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Cryptocurrency Competition and the U.S. Monetary System

Summary

Advocates of cryptocurrencies such as Bitcoin believe that having currency competition will help achieve the economic objective of price stability. This Issue Brief summarizes research that explores whether competition among privately issued fiat currencies can actually produce price stability. The research finds that in most cases, a system of private monies does not deliver price stability. And even when it does, it always is subject to self-fulfilling inflationary episodes, and it supplies a suboptimal amount of money. Although there is no economic reason to curb the use of cryptocurrencies at the moment, it is important to review key regulatory issues that policymakers need to consider now, before the use of cryptocurrencies becomes even more widespread.

Disciplines

Banking and Finance Law | Economic Policy | Public Policy

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Cryptocurrency Competition and the U.S. Monetary System

Jesús Fernández-Villaverde, PhD

ISSUE BRIEF

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The sudden appearance of Bitcoin, Ethereum, Ripple, and other cryptocurrencies¹ has triggered a wave of interest in privately issued monies.

Today, any person with internet access can use a bewildering array of cryptocurrencies as means of exchange. Nearly everyone has heard about Bitcoin, whose market capitalization (as of May 28, 2018) exceeds \$123 billion—an amount greater than the market capitalization of eight of the 30 companies in the Dow Jones Industrial Average.² But 21 other cryptocurrencies already have market capitalizations over \$1 billion, while another 109 have between \$100 and \$999.99 million. Just seven months earlier, only 12 cryptocurrencies had market capitalizations over \$1 billion and another 49 between \$100 and \$999.99 million.³ These are astonishing increases. While it is true that cryptocurrencies represent only a trivial fraction of all payments in the world economy, it is not inconceivable that their use may continue to exponentially increase over the next few years and even become widespread in emerging economies with dysfunctional government monies.

Nowadays it is straightforward to create a cryptocurrency. Thanks to fascinating advances in cryptography and computer science, cryptocurrencies solve the traditional monetary problems of over-issuing, double-spending (i.e., the holder of the currency should not be able to spend the same token twice), and counterfeiting.⁴ And cryptocurrencies are markedly different from

SUMMARY

- Many monetary reformers have welcomed the rise of cryptocurrencies such as Bitcoin, in part because they believe that having currency competition will help achieve the economic objective of price stability.
- This Issue Brief summarizes research that explores whether competition among privately issued fiat currencies can actually produce price stability. The research finds that in most cases, a system of private monies does not deliver price stability. And even when it does, it always is subject to self-fulfilling inflationary episodes, and it supplies a suboptimal amount of money.
- Even in the best-case scenario, a purely private monetary system fails to provide the socially optimum quantity of money.
- Nevertheless, the threat of competition from private monies has at least one salutary effect: it imposes some market discipline on any government involved in issuing currency. A central bank needs to provide sufficiently “good” money, or individuals can and will switch to using Bitcoin, Ethereum, or some other cryptocurrency.
- Although there is no economic reason to curb the use of cryptocurrencies at the moment, the Issue Brief concludes by posing some of the key regulatory issues that policymakers need to consider now, before the use of cryptocurrencies becomes even more widespread.



TABLE 1 CRYPTOCURRENCIES BY MARKET CAPITALIZATION (>\$3 BILLION AS OF MAY 28, 2018)

Rank	Cryptocurrency	Market Cap	Established
1	Bitcoin	\$123,000,000,000	2009
2	Ethereum	\$53,200,000,000	2013
3	Ripple	\$22,900,000,000	2012
4	Bitcoin Cash	\$16,000,000,000	2017
5	EOS	\$10,700,000,000	2017
6	Litecoin	\$6,500,000,000	2011
7	Stellar	\$4,900,000,000	2014
8	Cardano	\$4,700,000,000	2017
9	TRON	\$4,300,000,000	2017
10	IOTA	\$3,900,000,000	2015
11	NEO	\$3,200,000,000	2014

Source: <https://coinmarketcap.com>

the notes issued by financial institutions during the times of free banking for three reasons.⁵ First, most cryptocurrencies are fully fiduciary, whereas notes in the free banking era usually represented claims against deposits in gold or other assets. Second, cryptocurrencies are not directly related to credit but are issued by computer networks according to some pre-determined criteria, such as a “proof-of-work” (i.e., solving a complex mathematical problem or validating other cryptocurrency transactions). Third, cryptocurrencies like Ethereum can also work as a sophisticated automatic escrow account. It is effortless to add

certain conditions for payment to the code that controls the cryptocurrency.⁶

Over the past several years, monetary reformers such as Sen. Rand Paul have welcomed the rise of cryptocurrencies and pointed to currency competition as a possible key to achieving the economic objective of price stability. In this scenario, as different issuers compete to make their currency dominant, they are incentivized to perfect the administration of their currency and reduce inefficiencies so as to maintain their currency’s stable value.⁷ But can competition among privately issued fiat currencies work? And to take the experiment a

step further: is the scenario of a purely private monetary system feasible? That is the question I explore in my research, and it leads to an interesting follow-up question for government policymakers. Specifically, can private monies and a government-issued money coexist? Other, more normative questions can certainly be asked as well. For instance, how should governments react to private monies? Should governments prevent the circulation of private monies? Should governments treat private monies as currencies or as any other regular property? Should the private monies be taxed?

In my research, I build a model of competition among privately issued fiduciary currencies.⁸ Returning to the first question about private currency competition, I find that, in most cases, a system of private monies will not deliver price stability and, even when it does, it will always be subject to self-fulfilling inflationary episodes, and it will supply a suboptimal amount of money. Currency competition works only sometimes and partially, and it may even be a socially wasteful activity. In this Issue Brief, I will explore these findings a bit more and discuss how the advent of cryptocurrencies and their associated technology may affect the U.S. monetary system.

NOTES

- 1 Cryptocurrencies are digital currencies that exist independently of a central bank by using encryption techniques to issue new units, record transactions, and combat fraud. They are, in that sense, different from electronic monies issued by governments.
- 2 Market capitalization is the price per unit times the circulating supply. Updated cryptocurrency market capitalization figures are available at <https://coinmarketcap.com>.
- 3 Ibid.
- 4 For details, see Narayanan, A., J. Bonneau, E. Felten, A. Miller, and S. Goldfeder (2016). *Bitcoin and Cryptocurrency*

Technologies. Princeton University Press.

- 5 For details, see Dowd, K. (1992). *The Experience of Free Banking*. Routledge.
- 6 For example: “Peter will pay Mary 10 Ethereum if, tomorrow at noon, the weather in Philadelphia according to weatherunderground.com is over 80 degrees.” Once that code is in place, the verification of the specified conditions and the payment—if the conditions are satisfied—can be automatically implemented.
- 7 Wendy Milling, “Private Currency Competition Is the Monetary Answer,” *Forbes*, August 23, 2012.

- 8 The primary source for this Issue Brief is Fernández-Villaverde, J. and D. Sanches (2016). “Can Currency Competition Work?” CEPR Discussion Paper 11095. The model developed here extends the environment introduced in Lagos, R., and R. Wright (2005). “A unified framework for monetary theory and policy analysis,” *Journal of Political Economy*, 113(3), 463–484.
- 9 See Obstfeld, M., and K. Rogoff (1983). “Speculative hyperinflations in maximizing models: Can we rule them out?” *Journal of Political Economy*, 91(4), 675–87; and Lagos, R., and R. Wright (2003). “Dynamics, cycles, and



CAN CURRENCY COMPETITION WORK?

In my analysis, a monetary equilibrium with private monies will not generally deliver price stability. When a profit-maximizing entrepreneur issues money, she will try to maximize the real value of seigniorage (i.e., the difference between the value of money and the cost to produce and distribute it). The conjecture that a system of private monies competing among themselves would provide a stable means of exchange is, in general, wrong. When an automaton issues money, there is no particular reason why the quantity of money issued will be compatible with price stability, except by coincidence. Bitcoin, for instance, has already decided how many new units of currency will be issued in 2022 even though nobody knows what the demand for the currency will be in that year.

Furthermore, even when the cost function of minting money is such that there is equilibrium with price stability, there is a continuum of equilibrium trajectories where the value of private monies monotonically decreases and converges to zero. Such self-fulfilling inflationary episodes, observable in economies with gov-

ernment-issued money and a money-growth rule, are not, as it turns out, an exclusive feature of public monies.⁹ Self-fulfilling inflationary episodes are, instead, the consequence of using intrinsically useless tokens—even if those tokens are electronic and issued by private, profit-maximizing, sharp-witted entrepreneurs—whose valuation can change depending on expectations about the future.

The goal of a well-behaved monetary system, however, must be to achieve some efficiency goal, not price stability per se. Perhaps the most important result from my research is that a purely private monetary system does not provide the socially optimum quantity of money even in the best-case scenario (i.e., in equilibrium with stable prices). Currency competition cannot provide an optimal outcome because, unlike the U.S. government, entrepreneurs do not mint additional tokens to account for the price effects they create for other participants in the market. Entrepreneurs just seek to maximize profits.¹⁰ The market will eventually fail to provide the right amount of money, whereas it does not fail to provide the right amount of other goods. This is expected from a theoretical standpoint, and my results confirm this intuition.

It may help to take a closer look at why this happens. Markets work well without frictions, but money only exists because of frictions. Specifically, money's sole purpose is to solve the problem of transaction frictions. Money is not worth anything in itself, unlike wheat, bananas, and Netflix, which are valued for what they are. Markets do well supplying the optimal amount of wheat and bananas and Netflix because consumers can substitute other goods in each of these instances, if desired. The very reason that money exists, however, is to provide liquidity service—something for which there is no (practical) substitute. This service is not properly rewarded in the market, and the issuers of money do not receive the commensurate benefits for offering liquidity. This is true whether the money is privately-issued or government-issued. But unlike government-issued money, which has fiscal backing, entrepreneurs issuing private money will never internalize the cost of providing more liquidity when it is not in their interest. To paraphrase Milton Friedman: markets can solve most problems, just not the problem of money. And in part for that reason, cryptocurrency competition cannot be the monetary cure—all that some proponents have envisioned.

NOTES

sunspot equilibria in 'genuinely dynamic, fundamentally disaggregative' models of money," *Journal of Economic Theory*, 109(2), 156–171.

¹⁰ The price effects generated by a producer or a consumer on third parties when they decide to produce or consume more of something are known by economists as pecuniary externalities. As we will explain below, in markets without frictions, pecuniary externalities are of the "right size," as they induce the correct behavior by producers and consumers. Thus, entrepreneurs seeking only to maximize profits produce the "correct" amount of their good. In mar-

kets with frictions, pecuniary externalities have the "wrong size" and entrepreneurs do not deliver the socially optimal amount of the good they produce.

¹¹ The money-growth rule proposes that a central bank increase the money supply every year at a constant rate, regardless of macroeconomic conditions.

¹² Vincenzo Villamena, "Everything you need to know about Bitcoin and your taxes," CNBC, February 21, 2018.

¹³ See *U.S. vs. Coinbase, Inc.* ("Based upon an IRS search, only 800 to 900 persons electronically filed a Form 8949 that included a property description that is "likely related to

bitcoin" in each of the years 2013 through 2015.")

¹⁴ Anthony Peyton, "Australia's new payments platform launches," *BankingTech.com*, February 13, 2018.



TAKEAWAYS FOR POLICYMAKERS

As an alternative means of exchange, it is reasonable to expect that cryptocurrencies might have an effect on government monetary policy. Consider the case where the government follows a rather standard money-growth rule.¹¹ Under this policy, profit-maximizing entrepreneurs will frustrate the government's attempt to implement a positive real return on money through deflation when the public is willing to hold private currencies. There are, fortunately, alternative policies that can simultaneously promote stability and efficiency. For example, the government may peg the real value of its money. Under this rule, the government can implement an efficient allocation (i.e., supply the amount of money that maximizes social welfare) as the unique equilibrium outcome, but this would require driving all private money out of the economy. That is an unlikely scenario for the U.S.

There is, however, an important lesson here: the threat of competition from private monies imposes some market discipline on any government involved in issuing currency. If a central bank, for example, does not provide sufficiently "good" money, then it will have difficulties in the implementation of its desired allocations. This may be the best feature of cryptocurrencies. In a world where individuals can switch to Bitcoin or Ethereum, central banks need to provide, paraphrasing Adam Smith, a tolerable administration of money. On

this front, at least, currency competition may have a large upside for human welfare.

In the United States, there is nothing that government policymakers should do to curb the use of cryptocurrencies at the moment. They do not challenge the dollar and should be allowed to operate freely, although U.S. regulators may want to consider (more thoroughly) their responses to issues raised by the existence of cryptocurrencies. For instance, the IRS currently treats decentralized currencies like Bitcoin as property and not as regular currency.¹² It may be more accurate to tax cryptocurrencies like other currencies. Taxable gains from the growth in cryptocurrencies have been drastically underreported over the past few years, so some measure may likely need to be taken to facilitate compliance.¹³ Additionally, any steps that can be taken to ensure that these private monies are not used for criminal activity should be evaluated. Otherwise, cryptocurrencies themselves pose no threat to U.S. monetary policy operations.

Cryptocurrency technology, however, does bring to the fore a problem that will require serious efforts from federal policymakers to address adequately, and that is the problem of the United States' inefficient, costly (to users), and outdated payment system. Today, it typically takes 3-4 days to transfer money from one U.S. bank account to another, even though the sending account is often debited immediately. Given the current level of technology in the world, this process should require

mere minutes. Nowhere is this reality better exemplified than in Australia, which earlier this year rolled out its New Payments Platform (NPP). The NPP enables customers with accounts at different banking institutions "to make payments to each other any time of day, any day of the year." Moreover, the NPP uses an updated messaging standard to improve data processing and it "provides real-time settlement via the Reserve Bank of Australia's Fast Settlement Service."¹⁴ This modern payments system is the result of six years of work, following the release of a strategic report on Australia's previous system. There are fewer bureaucratic and financial barriers in Australia, but the creation of the NPP gives an idea of how much lead-time is required to modernize a country's payments system.

The technology associated with cryptocurrencies is a proof of concept for payment processing. Bitcoin can typically be transferred in about an hour. This sends the clear message that the U.S. payment system is outdated and could be much better. Revamping the entire payment system is a complex project that would require cooperation from many actors, including the Treasury Department, the Federal Reserve, and most private deposit-taking institutions. This transition will eventually be unavoidable, particularly as other countries continue to improve their own systems—and especially if the markets for cryptocurrencies continue their rapid growth—so serious efforts should begin now.



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Jesús Fernández-Villaverde is Professor of Economics and Director of Graduate Studies for the Department of Economics at the University of Pennsylvania. He also is a Research Associate for the National Bureau of Economic Research (NBER) and Penn's Population Studies Center, and a Research Affiliate for the Centre for Economic Policy Research. His research agenda is in macroeconomics and econometrics, with a focus on the computation and estimation of dynamic stochastic general equilibrium (DSGE) models, the standard tool of modern quantitative macroeconomics. Among other topics, he is interested in the role of monetary and fiscal policy, the sources of economic growth, and the foundations of market economies.

Professor Fernández-Villaverde has previously held academic appointments at Princeton University, Yale University, Duke University, New York University, Harvard University, and the University of Oxford. He has been a Visiting Scholar at the Federal Reserve Banks of St. Louis, Minneapolis, Cleveland, and Atlanta and at the Becker-Friedman Institute of the University of Chicago. He has co-authored and edited several books and published over two dozen articles in peer-reviewed academic journals. He serves on the editorial board of the International Economic Review and has held editorial responsibilities for several other academic publications.

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