

A Wall of Separation Between Money and State: Policy and Philosophy for the Era of Cryptocurrency

MAX RASKIN AND RICHARD A. EPSTEIN

THROUGHOUT HISTORY, THERE HAVE BEEN two fundamental and interrelated debates over the creation and use of money.¹

The first debate is whether money should be created by the market or the state.² When money is created by private markets, individual currencies operate in competition with each other, such that the value of any given currency is measured by its relative strength against the others. In contrast, under a system where the government has a monopoly over the supply of money, the soundness of the currency is ensured, if at all, by a set of institutional constraints to prevent its debasement.

A second debate arises between those who believe that money should be a tool used by policymakers to achieve certain political, economic, and social ends and those who believe that money should be a neutral unit of measurement, like inches or kilograms.³ Today, central banks are tasked with mandates to achieve full employment, plug budget deficits, and spur real economic growth. The institutional challenge for governments is to decide how to balance these goals with the need for price stability. Discretion by central bankers with respect to these tradeoffs is intended to allow public officials to operate the system for the public benefit. By the same token, government discretion in the management of

MAX RASKIN is Adjunct Professor of Law at New York University and a fellow at the school's Institute for Judicial Administration. He previously worked at the U.S. Treasury Department, serving as chief speechwriter to the Treasury Secretary and advisor to the General Counsel. Max began his career at Bloomberg News and Businessweek covering finance and technology.

RICHARD A. EPSTEIN is inaugural Laurence A. Tisch Professor of Law at the New York University (NYU) School of Law, the Peter and Kirsten Bedford Senior Fellow at the Hoover Institution, and the James Parker Hall Distinguished Service Professor Emeritus and Senior Lecturer at the University of Chicago.

Copyright © 2023 by the *Brown Journal of World Affairs*

money creates the possibility of major failures—such as runaway inflation—if that discretion is misused.

As history has shown, the dangers of government discretion can easily outweigh the benefits.⁴ We, therefore, welcome the sea change in attitudes toward money that began 15 years ago with the release of Satoshi Nakamoto’s white paper, “Bitcoin: A Peer-to-Peer Electronic Cash System,” and the subsequent creation of the Bitcoin network.⁵ The white paper laid out a novel payments system and currency—called bitcoin—that was independent of centralized institutions, relying instead upon a decentralized network of computers for regulation and validation—in and of itself, a private, international monetary system.

Since Nakamoto’s publication, those who believe in the separation of money and state have had cause to celebrate; decentralized cryptocurrency has the potential to restore important structural safeguards for monetary policy, such as fixed mandates. As the monetary system is increasingly wielded as a political weapon to achieve social equality or punish political opponents, the demand for a neutral unit of transaction will grow.⁶

In this article, we hope to accomplish two descriptive tasks and offer two policy proposals. We first introduce a novel classification scheme to categorize cryptocurrencies. Distinct terms like “central bank digital currency” and “cryptocurrency” are often interchanged, so a precise typology will be helpful in setting the parameters of debates over monetary policy.⁷ Stated briefly, digital assets can be classified by (a) their degrees of centralization and (b) their degree of control by a state. This framework is derived from previous scholarship by Max Raskin and co-authors.⁸

Second, the article will describe the ideology that undergirds the most successful digital currency thus far: bitcoin. According to the above classification scheme, bitcoin is a decentralized, private cryptocurrency. The philosophy that undergirds bitcoin is a libertarian one—specifically, the philosophy of the Austrian school of economics. This resurgent school of economic thought—which was established in Austria in the 1870s and best articulated by Ludwig von Mises and his student, Nobel Laureate F. A. Hayek—has powerfully influenced the design of the bitcoin protocol. A core tenet of the Austrian School is that a central bank’s policy of maintaining artificially low interest rates is the source of the boom-and-bust business cycle.⁹ In designing a system with a fixed money supply that mirrored the qualities of gold, Nakamoto embodied the Austrian skepticism of fiat currency.

Regarding the policy proposals, we first contend that governments’ plans for central bank digital currencies are neither novel nor good policy. The real-

ity is that most of today's central bank currencies are *already* digital, and any attempts to disintermediate the banking system—that is, to allow individuals to hold accounts directly with the central bank (and not private banks)—will result in a dangerous temptation for governments to micromanage the finances of their citizens.¹⁰

Our second policy conclusion is a positive one. We recommend that central banks in developing nations adopt private, decentralized digital currencies or fixed money supplies to encourage foreign investment and increase the economic well-being and stability of their citizens.

Above all, we hope to contribute to a rethinking of money in this digital age. Technological innovation is forcing economists and regulators to rediscover previously abandoned theories of economics. These revived theories approach money at a fundamental level, understanding it as a good like any other, subject to both the law of supply and demand and the law of unintended consequences.

A CLASSIFICATION OF CRYPTOCURRENCIES

The framework established by Raskin et al. outlines that all digital currencies can be classified along two axes: their degree of (a) centralization and (b) state sponsorship.¹¹

Digital currencies can be either public or private. Private digital currencies are those that do not receive legal privileges from the government. Public digital currencies are those that gain legal favor through laws and regulations. The most powerful tool to privilege a currency are legal tender laws, which require that a designated money be accepted for debts.¹² In the United States, for example, the Supreme Court used the Legal Tender Cases (*Knox v. Lee* and *Parker v. Davis*) of the nineteenth century to declare constitutional the federal government's privileging of its own currency.¹³

This ruling contravened sound legal principles. The Legal Tender Act, passed to help the Union fund the Civil War, required parties who had the right to receive gold for their certificates to accept paper money in its place.¹⁴ However, the Fifth Amendment to the Constitution requires just compensation for the taking of private property, money included. The standard rule of just compensation dictated that what was received in exchange for the property “must be a full and perfect equivalent for the property taken.” This condition could only have been satisfied if the new paper money (known as “greenbacks”) traded at par with the gold-backed receipts.¹⁵ Because of this disparity in value, individuals continued to demand payment in gold (ultimately leading to the

aforementioned lawsuits), revealing their preference for one asset over the other. This early incident demonstrates how the creation of a government monopoly can undermine private stores of money (in that case, gold).¹⁶

Turning to the second axis, digital currencies can either be centralized or decentralized. Decentralized digital currencies have no formal barriers to participation in or implementation of the network. Centralized digital currencies do face these barriers; they are created and implemented by a single organization that assigns certain privileges and rights to favored parties in the network. In other words, decentralized digital currencies are primarily built and maintained through an open-source software ethos in contrast with centralized digital currencies that rely on managers with privileges to establish and run the network.¹⁷

Bitcoin, which we classify as a private, decentralized digital currency, gave birth to the new generation of decentralized currencies. Bitcoin is private because, in the United States, the government does not force businesses or individuals to accept bitcoin for the payment of debts. In fact, the government disadvantages bitcoin by taxing any gains from its sale and requiring tax reporting. Bitcoin is decentralized because it is maintained as open-source software; all participants in the network have equal rights with respect to participation in the network, and the rules of the network are determined by consensus. If, for instance, reformers wanted to raise the cap on the number of bitcoins to be minted and were able to convince a sufficient proportion of bitcoin nodes, miners, and users to start running the new software, that new software would become the new bitcoin—but Nakamoto himself has no special power to do this. Indeed, in the case of Ethereum, another blockchain network with a cryptocurrency, there was a split that resulted in two Ethers—Ethereum and Ethereum Classic.¹⁸

Past attempts to change one fundamental underlying feature of the Bitcoin network, known as a “hard fork,” have failed because they could not pass this demanding threshold. Hard forks are not particularly common for the same reason the creation of a new language isn’t: network effects. In a decentralized system, an individual can decide that a “pen” should be referred to as a “frindle,” but unless he can convince his fellow network participants, i.e., English-language speakers, a pen will continue to be called a “pen,” at least in the absence of state mandates for the new usages.¹⁹ These parameters can change, but only through consensus.

Another class of digital assets that has attracted the world’s attention is central bank digital currencies. Central banks around the globe have announced plans, in conjunction with their governments, to issue their own digital assets.²⁰ In our typology, central bank digital currencies are public because they are le-

gally privileged by the government. These currencies will become legal tender for all debts, public and private, as well as tax obligations. They are centralized because they will be managed by the government or one of its instruments. A classic example is the digital renminbi, which is issued by the People’s Bank of China. In the United States, the digital dollar will almost certainly be issued by the Federal Reserve, which controls the nation’s money supply. In all likelihood, it will be impossible for any individual state to override those policies under the general principles of federalism and preemption, which would bring all issues of currency uniformity to the federal level.²¹ It is conceivable, however, that the federal government will want to encourage currency competition under the theory that such competitive pressures will improve currency.²²

Authorizing and verifying transactions in state-run systems is not subject to a consensus mechanism but instead is set by decision-making at a high level of centralized governance. The following table proposes a schematic for understanding the delineation between centralized and decentralized currencies across public and private spheres.

	<u>Public</u>	<u>Private</u>
<u>Centralized</u>	Central Bank Digital Currencies (e.g. Petro, e-krona, digital renminbi, etc.)	Ripple, Tether, Gemini Dollars, etc.
<u>Decentralized</u>	*Does not exist*	Bitcoin, Litecoin, Dogecoin, etc.

THE IDEOLOGY AND MECHANICS OF PRIVATE DECENTRALIZED CRYPTOCURRENCY

In this section, we will briefly describe the mechanics behind private, decentralized digital currency. We will then illustrate how those mechanics instantiate a particular worldview that is at odds with the worldview behind public, centralized digital currency. It is a dangerous misconception that central bank digital currencies are “cryptocurrencies.” In fact, they are antithetical to one another. Central bank digital currencies are no innovation, but rather represent an unrealized desire to disintermediate the private banking system from the state’s control of the money supply—a desire that has existed for hundreds of years.²³

Nakamoto’s white paper describing bitcoin, and his subsequent release of the software establishing the Bitcoin network, reflect a tension between private

and decentralized versus public and centralized digital currencies. Both his paper and software were self-conscious efforts to “gain a new territory of freedom,” given his fear that centralized states would attack private, voluntary systems.²⁴ Nakamoto was explicit that bitcoin is “very attractive to the libertarian viewpoint if we can explain it properly.”²⁵ Further, he explained that “governments are good at cutting off the heads of centrally controlled networks such as Napster, but pure P2P networks like Gnutella and Tor seem to be holding their own.”²⁶

Nakamoto did not expound on his political philosophy, but the system he designed was clearly influenced by economists skeptical of centralized monetary systems, most notably Hayek and von Mises. Indeed, toward the end of his life in 1984, Hayek insisted that in order to restore “sound” money, it would be necessary to create “in some sly roundabout way” a private currency, free from government control. This conclusion followed from a core tenet of the Austrian School: that a central bank’s decision to maintain artificially low interest rates is the source of the boom-and-bust cycle. In designing his system with a fixed money supply, Nakamoto mimicked the best qualities of gold, reifying the Austrian skepticism of fiat currency in the digital age. The bitcoin program followed the lessons of Hayek’s 1976 *The Denationalization of Money*, a full-throated defense of competing currencies. For Hayek, the classic critique that monopoly over goods and services leads to higher prices and lower quality applied equally to currency. Monopolistic practices—such as legal tender laws—benefit the state’s currency, forcing individuals to accept less favorable terms. Given such coercion, one check on unwise decisions by central bankers is removed, as any alternative is legally disadvantaged.

Economists have different views of what constitutes “unwise” actions in monetary policy. However, from another vocal critic of government power, Ludwig von Mises, Nakamoto drew another important lesson. Ludwig von Mises most clearly articulated the Austrian Business Cycle Theory in his 1912 *The Theory of Money and Credit*. Mises explained that the business cycle emerges from the central bank’s establishment of artificially low interest rates, which spurs malinvestment in certain boom industries, like housing. When interest rates are permitted to rise to combat inflation, these malinvestments must be liquidated—a process that constitutes the bust.²⁷ In the case of the 2008 Housing Crisis, such a bust generated the massive collapse in the residential home mortgage market when banks lent on the strength of an implicit government guarantee, given free of charge.²⁸

Our purpose here is not to defend Austrian Business Cycle Theory, but rather to observe that it strongly influenced the design of the Bitcoin network.

One crucial aspect of the Austrian view is its skepticism toward the creation of new money. This school of thought maintains that each dollar printed devalues the money currently in circulation, constituting a transfer of wealth to those who receive the newer money before prices rise, leading to inflation in the absence of offsetting productivity gains.²⁹ In contrast to central banks around the world, whose monetary policies vary month-to-month, Nakamoto designed the Bitcoin network to adhere to a fixed monetary policy.

Bitcoin mining, the method by which new bitcoins are “created,” occurs in accord with a programmed set of parameters under which no more than 21 million bitcoins can ever be created. New bitcoins are “minted” by the Bitcoin network roughly every 10 minutes at diminishing rates.³⁰ When the network began in 2009, 50 bitcoins were minted roughly every 10 minutes; currently, that number is 6.25 every 10 minutes. Approximately once every four years, the number of new bitcoins mined every 10 minutes is halved.³¹

Mining is a process by which networks of computers called “miners” compete to solve a computationally difficult math problem in order to bundle a single “block” of bitcoin transactions. The miners are rewarded with newly issued bitcoins for creating the blocks of transactions that are linked together in a chain; hence, the term “blockchain.”³²

In order to expand the supply of bitcoin, a strong consensus of network participants would have to agree to a change—a much more unlikely feat in a global, decentralized network like Bitcoin than in a centralized banking system like the Federal Reserve.³³

Nakamoto was wise to use a blockchain to implement this decentralized vision. The blockchain is a technological innovation used for building consensus among parties without preexisting trust between them. Blockchains use cryptography to establish certain facts. In the case of bitcoin’s blockchain, individuals using the network are able to verify all bitcoin transactions and all bitcoin ownership in a ledger that all nodes of the network possess a copy of. Blockchain technology is an important but misunderstood innovation.³⁴ For our purposes, however, two essential facts suffice: one, that blockchain

In order to expand the supply of bitcoin, a strong consensus of network participants would have to agree to a change.

enables a financial network to be established without centralized governance, and two, that this feature represents a skepticism of central banks and institutions. Importantly, Scott Stornetta, one of the two inventors of the world’s first

blockchain, calls himself a libertarian.³⁵ Stornetta's work with Stuart Haber was the most-cited paper in Nakamoto's own white paper.

Accordingly, there are two common misconceptions about bitcoin and other cryptocurrencies. The first is that, because bitcoin is digital, its supply cannot be limited—nothing is to prevent someone from “copying and pasting” their bitcoins to multiple recipients. The second is that the supply of bitcoin cannot be limited because anyone can create their own coin—a Raskoin, UpdocCoin, or Hayekoin, for example.

Starting with the first misconception, bitcoin was specifically designed to solve what is known as the double-spending problem—“copying and pasting” currency. Imagine that Max wanted to send a dollar to his friend Richard in China. If Max flies to China and hands the dollar to Richard, Richard can be assured that he is the only person receiving the dollar. Of course, flying to China is inefficient. Instead, Max could send Richard the serial number on the dollar. But this creates a double-spend problem: what is to stop Max from sending the same serial number to multiple people, effectively spending the dollar multiple times? In our financial system, banks usually intermediate this transfer to verify that Max has the necessary funds to pay Richard one dollar and that Max does not double-spend that dollar. Bitcoin was created to solve the double-spend problem *without* recourse to third-party intermediaries like banks. It does this through the process of mining, which both serves to incentivize participation in the network and verify that double spending is not occurring.

The second misconception is that anyone could create his own digital currency. While this is a technically true point, it fails to appreciate the role of network effects. Bitcoin may not be the ultimate winner in the digital currency “space race,” but the fact that so many people own and trade bitcoin is itself a reason why other people own and trade bitcoin. Much like Schelling or focal points in game theory, or philosopher John Searle's ontological interpersonal subjectivity, bitcoin is valuable because other people think bitcoin is valuable.³⁶

For example, consider an analogy to diamonds. Diamonds have not always been as valuable as they are today. Their current value ultimately derives from a social convention in modern Western societies—that diamonds are used in marriage proposals.³⁷ But such a convention is not etched in the heavens—rather it is the result of collective practices that emerge in many communities. Engagement rituals, an important feature of marriage, were also influenced by a marketing campaign from DeBeers that began in the 1940s with the aim of changing peoples' subject beliefs and preferences with respect to diamonds.³⁸

If, however, as a result of a shift in sentiments, perhaps brought on by a new

ad campaign, society would collectively change its preference and decide that emeralds or vintage Grateful Dead t-shirts were the new engagement convention, then those items would take on new value, even if any isolated individual did not particularly prefer the new way of doing things. In other words, there are certain facts of society that are true by virtue of aggregated beliefs that are interrelated and mutually reinforcing. Transformation of these facts is likely fueled by decentralized changes in consensus, rather than top-down dictates.

POLICY PROPOSAL 1: AGAINST A CENTRAL BANK DIGITAL CURRENCY (CBDC)

Governments around the world are currently experimenting with the creation of central bank digital currencies. While the United States is still at the purely investigatory stage, the CBDC development process is now at implementation stage in China and elsewhere. On the one hand, central bank digital currencies are a novel technology and are subject to unprecedented marketing campaigns. On the other hand, governments are using them to both monitor and directly control the bank accounts of their citizens.. The scheme works by having the central bank issue, on behalf of the state, a bank digital currency that it would then manage on its own digital ledger, which would be the only portal through which private individuals could transact in the currency.

9

Note that the first two of these conditions already describe the monetary system today.³⁹ In the United States, for example, dollars are mostly digital—not piles of physical cash sitting in each of our bank accounts. Today, private banks maintain their own ledgers and settle transactions between each other to effect private transactions between individuals and corporations. As it currently stands, individuals are not allowed to hold retail banking accounts in the Federal Reserve system. But the creation of a central bank digital currency would likely allow individuals to access the government’s system of digital cash directly, possibly without the option of going through the intermediary of the private banking system.

However, this scenario did not suddenly become possible because of new crypto technology, but is in fact a derivative of the well-known Chicago Plan first floated in the 1930s by a group of economists at the University of Chicago. Their plan proposes the U.S. banking system be “narrowed” by disaggregating private banks’ depository and lending activities, nationalizing money creation, and allowing individuals to hold accounts with the federal government, perhaps through the Post Office.⁴⁰ The early plan never came to fruition, but at present is being resurrected by Democrats in both houses of Congress who have

proposed bills to let individuals hold checking accounts directly with Federal Reserve banks under a “digital dollar” banner.⁴¹ This proposal is done with the express purpose of stimulating the economy with direct cash injections and by offering new banking services to the unbanked. As of November 2022, the Federal Reserve Bank of New York is in the midst of a pilot project testing out a digital dollar—the 12-week program is run in partnership with legacy financial institutions like Citigroup and Mastercard.⁴²

This plan is not without merit. Our current banking system operates in an intermediated fashion where large financial institutions move money between individuals without direct government involvement. If, for instance, one person wants to send money to another, they cannot access the Automated Clearing House (ACH) or Society for Worldwide Interbank Financial Telecommunication (SWIFT) networks; they must hold their money at a bank that is itself a part of the network. Only through bearer instruments like physical cash, bitcoin, gold, or diamonds can any individual send monetary value to another person without

But the cost of ending this oligopoly is an even more dangerous one: allowing the federal government to have access to every transaction by anyone participating in its system.

recourse to a third party.⁴³ This third-party service comes with a cost; namely, the banking fees required to let ordinary people gain access to the network, which total billions of dollars each year.

A digital dollar would disintermediate the banking system and eliminate the oligopoly of privileged private banks’ access to the payment rails of society. But the cost of ending this oligopoly is an even more dangerous one: allowing the federal government to have access to every transaction by anyone participating in its system.⁴⁴ That interaction could be either direct or indirect—anyone who does not sign up with the federal bank will still have to do business with individuals who do, making their data available to the federal regulator.

The first problem with a government-run banking system is the privacy concern that arises from the government knowing who transacts with whom. To be sure, the federal government would have comprehensive control in effectuating its monetary policy, especially in conducting counter-cyclical money policy, such as by providing cash deposits for those entitled to pandemic money. This more tailored approach, however, would quickly become the most valuable political football of all time. The federal government could punish political opponents and reward political supporters with a few keystrokes, as targeting

opposition groups—in the style of the Internal Revenue Service—would be far easier.⁴⁵ Pro-life administrations would be able to see which of their citizens had paid for abortions, just as anti-gun administrations would be able to see who purchased firearms. States that support an administration could receive preferable access to interest rates over those that oppose the administration, similar to how the federal government can decide which institutions have access to its discount window in times of distress, or decide which financial assets or institutions should be deemed systemically important.

Instead of merely surveilling financial decisions, digital dollars would give the government the ability to censor the private financial decisions of both large firms and ordinary citizens. Republicans could target alternative energy companies and pornographers while Democrats could do the same with gun manufacturers and pro-Israel organizations. While it is true that such actions could take place today (and would likely be struck down as unconstitutional), the ease and secrecy with which the banking system can be weaponized is frightening.

The U.S. founders were skeptical of centralized power not only as an abstract principle but for practical reasons.⁴⁶ A Post Office-run bank with either government preferences or monopoly power truly sounds like a haunting specter of bureaucracy and inefficiency. Indeed, Thomas Jefferson expressed such sentiment at the idea of a Post Office itself, viewing it as “a source of boundless patronage to the executive, jobbing to members of Congress and their friends, and a bottomless abyss of public money.”⁴⁷

Competition among banks helps provide consumers with innovative services, lower prices, and checks on power. It may well be that in our highly regulated banking system, thousands of small community banks cannot withstand financial shocks without some government guarantees. And it may be that too few larger banks could wield limited monopoly power. But, some mix of large, medium, and small banks, some with state and some with federal charters, is surely preferable to one omnipresent federal bank in its ability to deliver banking services to all sectors of the economy. Keeping the Federal Reserve as a bank for banks is far better than expanding it into the Third Bank of the United States. Financial federalism may be messy, but it is preferable to monopoly.

POLICY PROPOSAL 2: THE ADOPTION OF DECENTRALIZED DIGITAL CURRENCIES FOR DEVELOPING ECONOMIES

Private decentralized digital currencies also offer tremendous benefits for developing economies. Historically, government officials in developing countries have

had unhealthy relationships with the printing press.⁴⁸ Instead of making prudent choices to balance budgets and invest in long-term projects, too many of these governments have turned their central banks into personal piggy banks—plugging up budget deficits and funding short-term, politically expedient projects. The result is disastrous levels of inflation, from Zimbabwe to Turkey, from Venezuela to Argentina. In each case, the central bank became a tool to boost the sagging fortunes of the ruling party or leader, so money ceased to operate as a neutral medium of exchange. The short-term pain of inflation was compounded when flawed monetary policy drove away both domestic and foreign investment, further impairing economic growth.⁴⁹

Private decentralized digital currencies hold the promise of a solution. Digital currencies like bitcoin can represent a variation on the old theme of dollarization or euroization, whereby a government outsources control over its monetary policy to an impersonal, nonpolitical institution—namely a decentralized network of non-state actors that adheres to a non-discretionary monetary policy.


The temptation of money printing is great, especially for countries with dubious commitments to the rule of law. In these countries, the transparent nature of open networks can remove monetary discretion from political actors in order to encourage investment, thereby dampening currency instability. Currency stability in turn should reduce the high interest rates driven by the lack of confidence in local currencies.⁵⁰ More reforms, of course, are needed, given that monetary problems are compounded by other structural and acute problems, such as the fear of nationalization, slapdash regulations, and erratic enforcement. But, by tying themselves to the mast of a fixed and deterministic monetary policy, developing economies can signal that they are prepared to reform other portions of their financial constitutions, providing greater clarity to potential investors.

Digital currencies are unique because they forego ties to the Federal Reserve or the European Central Bank, thus permitting developing central banks to adopt a variety of fixed monetary policies. For instance, in 1993, Stanford economist John Taylor proposed a famous mathematical rule determining an optimal monetary policy that would remove the need for central banker discretion, thereby giving market participants greater certainty when making their capital allocation decisions. The eponymous Taylor Rule is a simple equation that determines the optimal federal funds rate based on inflation and the GDP output gap.⁵¹ Whether the Taylor Rule, Milton Friedman's money supply rule, or some other deterministic rule, monetary policy is like judicial precedent—

in most matters it is more important that a rule be established than that it be established correctly.⁵²

CONCLUSION

As Hayek pointed out many years ago, money is like language in that it evolves not as a series of edicts from on high, but instead through a ground-up process of spontaneous order. Indeed, at its origin, money was a form of negotiable warehouse receipts for a fixed store of gold.⁵³ Billions of individual decisions shaped not only the definition of money, but also its value. There are huge social gains when a government no longer tries to set some “real” interest rate and instead turns that task over to millions of everyday decisions that arise every time ordinary people—with localized knowledge—choose to save versus spend. Aggregated individual decisions paint a much more complete tapestry than the diktat of technocratic gurus.

Stronger private markets, such as decentralized digital currencies, offer one set of useful countervailing forces to government chicanery and mismanagement. Currencies like bitcoin or gold function as the thermometer that informs central bankers, especially in developing countries, whether or not they are behaving prudently. Instead of seeking to destroy these thermometers because they do not like the temperature, central banks should embrace these disciplining mechanisms. 

13

NOTES

1. The authors would like to thank Raina Raskin, Joseph Salerno, Jacquelyn Thorbjornson, Alexander “Ali” Haberman, Lord Mervyn King, Peter Van Valkenburgh, Harry Cohen, and David Gordon for reviewing the article.

2. Compare, e.g., Georg F. Knapp, *The State Theory of Money* (London: Macmillan & Company Limited, 1924) and Abba P. Lerner, “Money as a Creature of the State,” *The American Economic Review* 37, no. 2, 1947, with Ludwig von Mises, *The Theory of Money and Credit* (1912).

3. Compare, e.g., the White House’s support of the Federal Reserve Racial and Economic Equity bill (Brendan Pedersen, “White House backs Maxine Waters’ financial-equity bill,” *American Banker*, June 13, 2022, <https://www.americanbanker.com/news/white-house-backs-maxine-waters-financial-equity-bill>) with Charles Plosser’s A Limited Central Bank (Charles Plosser, “A Limited Central Bank,” *Journal of Applied Corporate Finance* 31, no. 4 (Fall 2019): 16–20).

4. Modern examples of politically-controlled central banks causing inflation abound, notably in the modern cases of Turkey and Argentina. See, e.g., Joe Karaganis, “Delusion and Despotism: Why Erdogan’s Monetary Policy is to Blame for Turkey’s Financial Crisis,” *Columbia Political Review*, September 21, 2022, <http://www.cpreview.org/blog/2022/9/delusion-and-despotism-why-erdogans-monetary-policy-is-to-blame-for-turkeys-financial-crisis>; and Nicolás Cachanosky and Adrián O. Ravier, “A Proposal of Monetary Reform for Argentina: Flexible Dollarization and Free Banking,” *The Independent Review* 19, no. 3 (2015): 397–426.

5. We refer to Satoshi as an individual man because, inter alia, he identified himself as a 37-year-old Japanese man on his P2P Foundation profile: “Satoshi Nakamoto’s Page,” P2P Foundation, <https://web.archive.org/web/20120529203623/http://p2pfoundation.ning.com/profile/SatoshiNakamoto>; Satoshi Nakamoto, “Bitcoin: A Peer-to-Peer Electronic Cash System,” October 31, 2008, <https://bitcoin.org/bitcoin.pdf>. Also, a stylistic note on capitalization: when referring to the network of computers that issues the currency, we refer to the capitalized “Bitcoin network” and when referring to the currency, we refer to lower-case “bitcoin.”

6. Strictly speaking, money is never neutral because its value changes unevenly and constantly throughout the economy. By neutral here, we mean not subject to unilateral control, but rather subject to decentralized, aggregated market forces. See, e.g., “Trudeau vows to freeze anti-mandate protesters’ bank accounts,” *BBC News*, February 15, 2022, <https://www.bbc.com/news/world-us-canada-60383385>. See also Emily Jin, “Virtual control: the agenda behind China’s new digital currency,” *Financial Times*, February 16, 2021, <https://www.ft.com/content/7511809e-827e-4526-81ad-ae83f405f623>.

7. The term “central bank digital currency” refers to a certain kind of project to produce digital money by central banks, but as will be shown later, this is not “digital currency” in the sense that the creator of bitcoin or its early adopters and technologists use the term.

8. Max Raskin, Fahad Saleh, and David Yermack, “How Do Private Digital Currencies Affect Government Policy?” NYU Stern Law and Economics Research Paper No. 20-05, October 27, 2022. Forthcoming in *Journal of Financial Stability*.

9. Murray N. Rothbard, “The Austrian Theory of Money,” *The Foundations of Modern Austrian Economics*, Edwin Dolan, ed. (Kansas City: Sheed Andrews and McMeel, 1976), 160–84; *The Logic of Action One: Method, Money, and the Austrian School* (Cheltenham, UK: Edward Elgar, 1997), 297–320.

10. Authoritarian countries like China have already demonstrated a keen desire to use the financial system to control their 1.4 billion citizens. See James Kyngé and Sun Yu, “Virtual control: the agenda behind China’s new digital currency,” *Financial Times*, February 17, 2021, <https://www.ft.com/content/7511809e-827e-4526-81ad-ae83f405f623>.

11. Raskin, Saleh, and Yermack, “How Do Private Digital Currencies Affect Government Policy?”

12. This article will use the United States as an example for understanding the operation of legal tender laws, but such laws are used by central banks around the world. See, e.g., Coinage Act 1971 §2 (United Kingdom); Reserve Bank Act 1959 §36(1) (Australia); Bank of Israel Law 1954 §30 (Israel).

13. *Legal Tender Cases*, 79 U.S. 12 Wall. 457 (1870).

14. 79 U.S. 457, 458, 20 L. Ed. 287 (1870).

15. *Monongahela Nav. Co. v. United States*, 148 U.S. 312, 326 (1893).

16. It is the operation of legal tender laws that gives rise to Gresham’s law, which is popularly stated as “bad money drives out good.” See Murray Rothbard, *What Has Government Done to Our Money?* (Auburn: Ludwig von Mises Institute, 1963), 59.

17. Such an ethos relies on collaboration between individuals not formally connected and such software allows anyone “to use, examine, alter and redistribute however they like.” See “What is open source software?” *IBM*, <https://www.ibm.com/topics/open-source>; Manuel DeLanda, “Open-Source: A Movement in Search of a Philosophy,” presented at the Institute for Advanced Study, 2001; and Michele Boldrin and David K. Levine, *Against Intellectual Monopoly* (Cambridge: Cambridge University Press, 2008).

18. “Ethereum’s Two Ethereums Explained,” *Coindesk*, <https://www.coindesk.com/markets/2016/07/28/ethereums-two-ethereums-explained/>.

19. One of the authors fondly remembers this point vividly from *Frindle* by Andrew Clements, a book from his childhood; Indeed, even official language regulators around the world, including the Académie Française and the Academy of the Hebrew Language, have, like King Canute, tried to mandate words that are rejected by the populace. See, e.g., “Should You Use ‘le Courriel’ for ‘Email?’” ThoughtCo, <https://www.thoughtco.com/le-courriel-vocabulary-1371793>.

20. See, e.g., “The digital pound: a new form of money for households and businesses?” Bank of England and HM Treasury, Consultation Paper, February 2023; and “Money and Payments: The U.S. Dollar in the Age of Digital Transformation,” Federal Reserve System, January 2022.

21. Ben Weiss, “Ron DeSantis proposed a bill to ban CBDs. A trade policy professor calls that a little ludicrous,” *Yahoo! Life*, March 22, 2023, <https://www.yahoo.com/lifestyle/ron-desantis-proposed-bill-ban-172801827>.
22. Cf. George A. Selgin, *The Theory of Free Banking: Money Supply under Competitive Note Issue* (Lanham, MD.: Rowman & Littlefield, 1988), <https://oll.libertyfund.org/page/selgin-on-free-banking>.
23. See, e.g., Ronnie J. Phillips, “An End to Private Banking: Early New Deal Proposals to Alter the Role of the Federal Government in Credit Allocation,” *Journal of Money, Credit and Banking* 26, no. 3 (1994); Irving Fisher, *100% Money* (New York: Adelphi Company, 1936); Henry C. Simons, “A Program for Laissez Faire: Some Proposals for a Liberal Economic Policy,” *Public Policy Pamphlet* no. 15, (The University of Chicago Press, 1934: 18); and Ronnie J. Phillips, “The ‘Chicago Plan’ and New Deal Banking Reform,” *The Jerome Levy Economics Institute of Bard College, Working Paper No. 76*, June 1992.
24. “Bitcoin P2P e-cash paper 2008-11-06 20:15:40 UTC,” Satoshi Nakamoto Institute, <https://satoshi.nakamotoinstitute.org/emails/cryptography/4/#selection-9.0-15.23>.
25. “Bitcoin P2P e-cash paper 2008-11-14 18:55:35 UTC,” Satoshi Nakamoto Institute, <https://satoshi.nakamotoinstitute.org/emails/cryptography/12/>.
26. “Bitcoin P2P e-cash paper 2008-11-06 20:15:40 UTC,” Satoshi Nakamoto Institute, <https://satoshi.nakamotoinstitute.org/emails/cryptography/4/>.
27. For an overview of Mises’ business cycle theory, see Murray Rothbard, *America’s Great Depression* (Auburn: Ludwig von Mises Institute, 1963), Chapter 1.
28. Richard A. Epstein, “The Government Takeover of Fannie Mae and Freddie Mac: Upending Capital Markets with Lax Business and Constitutional Standards,” *10 N.Y.U. J. Law & Business* 379 (2014).
29. And such gains are decreased by the new money creation—on the Austrian worldview, the general trend on the free market is for prices to fall.
30. Max I. Raskin, “Realm of the Coin: Bitcoin and Civil Procedure,” *20 Fordham J. Corp. & Fin. L.* 969 (2015).
31. Joseph Bonneau, “How long does it take for a Bitcoin transaction to be confirmed?,” Coin Center, November 3, 2015, <https://www.coincenter.org/education/crypto-regulation-faq/how-long-does-it-take-for-a-bitcoin-transaction-to-be-confirmed/>.
32. Peter Van Valkenburgh, “What is Bitcoin mining, and why is it necessary?,” December 15, 2014, <https://www.coincenter.org/education/advanced-topics/mining/>.
33. Parameters, like caps on new currency creation, are encoded into the Bitcoin network. Participants in the network are free to develop an alternative network with a different set of parameters, but this would no longer be part of the Bitcoin network. The analogy here would be to an individual who wants to create his own language. While there are no formal barriers to an individual creating and developing his own language (even, perhaps, using English as a starting point), unless he is able to convince a critical mass to use his new language, his effort will not succeed.
34. For a helpful introduction to blockchain technology see Peter Van Valkenburgh, “What’s a blockchain, anyway?,” Coin Center, April 25, 2017, <https://www.coincenter.org/education/blockchain-101/whats-a-blockchain/>.
35. Interview with Author, “Interview with Scott Stornetta,” available at <https://www.maxraskin.com/interviews/scott-stornetta>.
36. This is another core insight of the Austrian School—that all value is ultimately subjective; John Searle, *The Construction of Social Reality* (London: Penguin Books, 1995).
37. Besides their industrial-use value, which also ultimately is justified by consumer demand for products created through industrial processes using diamonds.
38. Uri Friedman, “How an Ad Campaign Invented the Diamond Engagement Ring,” *The Atlantic*, February 13, 2015, <https://www.theatlantic.com/international/archive/2015/02/how-an-ad-campaign-invented-the-diamond-engagement-ring/385376/>.
39. Indeed, the House of Lords’ Economic Affairs Committee titled their report on the subject “Central bank digital currencies: a solution in search of a problem?”
40. Ronnie J. Phillips, “An End to Private Banking: Early New Deal Proposals to Alter the Role of the Federal Government in Credit Allocation,” *Journal of Money, Credit and Banking* 26, no. 3, 1994; *Federal*

Credit Allocation: Theory, Evidence, and History (1994), 552–68.

41. “Banking for All Act”, SIL20449, 116TH CONGRESS 2D SESSION, <https://www.banking.senate.gov/imo/media/doc/SIL20449.pdf>.

42. Lananh Nguyen, “Banking giants and New York Fed start 12-week digital dollar pilot,” *Reuters*, November 15, 2022, <https://www.reuters.com/markets/currencies/banking-giants-new-york-fed-start-12-week-digital-dollar-pilot-2022-11-15/>.

43. This is a definitional claim—non-bearer instruments, or order paper, necessarily involve a third party who receives instructions to transfer to a payee.

44. Indeed, even if private banking networks operated side-by-side with the government network, the government would still get ample information about private parties who transact with members of the government-run system.

45. “Inappropriate Criteria Were Used to Identify Tax-Exempt Applications for Review,” Department of the Treasury, May 14, 2013.

46. Michael McConnell, “Federalism: Evaluating the Founders’ Design,” 1987.

47. Paul Leicester Ford, *The Works of Thomas Jefferson* (New York and London: G. P. Putnam’s Sons, 1904–5).

48. Steve Hanke and Erik Bostrom, “Zimbabwe Hyperinflates, Again,” *Studies in Applied Economics*, October 2017, 90, <https://sites.krieger.jhu.edu/iae/files/2018/07/Zimbabwe-Hyperinflates-Again-Hanke-Bostrom-.pdf>.

49. One problem written about in modern macroeconomic literature is investment outflow from poor countries into richer countries where there are diminishing marginal returns. Institutional risk and monetary instability may be an answer. See Ricardo J. Caballero, Emmanuel Farhi, and Pierre-Olivier Gourinchas, “An Equilibrium Model of ‘Global Imbalances’ and Low Interest Rates” (working paper 11996, National Bureau of Economic Research, January 2006), https://www.nber.org/system/files/working_papers/w11996/w11996.pdf.

16 50. Raskin, Saleh, and Yermack, “How Do Private Digital Currencies Affect Government Policy?” See footnote 10.

51. “The Taylor Rule,” *The Fred Blog*, <https://fredblog.stlouisfed.org/2014/04/the-taylor-rule/>.

52. “Friedman’s k-percent rule,” Wikipedia, https://en.wikipedia.org/wiki/Friedman%27s_k-percent_rule; Cf. *Burnet v. Coronado Oil & Gas Co.*, 285 U.S. 393, 406–8 (1932) (Brandeis, J., dissenting), overruled by *Helvering v. Mountain Producers Corp.*, 303 U.S. 376 (1938) (“in most matters it is more important that the applicable rule of law be settled than that it be settled right.”)

53. Rothbard, *What Has Government Done to Our Money* (1963).