law currently bestows on conventional deposit-taking banks. Collectively, these privileges and protections create a comprehensive public backstop: a financial safety net that includes access to central bank lender-of-last-resort facilities, deposit insurance schemes, and special resolution regimes for struggling banks. This safety net gives banks a comparative advantage in the creation of monetary IOUs—transforming otherwise risky deposits into good money. In order to address the resulting moral hazard problems, banks are then subject to sophisticated frameworks of prudential regulation and supervision. Compliance with these frameworks is also often a legal precondition for obtaining access to the clearinghouses and other financial plumbing through which the vast majority of payments currently flow. In many countries, this gives banks—and *only* banks—direct access to our basic financial infrastructure. Viewed in this light, the law plays a number of critical, and yet critically understudied, roles in promoting the tight institutional bundling of banking, money, and payments. Chapter 3 explores how this bundling entrenches banks at the apex of the financial system, thereby erecting significant barriers to entry, undercutting competition, and slowing technological innovation and adoption in the markets for money and payments. It also identifies the risks that this bundling creates for customer protection, for microprudential safety and soundness and, ultimately, for financial stability.

The historical, legal, and institutional developments chronicled in the first three chapters will be familiar to most students of banks and bank regulation. The *real* story—the story at the heart of this book—is what happened next. Despite the legally entrenched bundling of banking, money, and payments, recent years have witnessed an explosion in the number and variety of new financial institutions and platforms seeking to compete with banks in the increasingly lucrative markets for money and payments. Chapter 4 describes the emergence, evolution, and staggering growth of this shadow monetary system and the collective process of unbundling it has already started to unleash. This chapter is structured around four case studies—P2P payment platforms, mobile money, cryptocurrency exchanges, and stablecoins—each designed to illuminate the various ways in which these new entrants are responding to the pent-up demand for cheap, fast, secure, convenient, interoperable, and accessible payments.

The common thread connecting these case studies is that they all involve technology-driven financial institutions and platforms that seek to issue monetary IOUs *outside* the perimeter of conventional bank regulation.

(continued...)

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