STABLECOINS IN CRYPTOECONOMICS: FROM INITIAL COIN OFFERINGS TO CENTRAL BANK DIGITAL CURRENCIES

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Cryptocurrencies have suffered from tremendous volatility. As a result, cryptocurrencies cannot adequately serve the needs generally associated with currencies: to serve as a store of value as well as a medium of exchange and a unit of account. For this reason, developers and entrepreneurs have started to design an alternative form of currency called "stablecoins." A stablecoin is a stable cryptocurrency, pegged to fiat currencies such as the U.S. dollar and Euro. Stablecoins are stabilized (in principle) by either being backed by collateral (such as fiat currency, precious metal, or a basket of cryptocurrencies) or with algorithmic "seigniorage" mechanisms.

This Article analyzes stablecoins' main characteristics, identifies the different types of stablecoins, and considers stablecoins' role in cryptoeconomics and their potential to revolutionize distributed ledger technology. Furthermore, this Article builds on the problems affecting stablecoins, focusing in particular on: the apparent contradiction in implementing a fully decentralized system that is based on a central validator; the endemic opaqueness of auditing operations; conflicts of interest emerging from stablecoins' relationship with cryptoexchanges; and their role in the recent Bitcoin bubble. Finally, this Article highlights the regulatory uncertainty that exists in securities and commodities law, which may cause stablecoins to be characterized in the same way as initial coin offerings (ICOs) and motivate governments and central bankers to design and effectively implement central bank digital currencies (CBDCs). More broadly, this Article aims to highlight the factual interconnections linking ICOs, cryptocurrencies, stablecoins and CBDCs.

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Introduction

Just months after the 2008 Financial Crisis, the world's first cryptocurrency hit the market. In a now famous paper, *Bitcoin: A Peer-to-Peer Electronic Cash System*, Satoshi Nakamoto unleashed the first decentralized cryptocurrency, called Bitcoin, and spearheaded the world's revolution into digital currency.[1] As the cryptocurrency market evolved, entrepreneurs began to create new types of coins. Just several years later, J.R. Willett proposed the possibility of creating new coins *on top* of Bitcoins,[2] opening a new era of "cryptoeconomics." Willett later launched the first initial coin offering (ICO), Mastercoin[3] (now Omni[4]).

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1. Satoshi Nakamoto, Bitcoin: A Peer-to-Peer Electronic Cash System (2008), https://bitcoin.org/bitcoin.pdf [https://perma.cc/VEM2-2HS3].

2. J.R. Willett, The Second Bitcoin Whitepaper (2012), https://sites.google.com/site/2ndbtcwpaper/2ndBitcoinWhitepaper.pdf [https://perma.cc/QH22-PQH8]. As Willett explains in the summary,

> We claim that the existing bitcoin network can be used as a protocol layer, on top of which new currency layers with new rules can be built . . . We further claim that the new protocol layers . . . [w]ill provide initial funds to hire developers to build software which implements the new protocol layers, and . . . [w]ill richly reward early adopters of the new protocol.

Id. at 1 (emphasis omitted).

3. *See* Marco Dell'Erba, *Initial Coin Offerings: The Response of Regulatory Authorities*, 14 N.Y.U. J. L. & Bus. 1107, 1136 (2018).

4. *See* Laura Shin, *Here's the Man Who Created ICOs and This Is the New Token He's Backing*, Forbes (Sept. 21, 2017, 12:06 PM), https://www.forbes.com/sites/

The story that follows is well-known: new so-called "alternative coins" or cryptocurrencies proliferated, generally supported by their own underlying blockchain technology. Predictably, this new wave of entrepreneurial initiatives raised concerns for regulators (especially for securities and commodities regulators) as well as for governments and central bankers, about the impact that privately issued money-like instruments could have on monetary policy and financial stability.[5] Even so, more than 2,000 cryptocurrencies exist today.[6] As of publication, cryptocurrencies reached the peak of their popularity and value capitalization in 2018, driven by the growing popularity of ICOs, with entrepreneurs and academics looking at ICOs as one of the most revolutionary tools in entrepreneurial finance in recent years.[7]

Notwithstanding their incredible wave of popularity and a growing penetration of blockchain technology in different markets, cryptocurrencies experienced a significant decline in terms of market capitalization starting in January 2018. While regulators regarded blockchain technology with growing favor, looking at systematic large-scale adoption, they remained skeptical of the cryptocurrency market. A major cause of this skepticism was the uncertain regulatory framework that existed in 2018,[8] followed by growing regulatory pressure and enforcement action aimed at restoring investors' confidence and market integrity.[9] In fact, a significant number of scams occurred during this time,[10] most of them on the Ethereum platform in the form of Ponzi schemes or phishing.[11] Furthermore, behavioral reasons,

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laurashin/2017/09/21/heres-the-man-who-created-icos-and-this-is-the-new-token-hes-backing/#108e76ad1183 [https://perma.cc/M5XS-DYMZ].

5. *See infra* Section III.D.

6. *All Cryptocurrencies*, CoinMarketCap, https://coinmarketcap.com/all/views/all/ (last visited June 23, 2019).

7. Sabrina Howell, Marina Niessner & David Yermack, *Initial Coin Offerings: Financing Growth with Cryptocurrency Token Sales* 2 (European Corp. Governance Inst., Finance Working Paper No. 564/2018, 2018).

8. *See* Dell'Erba, *supra* note 3, at 1126.

9. *See* Marco Dell'Erba, *From Inactivity to Full Enforcement. The Implementation of the 'Do No Harm' Approach in Initial Coin Offerings (ICOs)*, Mich. Telecomm. & Tech. L. Rev. (forthcoming 2019) (manuscript at 45).

10. Sherwin Dowlat, Satis Group, Cryptoasset Market Coverage Initiation: Network Creation 24 (2018), https://research.bloomberg.com/pub/res/d28giW28tf6G7T_Wr77aU0gDgFQ [https://perma.cc/JMB5-PKMZ] (finding that seventy-eight percent of ICOs were scams); *see also* Hugo Benedetti & Leonard Kostovetsky, Digital Tulips? Returns to Investors in Initial Coin Offerings (May 20, 2018) (unpublished manuscript), https://ssrn.com/abstract=3182169.

11. Gareth Jenkinson, *From Ponzi Schemes to ICO Exits, Ethereum's Blockchain Has Been the Platform of Choice for Scammers*, Cointelegraph (Feb. 4, 2019), https://cointelegraph.com/news/from-ponzi-schemes-to-ico-exits-ethereums-blockchain-has-been-the-platform-of-choice-for-scammers [https://perma.cc/74TS-9WR6].

mostly related to users' aversion to new technologies, significantly slowed down cryptocurrency market capitalization. In addition, blockchain faced structural deficiencies, such as serious scalability problems,[12] that stymied the growth of theses cryptoeconomies.

All these factors resulted in a high degree of volatility that was made worse by specific structural characteristics of cryptocurrencies, in particular that traditional cryptocurrencies are not the liability of any institution and are not backed by assets, coupled with rigid issuance rules.[13] Among these deficiencies, cryptocurrencies' novelty in the economic landscape was a physiological cause for volatility. Although volatility may be perceived as pathological, it is part of a physiological process of establishing a novel framework in the economy. In recent years, the Nasdaq Composite Index experienced huge losses, equal to a seventy-eight percent peak-to-trough decline after the dot-com bubble burst in 2000.[14] Cisco lost eighty-six percent from its peak and Amazon lost ninety-five percent from 1999 to 2001, falling from $107 to $5.97.[15] Furthermore, significant volatility characterized the year 2018 in many different markets, from capital markets (where volatility returned to the average after a "calm" 2017)[16] to the art market.[17]

This volatility diminished the cryptocurrency market's ability to establish itself as a unit of account and limited the opportunity for consumers to use cryptocurrencies as a means of exchange in business transactions. At the same time, volatility has damaged long-term in-

12. *See* Connor Blenkinsop, *Blockchain's Scaling Problem, Explained*, COINTELEGRAPH (Aug. 22, 2018), https://cointelegraph.com/explained/blockchains-scaling-problem-explained [https://perma.cc/LAW9-4TZW].

13. *See* TOMMASO MANCINI-GRIFFOLI ET AL., IMF STAFF DISCUSSION NOTE, CASTING LIGHT ON CENTRAL BANK DIGITAL CURRENCY 13 (Nov. 2018), https://www.imf.org/en/Publications/Staff-Discussion-Notes/Issues/2018/11/13/Casting-Light-on-Central-Bank-Digital-Currencies-46233.

14. Michael Patterson, *Crypto's 80% Plunge Is Now Worse than the Dot-Com Crash*, BLOOMBERG, https://www.bloomberg.com/news/articles/2018-09-12/crypto-s-crash-just-surpassed-dot-com-levels-as-losses-reach-80 (last updated Sept. 12, 2018, 7:52 AM) [https://perma.cc/A54A-ZDV3].

15. Hu Liang, *The Intrinsic Value of Crypto (What the Bubble Hasn't Changed)*, COINDESK (Dec. 16, 2018, 11:02 PM), https://www.coindesk.com/the-intrinsic-value-of-crypto-what-the-bubble-hasnt-changed [https://perma.cc/LK46-P6CW].

16. Sarah Hansen, *Market Volatility: A Return to the Old Normal*, FORBES (Dec. 12, 2018, 9:30 AM), https://www.forbes.com/sites/sarahhansen/2018/12/12/market-volatility/#7035607971f0 [https://perma.cc/6F27-WSB5].

17. *See* Kelly Crow, *'Things Are Just Blurry': Auction Houses Brace for a Volatile Year*, WALL STREET J. (Feb. 6, 2019, 11:59 PM), https://www.wsj.com/articles/things-are-just-blurry-auction-houses-brace-for-a-volatile-year-11549515541 [https://perma.cc/H9S9-VU29].

vestors' view of cryptocurrencies as a long-term store of value.[18] Although the establishment of blockchain technology goes beyond the sole purpose of creating a currency, the overall instability of cryptocurrencies is regarded as a key obstacle to the development of blockchain as an ecosystem. High volatility impacts the mechanisms of cryptoeconomics, making costs and incentives highly unpredictable.[19]

In such a context, "stablecoins" emerged as a more reliable alternative to well-known "traditional" cryptocurrencies. The growing attention to stablecoins is mostly due to their promise of solving structural problems emerging in the blockchain ecosystem. Although the mechanics supporting each stablecoin can be complex, they all share the same purpose of holding a *stable* value, which favors their use as traditional currencies—being a store of value as well as a medium of exchange and unit of account.[20]

The market took note. Stablecoins emerged as a global phenomenon, with projects in North America and Europe (the two leading blocks), Asia, the Middle East, and Oceania (though, surprisingly, not in China and Japan, notwithstanding their position as leading cryptocurrency trading markets).[21] As a result, the stablecoin market value grew by 700% in 2018[22] and is still gaining momentum today.[23]

Tether was the first stablecoin. Originally called Realcoin and subsequently rebranded in order not to be associated with other altcoins,[24] Tether was first launched in 2014 and listed in the

18. Kingsley Advani, *The Top 6 Stablecoins in Crypto*, MEDIUM (Feb. 23, 2018), https://medium.com/@kingsleyadvani/the-top-6-stable-coins-in-crypto-e6f53e9b03be [https://perma.cc/XC6S-5GPY].

19. Nathan Sexer, *State of Stablecoins, 2018*, MEDIUM (July 24, 2018), https://media.consensys.net/the-state-of-stablecoins-2018-79ccb9988e63 [https://perma.cc/Q349-JPQ3].

20. *See* David Yermack, *Is Bitcoin a Real Currency? An Economic Appraisal* 2 (Nat'l Bureau of Econ. Research, Working Paper No. 19747, 2013), https://www.nber.org/papers/w19747.pdf [https://perma.cc/P4G9-VBV2].

21. *See* BLOCKCHAIN, THE STATE OF STABLECOINS (2018), https://www.blockchain.com/research (follow "Download the Report" hyperlink below the report titled "2018 — The State of Stablecoins").

22. *See* Fan Wen, *Stablecoin—"Bad" Idea, "Good" Investment*, MEDIUM (Sept. 30, 2018), https://medium.com/coinmonks/stablecoin-bad-idea-good-investment-f35b79b21016 [https://perma.cc/52A4-ZJTJ].

23. *See* Rachel Wolfson, *Stablecoins Could Unleash Wall Street Adoption of Blockchain Technology*, FORBES (Feb. 20, 2019, 8:00 AM), https://www.forbes.com/sites/rachelwolfson/2019/02/20/stablecoins-could-unleash-wall-street-adoption-of-blockchain-technology/#a40ae14453c9 [https://perma.cc/NQL6-4ARL].

24. Pete Rizzo, *Realcoin Rebrands as 'Tether' to Avoid Altcoin Association*, COINDESK, https://www.coindesk.com/realcoin-relaunches-tether-avoid-altcoin-association (last updated Nov. 20, 2014, 9:08 PM) [https://perma.cc/7EMQ-NQ8L].

cryptoexchange Bitfinex in 2015.[25] In 2018, Tether accounted for *ninety-three percent* of the total market value of stablecoins and, today, is still the most capitalized stablecoin that exists,[26] though the stablecoin is now under scrutiny after news reports suggested that its collateral may not sufficiently exist.[27]

Regardless, the financial downturn that affected almost all of the existing cryptocurrencies effectively made stablecoins more popular, attracting institutional investors (such as Goldman Sachs and more recently JPMorgan Chase & Co.) and venture capitalists.[28] As a consequence, by 2018, Tether ranked among the top five cryptocurrency assets by market cap.[29] As of September 2018, fifty-seven stablecoins were under development, twenty-three live and the rest at a pre-launch phase, for a total value capitalization of $3 billion, equal to 1.5% of the total market value of all cryptoassets.[30]

Part I of this Article analyzes stablecoins' main characteristics, identifying the main categories that have emerged in the market (in particular, collateralized and algorithmic stablecoins), and considers their role in cryptoeconomics. Part II analyzes stablecoins as part of a broader array of initiatives intended to promote the infrastructural development of blockchain technology, and analyzes the problems related to each category of stablecoin. It further considers the relationship between stablecoins and other cryptocurrencies, focusing on the role that stablecoins, namely Tether, had in the Bitcoin bubble and the conflicts of interest that exist at the level of cryptoexchanges. Finally, it assesses the applicability of securities and commodities law in the United States and Europe in light of the problems that emerged in the context of cryptocurrencies' ICOs. It also briefly builds on the relationship between stablecoins and Central Bank Digital Currencies

25. Siamak Masnavi, *The Tether (USDT) Story: How the World's Most Popular Stablecoin Became a Lot Less Stable*, CRYPTOGLOBE (Oct. 15, 2018), https://www.cryptoglobe.com/latest/2018/10/the-tether-usdt-story-how-the-worlds-most-popular-stablecoin-became-a-lot-less-stable/ [https://perma.cc/DQC9-LGPR].

26. BLOCKCHAIN, *supra* note 21, at 4.

27. *See infra* Section III.A.

28. *See* Steven Ehrlich, *Two Explanations for Venture Capital's Inexplicable Interest in Stablecoins*, FORBES (Sept. 25, 2018, 4:27 PM), https://www.forbes.com/sites/stevenehrlich/2018/09/25/two-reasons-for-venture-capitals-inexplicable-interest-in-stablecoins/#7feef7321a57 [https://perma.cc/9VZE-A5B7]; Helen Partz, *JPMorgan Will Pilot 'JPM Coin' Stablecoin by End of 2019: Report*, COINTELEGRAPH (June 25, 2019), https://cointelegraph.com/news/jpmorgan-will-pilot-jpm-coin-stablecoin-by-end-of-2019-report [https://perma.cc/57RF-8TK2].

29. P.H. Madore, *Crypto Downturn Thrusts Tether into Top 5 in Market Cap Rankings*, CCN (Nov. 12, 2018, 1:37 PM), https://www.ccn.com/crypto-downturn-thrusts-tether-into-top-5-in-market-cap-rankings/ [https://perma.cc/U2VP-WH4C].

30. *See* BLOCKCHAIN, *supra* note 21, at 4.

(CBDCs), an increasingly popular institutional initiative that involves governments, central bankers and international organizations interested in identifying a response to the proliferation of privately-issued digital currencies.

I.
What Is a Stablecoin?

A. Stablecoins' Main Characteristics

Stablecoins are cryptocurrencies that maintain a stable value against a target price, generally U.S. dollars.[31] Stablecoins generally combine liquid collateral (such as gold or U.S. dollar)[32] or algorithmic mechanisms of stabilization with the management of the supply "to incentivize the market to trade the coin for no more or less than $1."[33] A collateral of high quality (one that is extremely liquid, such as U.S. dollars or gold) should in principle lead to the dual effect of making the stablecoin both stable and liquid. A new wave of stablecoins implement models that use other digital assets as collateral or which are not collateralized at all, opting for riskier algorithmic mechanisms of price stabilization.[34]

ICOs experienced exponential growth from 2017–2018, emphasizing their affinity to cryptocurrencies and equities rather than commodities and currencies. Though cryptocurrencies resulting from ICOs experienced significant problems, such as extreme volatility and a high number of scams, ICOs contributed to the rising popularity of cryptocurrencies. ICOs, cryptocurrencies and stablecoins (and CBDCs) are examples of the interstices between securities and monetary issues. For instance, an entity from the world of securities, such as an ICO, may trigger significant consequences at the monetary level and for the payment system, as well as at the broadest level of pure monetary policy analysis (as confirmed by the development of CBDCs). In fact, while stablecoins are a consequence of the emergence of cryptocurrencies, they emerged as a rather distinct phenome-

31. Sexer, *supra* note 19.

32. Sherman Lee, *Explaining Stable Coins, the Holy Grail of Cryptocurrency*, Forbes (Mar. 12, 2018, 12:15 AM), https://www.forbes.com/sites/shermanlee/2018/03/12/explaining-stable-coins-the-holy-grail-of-crytpocurrency/#4db76f8f4fc6 [https://perma.cc/L9AR-VNTS].

33. *What Is a Stable Coin?*, CryptoCurrency Facts, https://cryptocurrencyfacts.com/what-is-a-stable-coin/ (last visited July 21, 2019) [https://perma.cc/N5BU-HXL6].

34. *See* Kirill Bryanov, *Breaking the Peg: Every Stablecoin Has Its Points of Failure,* Cointelegraph (Nov. 19, 2018), https://cointelegraph.com/news/breaking-the-peg-every-stablecoin-has-its-points-of-failure [https://perma.cc/3KFD-3VPB].

non and work in a manner that can be compared to money market funds in the ecosystem of cryptocurrencies. Typically, money market funds invest in highly liquid cash or cash-equivalent securities, with a short-term maturity of less than thirteen months and the possibility to redeem their shares anytime at a stable value.[35]

In a study for the European Parliament, Rosa María Lastra and Jason Grant Allen identified three main characteristics of "virtual currencies" as opposed to the "conventional types of financial industry": virtual currencies make use of blockchain technology in an effort to make peer-to-peer easier; they are issued by an entity that is not a central bank or a licensed financial intermediary;[36] and they are denominated in a novel unit of account rather than a fiat monetary unit.[37] These characteristics can be safely extended to stablecoins. In addition, a key characteristic distinguishing virtual currencies from "book-money" is that no system of reserve is necessarily in place in virtual currency schemes. Furthermore, there is no lender of last resort, whereas bank deposits represent the liability of a commercial bank.[38] The theoretical existence of a collateral in the form of fiat currency for those stablecoins implementing this means of stabilization, as discussed below, would make this general difference between virtual currency schemes and "book-money" less marked.

Furthermore, while stablecoins use mechanisms capable of minimizing exchange rate volatility[39] that other cryptocurrencies do not have (making them "price-stabilized cryptocurrencies"[40]), they share with these the main features of programmability, efficiency and fungibility.[41] Some articles tend to conclude that both stablecoins and traditional cryptocurrencies share another key feature, being "open and permissionless," but this is less clear. While traditional cryptocurren-

35. *See* Troy Segal, *Money Market Fund*, INVESTOPEDIA, https://www.investopedia.com/terms/m/money-marketfund.asp (last updated May 17, 2019) [https://perma.cc/6L9K-UXQ7].

36. For a discussion on the characteristics of virtual money issued by central banks, see generally Aleksander Berentsen & Fabian Schar, *The Case for Central Bank Electronic Money and the Non-Case for Central Bank Cryptocurrencies*, 100 FED. RES. BANK SAINT LOUIS REV. 97 (2018), https://research.stlouisfed.org/publications/review/2018/02/13/the-case-for-central-bank-electronic-money-and-the-non-case-for-central-bank-cryptocurrencies/ [https://perma.cc/SQ2J-A6DE].

37. *See* Rosa María Lastra & Jason Grant Allen, *Monetary Dialogue Study Requested by the ECON Committee on Virtual Currencies in the Eurosystem: Challenges Ahead*, at 11 (July 2018), http://www.europarl.europa.eu/cmsdata/150541/DIW_FINAL%20publication.pdf [https://perma.cc/PRY4-NK6R].

38. *Id.* at 10.

39. BLOCKCHAIN, *supra* note 21, at 7.

40. *Id.*

41. *Id.*

cies are "open and permissionless" since they are built on a public blockchain and therefore can be downloaded without any permission,[42] this cannot be entirely extended to stablecoins.[43] Fiat-currency collateralized stablecoins (such as Tether) are linked to reserves (for example, in U.S. dollars) that the issuer directly or indirectly holds in a bank; therefore, they cannot be permissionless. However, in the secondary market they become permissionless because they do not need any agreement to be sold to third parties.

From a structural perspective, stablecoins are generally built on top of the Ethereum blockchain protocol: the reason for this choice depends on the opportunity to instantaneously improve the compatibility of the newly issued asset with the pre-existing infrastructure and therefore with "second generation" applications similarly built on top of the same blockchain protocol.[44] This is very important for the way wallets operate, with potential benefits for e-commerce. Further advantages depend on the adoption of the so-called ERC20 standard[45] by the stablecoin, with the possibility of using such stablecoin in any other application similarly designed on that standard. There is an additional advantage for developers and fintech to have a "programmable dollar," facilitating the programming phase.[46] Furthermore, Ethereum platform-based stablecoins allow users improved opportunities for tracking the circulation of the tokens via specific "block explorers," such as Etherscan.[47] Block explorers are decentralized applications

42. *See* Aaron Hankin, *JPM Coin Is Not a Cryptocurrency, Says Crypto Advocacy Group*, MARKETWATCH (Feb. 15, 2019, 8:09 AM), https://www.marketwatch.com/story/jpm-coin-is-not-a-cryptocurrency-says-crypto-advocacy-group-2019-02-14 [https://perma.cc/2MMU-WW6N].

43. *See* Kyle Torpey, *Opinion: Stablecoins Have No Need for Public Blockchains*, LONGHASH (Feb. 7, 2019, 4:16 PM), https://www.longhash.com/news/opinion-stablecoins-have-no-need-for-public-blockchains [https://perma.cc/N2KG-KXLE].

44. Joseph Young, *Why New Generation Stablecoins Are Crucially Based on Ethereum*, CCN (Oct. 24, 2018, 4:26 PM), https://www.ccn.com/why-new-generation-stablecoins-are-crucially-based-on-ethereum/ [https://perma.cc/8Y83-4FAA]. The author notes that "users of GUSD, PAX, and TUSD can utilize hardware wallets like Trezor and Ledger along with software wallets such as Metamask to send and receive stablecoins."

45. *See infra* note 244 and accompanying text for a discussion on the ERC20 standard.

46. *See* Coinbase, *Coinbase and Circle Announce the Launch of USDC—a Digital Dollar*, MEDIUM: COINBASE BLOG (Oct. 23, 2018), https://blog.coinbase.com/coinbase-and-circle-announce-the-launch-of-usdc-a-digital-dollar-2cd6548d237 [https://perma.cc/92XF-AZVM].

47. *See* Young, *supra* note 44.

(so-called "dapps"),[48] generally underpinned by the Ethereum network, and their main function consists of allowing users to "lookup, confirm, and validate transactions that have taken place on the Ethereum Blockchain."[49] They have been widely used by the industry as the basic tool for data query and data analysis on the blockchain. Due to the characteristic of tokens being stored in smart contracts, U.S. dollars stored in a particular stablecoin can be tracked by users.[50]

The process leading to the issuance of stablecoins does not differ from any "traditional" ICO.[51] However, Basis (a newly launched stablecoin that has since shut down),[52] which had one of the largest token sales in 2018 at $133 million, has shown that ICOs may not be as "democratic," "inclusive"[53] or revolutionary[54] as they are supposed to be. Due to regulatory needs (with the SEC strengthening its enforcement on ICOs) and a more mature market, the majority of ICOs were structured as private sales exclusively targeting institutional investors or accredited investors. Furthermore, stablecoins in particular captured the attention of venture capitalists and important financial institutions,[55] whereas ICOs and cryptocurrencies attracted relatively large masses of unsophisticated investors.

B. The Different Categories of Stablecoins

Three main categories of stablecoins have emerged in the market, each of which use different models to stabilize their value. First, fiat-currency asset-backed stablecoins (so-called off-chain collateralized stablecoins) rely on fiat currencies as a collateral, and due to this characteristic cannot be fully decentralized. The most famous off-chain

48. *See What Is a DApp?*, ETHEREUM STACKEXCHANGE, https://ethereum.stackexchange.com/questions/383/what-is-a-dapp (last visited July 21, 2019) [https://perma.cc/LVK9-WZ2U].

49. *See Ethereum Blockchain Explorer*, ETHERSCAN, https://etherscan.io (last visited July 21, 2019).

50. *See* Young, *supra* note 44.

51. *See generally* Dell'Erba, *supra* note 3.

52. Brady Dale, *Basis Stablecoin Confirms Shutdown, Blaming 'Regulatory Constraints*,*'* COINDESK, https://www.coindesk.com/basis-stablecoin-confirms-shutdown-blaming-regulatory-constraints (last updated Dec. 13, 2018, 8:35 PM) [https://perma.cc/YH54-95WG].

53. *See* Dell'Erba, *supra* note 3, at 1120.

54. *See* Justina Lee, *ICOs Are Turning Exclusive as Wealthy Investors Snatch Up Deals*, BLOOMBERG, https://www.bloomberg.com/news/articles/2018-08-08/token-sales-turn-exclusive-as-private-investors-snatch-up-deals (last updated Aug. 8. 2018, 10:23 AM) [https://perma.cc/8YDF-ZPV6].

55. *See* Ehrlich, *supra* note 28; *see also* Chainalysis Team, *Bitcoin Investor and Speculator Hold Their Position over the Summer* (Sept. 24, 2018), https://blog.chainalysis.com/reports/money-supply-q3 [https://perma.cc/GD4X-ZVUN].

collateralized stablecoin is Tether, with a theoretical ratio of 1:1 between USDT (Tether's stablecoin) and the U.S. dollar.[56] A more recent example of a fiat-backed stablecoin is StableUSD (USDS), issued by the venture-capital backed start-up Stably Inc.[57] According to the Stably's whitepaper, USDS is based on a centralized model "to fully back every token issued with an equivalent unit of real currency (i.e. U.S. dollars) in a transparent reserve managed by Stably, Inc., the central issuer of USDS tokens, as well as our fiduciary custodial partners."[58]

A second category of stablecoins, on-chain collateralized stablecoins, is collateralized with digital assets, generally on one or a basket of cryptocurrencies. This category of stablecoins is fully decentralized. As the whitepaper of the decentralized stablecoin Havven explains, "A decentralised system cannot use collateral assets that exist outside the blockchain, as interfacing with these assets necessitates centralisation with the aforementioned failure modes."[59] The full decentralization implemented with on-chain collateral would in principle be conducive to greater transparency. In the case of Havven, for example, an on-chain collateralization would enable "full transparency over how many tokens have been issued against the available collateral. This provides a solid basis for confidence in the solvency of the payment network built upon it."[60] According to Havven's whitepaper, its users

> transact directly in a price-stable cryptocurrency. Those who use the stablecoin pay fees to those who collateralise the network, compensating them for the risks of providing collateral and stability. Collateral providers control the money supply, and fees are distributed in proportion with each individual's stabilisation performance. Thus, Havven rewards suppliers of stability and charges those who demand it.[61]

To implement this mechanism, Havven relies on a structure based on two different tokens. The first token, Nomin, with a floating supply, has a price measured in fiat currencies and should be a me-

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56. For further discussion of Tether, see *infra* Section III.B.

57. STABLY, https://www.stably.io/ (last visited July 21, 2019).

58. STABLY, TRANSPARENT RESERVE-BACKED STABLECOINS FOR MULTIPLE BLOCKCHAIN PROTOCOLS 1, https://www.stably.io/static/whitepaper.pdf (last updated Sept. 4, 2018) [https://perma.cc/3ASQ-T6DP].

59. SAMUEL BROOKS ET AL., HAVVEN, A DECENTRALIZED PAYMENT NETWORK AND STABLECOIN v0.8, at 2 (2018), https://www.synthetix.io/uploads/havven_whitepaper.pdf [https://perma.cc/3GWK-4KD9].

60. *Id.* at 3.

61. *Id.*

dium of exchange.[62] The second token, Havven, should be the collateral for the system and have a static supply (as opposed to the floating supply of Nomin).[63] According to the developers, the Havven token is a novel decentralized asset, whose value derives from the fees generated in the network it collateralizes.[64] In this way, the promoters aim to create "a form of representative money in which there is no requirement for a physical asset, thus removing the problems of trust and custodianship."[65] Havven's market capitalization "reflects the system's aggregate value," and "[o]wnership of havvens grants the right to issue a value of nomins proportional to the dollar value of havvens placed into escrow."[66]

Non-collateralized stablecoins are a third category, implementing algorithmic tools to maintain the stability of stablecoins. As Robert Sams explains in a seminal paper, Bitcoin-like cryptocurrencies "govern the supply of coin through simple and deterministic coin supply rules."[67] For this reason, any unanticipated changes in coin demand impact the coin price, with the consequence that significant volatility limits its utility as a medium of exchange. Therefore, Sams proposed an alternative method of stabilization based on an elastic supply rule capable of adjusting the quantity of coin supply as a reaction to changes in coin market value.[68] Non-collateralized stablecoins are not backed by any form of collateral and instead are based on "self-sustaining models that incorporate additional layers of game-theoretic incentives to encourage self-interested user behavior that would be instrumental in sustaining the peg."[69] In this context, the role of a central bank managing the supply of fiat currencies is overtaken by smart contracts in charge of algorithmically expanding or contracting the supply of the stablecoin.[70]

The majority of non-collateralized coins are based on a "seigniorage system" where two types of coin co-exist, one acting like money and one acting like shares: while the two coins share the same fea-

62. *Id.*
63. *Id.*
64. *Id.*
65. *Id.*
66. *Id.*
67. ROBERT SAMS, A NOTE ON CRYPTOCURRENCY STABILISATION: SEIGNIORAGE SHARES 1, https://assets.ctfassets.net/sdlntm3tthp6/resource-asset-r390/5a940afb21681d19c0b3b76cf69259e1/58ebe9e2-1f28-4a8d-8ce1-26abef07aedf.pdf (last updated Apr. 28, 2015) [https://perma.cc/ZF9S-GLVD].
68. *Id.* at 2.
69. *See* Bryanov, *supra* note 34.
70. *Id.*

tures, the two processes regulating their supply differ.[71] As Sams explains, in situations where coin supply needs to be increased, "coinbase is distributed to shareholders in exchange for a certain percentage of shares, which are destroyed (coin supply increases, share supply decreases)."[72] When there is a need to decrease the coin supply, "sharebase is distributed to coin holders in exchange for a certain percentage of coin, which are destroyed (coin supply decreases, share supply increases)."[73] Such "shares-for-coin" and "coin-for-shares" swap mechanism is voluntary, and is implemented through a decentralized auction as programmed in the protocol.[74]

Although recently shut down due to regulatory constraints (in particular uncertainty regarding the applicability of the securities law to stablecoins),[75] the Basis project is a useful example: it is built on two assets coexisting on the platform, proper stablecoins and supporting bonds. Should the coin's price fall below a predetermined threshold, the system issues bonds to be sold to coin holders, attracted by the opportunity to be paid interest from the future coin issuance.[76] At the same time, the coins used to buy the bonds are destroyed, with the effect of reducing supply to consequentially lead to an increase in price.[77]

Non-collateralized stablecoins enjoy the advantages of full decentralization and do not require the trust of the main issuing company.[78] A downside effect is the risk of exposing these stablecoins to attacks that may potentially affect their price.[79] Furthermore, some critique the expectation (or assumption) that non-collateralized st-

71. *See* SAMS, *supra* note 67, at 3.
72. *Id.* at 4.
73. *Id.*
74. *Id.*
75. *See* Dale, *supra* note 52.
76. NADER AL-NAJI ET AL., BASIS: A PRICE-STABLE CRYPTOCURRENCY WITH AN ALGORITHMIC CENTRAL BANK 11, 13, https://www.basis.io/basis_whitepaper_en.pdf (last updated June 4, 2018) [https://perma.cc/R4BG-33ZC].
77. *Id.* at 11, 15.
78. BlockShow, *Security Tokens Ecosystem in 2018: A Research by BlockShow*, MEDIUM (Nov. 22, 2018), https://medium.com/@BlockShow/security-tokens-ecosystem-in-2018-a-research-by-blockshow-5641a2286ef7 [https://perma.cc/8725-HTCC].
79. *Id.*

ablecoins will grow indefinitely[80] and as a consequence will maintain their value.[81]

In addition to these three main categories, two further categories of stablecoins may be identified: hybrid stablecoins and alternative stablecoins.[82] Hybrid stablecoins combine both off-chain and on-chain mechanisms of stability. Reserve is an example of a hybrid stablecoin.[83] The Reserve network is based on three different phases: in the first centralized phase, Reserve is backed by U.S. dollars, which are held by a trust company; during the decentralized second phase, Reserve is backed by a changing basket of assets in a decentralized way, maintaining a stabilized price against the U.S. dollar; in the third "independent phase," Reserve should become non-correlated to the U.S. dollar and no longer pegged to the U.S. dollar, which would serve to stabilize Reserve's real purchasing power irrespective of any fluctuation affecting the fiat currency's value (in this case the U.S. dollar).[84]

Alternative stablecoins are a residual category. An example of an alternative stablecoin is Terra,[85] a cryptocurrency price-pegged to a basket of currencies, mirroring the composition of the Special Drawing Right (SDR) international asset reserve designed by the IMF.[86]

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80. Barry Eichengreen, *Why 'Stable Coins' Are No Answer to Bitcoin's Instability*, GUARDIAN (Sept. 11, 2018, 7:01 AM), https://www.theguardian.com/technology/2018/sep/11/stable-coins-bitcoin-cryptocurrencies-tether [https://perma.cc/TT8S-Y8BM].

81. *See* Lukas Schor, *Stablecoins Explained*, MEDIUM (Mar. 15, 2018), https://medium.com/@argongroup/stablecoins-explained-206466da5e61 [https://perma.cc/2EA2-NKAP].

82. STABLECOIN INDEX, https://stablecoinindex.com/projects (last visited July 5, 2019). The Stablecoin Index currently lists eleven Fiat-Collateralized Stablecoins (Tether-USDT, TrustToken-TrueUSD, Circle-USDC, Stably, AAA Reserve, X8X, Globcoin, Stasis, Stronghold, Gemini Dollar, Paxos Standard), five Crypto-Collateralized Stablecoins (Bitshares BitUSD, MakerDAO-DAI, Sweetbridge, Havven-NUSD, Augmint), four Algorithmic Supply Stablecoins (Basis, Fragments, Carbon, Kowala), three Hybrid Stablecoin Models (Reserve, Saga, Aurora-Boreal), three Alternative Stablecoin Models (Phi, Stableunit, Terra Money, Celo), and two Metal-backed Stablecoins (Digix Global, HelloGold).

83. *See* RESERVE, https://reserve.org/ (last visited July 5, 2019).

84. *See The Reserve Protocol*, RESERVE, https://reserve.org/protocol (last visited July 5, 2019) [https://perma.cc/W65R-B3RV].

85. EVAN KEREIAKES ET AL., TERRA MONEY: STABILITY AND ADOPTION (2019), https://s3.ap-northeast-2.amazonaws.com/terra.money.home/static/Terra_White_paper.pdf?201904 [https://perma.cc/7ZRV-JQKC].

86. As the IMF explains,

> The SDR is an international reserve asset, created by the IMF in 1969 to supplement its member countries' official reserves. So far SDR 204.2 billion (equivalent to about US$291 billion) have been allocated to members, including SDR 182.6 billion allocated in 2009 in the wake of the

Finally, while the vast majority of stablecoins are pegged to the U.S. dollar, some are pegged to metals. An example is Digix, where one DGX (Digix's stablecoin) represents one gram of gold on Ethereum.[87]

In addition to the distinctive stabilizing mechanism, stablecoins do not depend on any national central bank, aspiring to be truly global currencies, like any other traditional cryptocurrency. The two "key promises" of being stable and global should be the preconditions for the implementation of cryptocurrencies on a broader scale in daily life, due to increased opportunities for practical usage.[88]

C. Stablecoins' Role in Cryptoeconomics

A new phase of infrastructural initiatives has emerged in the blockchain ecosystem. An important pillar of this infrastructural evolution is the debate on smart contracts and their functional implementations in different contexts. A major area of infrastructural development is corporate governance, with the possibility for corporations based in Delaware and Wyoming to issue so-called electronic shares on a distributed ledger, and the consequent prospect of implementing a more reliable proxy voting system executed on the blockchain.[89] A further relevant implementation of blockchain is the one for market infrastructures, in both the trading and post-trading phases, such as cryptoexchanges and clearinghouses. In addition, new self-regulatory initiatives represent the effort to design a healthy regulatory infrastructure.[90] Stablecoins may be considered part of this broader ecosystem of initiatives and represent "a form of infrastructure or foundational layer for crypto assets"[91] that may contribute to the substitution of opaque and inefficient platforms and assets, improving the trans-

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> global financial crisis. The value of the SDR is based on a basket of five currencies—the U.S. dollar, the euro, the Chinese renminbi, the Japanese yen, and the British pound sterling.

Special Drawing Right (SDR), Int'l Monetary Fund (Mar. 8, 2019), https://www.imf.org/en/About/Factsheets/Sheets/2016/08/01/14/51/Special-Drawing-Right-SDR [https://perma.cc/9B3U-C9AZ]. The current basket includes U.S. dollar 41.73%, Euro 30.93%, Chinese renminbi 10.92%, Japanese yen 8.33%, British pound 8.09%. *Id.*

87. *See* Digix, https://digix.global/ (last visited Oct. 26, 2019) [https://perma.cc/6KJU-RCKM].

88. Lee, *supra* note 32.

89. *See How Blockchain Transforms Proxy Voting,* Broadridge, https://www.broadridge.com/video/how-blockchain-transforms-proxy-voting (last visited July 21, 2019).

90. *See* Aaron Stanley, *Just in Time? Winklevoss-Backed Crypto Self-Regulatory Effort Picks Up Steam*, Forbes (Aug. 20, 2018, 6:04 PM), https://www.forbes.com/sites/astanley/2018/08/20/just-in-time-winklevoss-backed-crypto-self-regulatory-group-has-liftoff/#663aa2092ea5 [https://perma.cc/7RYU-BFLF].

91. *See* Blockchain, *supra* note 21, at 7.

parency and the regulatory compliance of the coming structures.[92] In such a mature environment, it is not surprising that companies like Fidelity, ICE (New York Stock Exchange Group), NASDAQ, Microsoft, Starbucks and some Ivy League endowment funds have increasingly shifted their attention toward blockchain initiatives, venturing new significant initiatives or indirectly investing in the "crypto-ecosystem."[93]

From a theoretical perspective, stablecoins should help cryptocurrencies serve the fundamental purposes of currencies, that is simultaneously serving as a store of value, a medium of exchange and a unit of account.

While Bitcoin was considered useful both for storing value as well as a medium of exchange,[94] the expectation of continuous growth in the value of Bitcoin and the spectacular growth (and fall) of other alt-coins encouraged the trend of holding these assets for speculative purposes. In the context of such volatility, people have an incentive to keep cryptocurrencies in expectation of their appreciation in value rather than circulate them.[95] Therefore, the creation of stable cryptocurrencies as a medium of exchange would contribute to their widespread adoption,[96] unlocking mass-adoption for day-to-day businesses and recurrent payments. Nowadays, cryptocurrencies' volatility generates uncontrolled risks for those businesses accepting them. Stablecoins may prove useful in increasing the degree of certainty, in particular for short-term cash reserves and revenues.[97] Stability has the potential to cut off purely speculative activity, making them better suited to be used as a means of exchange. In contrast, cryptocurrencies with daily fluctuations of ten to twenty percent due to speculative maneuvers cannot serve as a means of exchange.[98]

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92. Young, *supra* note 44.

93. *See* Liang, *supra* note 15.

94. *But see* Yermack, *supra* note 20 (arguing that Bitcoin "somewhat" functions as a medium of exchange "because a growing number of merchants, especially in online markets, appear willing to accept it as a form of payment," but it "performs poorly as a unit of account and as a store of value").

95. Patrick Tan, *Security Tokens Versus Stablecoins*, MEDIUM (Sept. 27, 2018), https://medium.com/predict/security-tokens-versus-stablecoins-2d33b91e2fd [https://perma.cc/GPP8-X6R8].

96. *Id.*

97. BLOCKCHAIN, *supra* note 21, at 12. As Blockchain's report emphasizes, "Transacting in ether or bitcoin would make the role of a treasurer a difficult task as the business's runway (how long the company can survive if income and expenses stay constant) could adversely shift in an instant due to unfavorable market swings." *Id.*

98. *See* Schor, *supra* note 81.

Complementary to their function as a medium of exchange, stablecoins may also serve as a unit of account. In the short term, stablecoins may serve as a digitized unit of account by being pegged to national units of account, while in the long term they may become independent units of account.[99] Furthermore, stablecoins may serve as a more reliable performance measurement to better analyze the intrinsic value of a project, separating it from the fluctuations of any cryptocurrency,[100] and if pegged to inflation, stablecoins would not require any adjustment to historical data.[101] Finally, stablecoins' stability would enable the denomination of trading pairs in U.S. dollars instead of classic cryptocurrencies, such as Bitcoin or Ether, enabling exposure to fiat rates (other than Bitcoin or Ether), while creating new arbitrage opportunities.[102]

At the same time, stablecoins may also serve as a store of value, useful for typical financial operations, in particular for hedging purposes over the long term, and for the implementation of a systematic tokenization of real-world assets. With regard to hedging, a stable reserve of liquid assets would be helpful for miners to cover fixed and variable costs related to the activity of mining cryptocurrencies with their computing resources.[103] Furthermore, stablecoins may benefit founding teams launching an ICO; by retaining their funds in Ether, entrepreneurs may be exposed to a bear market with falling prices, with the obligation to fulfill investor expectations with decreasing available capital.[104] Tokenization, the digitized version of real-world assets, may involve $256 trillion of real-world assets[105] and has already started to be implemented in "real estate, commodities, securities and fine art."[106] To be effective, tokenization requires a "definitive store of value," such as a "stablecoin which is consistently audited," capable of offering "guarantees over the underlying assets with full collateral and possess[ing] legal consequences for bad actors and remunerations to affected parties . . . ."[107] However, it may not be

99. *Id.*

100. *See* BLOCKCHAIN, *supra* note 21, at 13.

101. *Id.*

102. Sexer, *supra* note 19.

103. *Id.*

104. *Id.*

105. CREDIT SUISSE RESEARCH INST., GLOBAL WEALTH REPORT 2016, at 4 (2016), https://www.credit-suisse.com/corporate/en/research/research-institute/global-wealth-report.html (follow "Global wealth report 2016" hyperlink).

106. *See* Ryan Hennebry, *Fundamental Analysis: TrueUSD (TUSD)*, BBOD RESEARCH BLOG (Feb. 4, 2019), https://blog.bbod.io/fundamental-analysis-trueusd-tusd/.

107. *Id.*

realistic to expect that a cryptocurrency, namely a stablecoin, would have all these characteristics.

Stablecoins may solve the practical difficulties of circulating dollars in the cryptocurrency world in different ways. For exchanges that cannot or do not deal in dollars, stablecoins are an easy substitute to fiat currencies in dollars.[108] For this reason, stablecoins may be beneficial for investors or traders, as well as exchanges. By using a fiat currency substitute, investors and traders can much more easily liquidate a position in Bitcoin operating on an exchange not dealing in fiat currencies, opting for a cryptocurrency with stable prices, which would be equivalent to selling that position in Bitcoin for cash. In addition, stablecoins may grant liquidity to exchanges, which would benefit the entire cryptocurrency market.[109] In August 2018, according to a report by Chainalysis, twenty-three percent of the total outstanding supply of Bitcoin, equal to 4.8 million Bitcoin, was held in personal wallets with some activity since August 31, 2018; 6.4 billion Bitcoin were inactive investments, held in accounts with no activity for a year.[110] On this basis, unsurprisingly, cryptocurrency exchanges have been increasingly adding stablecoins to their platforms.[111]

Liquidity concerns led venture capitalists to invest in stablecoins. Many ICOs, either in a preliminary stage or exclusively, were directed to accredited investors or institutional investors,[112] in particular venture capitalists (who played an important role in blockchain)[113] via private sales or private pre-sales.[114] Stablecoins may be helpful for venture capitalists because, instead of keeping wallets with multiple utility tokens, each of which is used for a specific application, venture capitalists can "hold most of [their] money in a stablecoin and exchange it for the required token."[115]

In addition to liquidity concerns, stablecoins may be disruptive in the banking market by acting as bank disintermediators. Bank disintermediation is a phenomenon that has existed since the 1970s[116]

108. *What Is a Stable Coin?*, *supra* note 33.
109. *Id.*
110. *See* Ehrlich, *supra* note 28; *see also* Chainalysis Team, *supra* note 55.
111. *See* Ana Alexandre, *Report: Stablecoins See Significant Growth in Adoption over Recent Months*, COINTELEGRAPH (Dec. 10, 2018), https://cointelegraph.com/news/report-stablecoins-see-significant-growth-in-adoption-over-recent-months [https://perma.cc/25PM-GEN6].
112. *See* Ehrlich, *supra* note 28.
113. *See* Dell'Erba, *supra* note 3, at 1121.
114. *See* Lee, *supra* note 54.
115. *See* Ehrlich, *supra* note 28.
116. *See* Charles K. Whitehead, *The Evolution of Debt: Covenants, the Credit Market, and Corporate Governance*, 34 J. CORP. L. 641, 654 (2009).

and generally refers to corporations that obtain funding from sources other than banks, whether funding is provided from non-bank lenders or by issuing bonds. By extending the concept of banking disintermediation to "retail" banking transactions, stablecoins may be disruptors in this field. Stablecoins' long-term potential to function as retail banks and monetary systems has attracted the attention of institutional investors, not only venture capitals but also established financial institutions, such as Goldman Sachs,[117] interested in pursuing a strategy as a local banker.[118]

In a function that is complementary to "classic" banking service, stablecoins may be important for strengthening the payment system. Indeed, the European Banking Authority (EBA) includes them under the category of "payment/exchange/currency tokens," as distinguished from "investment tokens" and "utility tokens," after noting the lack of a common taxonomy in use by international standard-setting bodies.[119] Although in September 2017 JPMorgan Chase & Co.'s CEO, Jamie Dimon, was very critical of Bitcoin, publicly stating that it was fraud,[120] JPMorgan Chase & Co. became increasingly active in this space. Firstly, it created Quorum, a strategic blockchain-based infrastructure, with the function of tokenizing gold bars in an effort "to allow sustainable miners to earn a premium on global markets," as part of a broader mission to manage global liquidity, improve information inefficiencies and create "crypto assets."[121] Secondly, JPMorgan Chase & Co. was reported to have launched the first ever cryptocurrency created by a bank, a USD-backed stablecoin, the "JPM Coin," with the ambition to "instantly settle transactions between clients of its

117. *See* Ehrlich, *supra* note 28.

118. *Id.*; *see also* Liz Hoffman & Peter Rudegeair, *Goldman Sachs, Adviser to the Elite, Wants to Be Your Local Bank*, WALL STREET J., https://www.wsj.com/articles/goldman-sachs-adviser-to-the-elite-wants-to-be-your-main-street-banker-1519745369 (last updated Feb. 27, 2018, 11:18 PM) [https://perma.cc/M3KB-EMVZ].

119. *See Report of the European Banking Authority on Crypto-Assets*, at 7 (Jan. 9, 2019), https://eba.europa.eu/sites/default/documents/files/documents/10180/2545547/67493daa-85a8-4429-aa91-e9a5ed880684/EBA%20Report%20on%20crypto%20assets.pdf?retry=1.

120. *See* Michael Patterson, *Jamie Dimon Vindicated? Bitcoin's Back to Where He Cried 'Fraud'*, BLOOMBERG (Nov. 20, 2018, 6:35 AM), https://www.bloomberg.com/news/articles/2018-11-20/jamie-dimon-vindicated-bitcoin-s-back-to-where-he-cried-fraud [https://perma.cc/VR52-2E9X].

121. James Eyers, *JP Morgan's Quorum Blockchain Opens New World of Trading Opportunities,* FIN. REV., https://www.afr.com/technology/jp-morgans-quorum-blockchain-opens-new-world-of-trading-opportunities-20181027-h176fs (last updated Oct. 29, 2018, 1:54 PM) [https://perma.cc/VZM6-WK4Z].

wholesale payments business."[122] The nature of the JPM Coin is unclear, since it does not share key characteristics with traditional cryptocurrencies; in fact, it will run on a private blockchain, with the coins issued directly by the bank, as opposed to cryptocurrencies running on public blockchain where entrepreneurs generally launch their ICOs.[123]

In addition to credit institutions, even social media companies may play a role in the banking system,[124] and stablecoins may make these market transformations much easier. Facebook announced the possibility of issuing a cyptocurrency-based payment system, Libra, and planned its launch for the first half of 2020,[125] initially with the support of twenty-eight founding members, including Visa, Mastercard, PayPal, Uber, Lyft and Coinbase.[126] This payment system would enable its users to send money to each other and to purchase goods on Facebook, Instagram and WhatsApp as well as across the internet and the real world.

Libra may resemble a stablecoin.[127] Consistent with other stablecoins existing in the market, Libra is "backed by a collection of low-volatility assets, such as bank deposits and short-term government securities in currencies from stable and reputable central banks."[128] Furthermore, a network of investment-grade credit rating custodians based all over the world implements a secure decentralized system for holding these assets.[129] As a consequence, Libra's key characteristics

122. Hugh Son, *JP Morgan Is Rolling Out the First US Bank-Backed Cryptocurrency to Transform Payments Business*, CNBC, https://www.cnbc.com/2019/02/13/jp-morgan-is-rolling-out-the-first-us-bank-backed-cryptocurrency-to-transform-payments—.html (last updated Feb. 14, 2019, 7:13 PM) [https://perma.cc/Z9FM-L6X5].

123. *See* Hankin, *supra* note 42.

124. *See* Hannah Murphy & Philip Stafford, *Facebook Held Talks with Winklevoss Twins over New Currency*, Fin. Times (May 24, 2019), https://www.ft.com/content/0207778c-7d62-11e9-81d2-f785092ab560.

125. *See* Libra, An Introduction to Libra 4, https://libra.org/en-US/white-paper/ (last updated July 23, 2019) (follow ".pdf" hyperlink) [https://perma.cc/U52A-MXR2].

126. Zack Seward & Nikhilesh De, *Facebook Unveils Libra Cryptocurrency, Targeting 1.7 Billion Unbanked*, CoinDesk, https://www.coindesk.com/facebook-launches-subsidiary-to-support-new-libra-crypto (last updated June 18, 2019 at 11:13 AM) [https://perma.cc/F7PW-NB5U]. PayPal, Visa, Mastercard, Stripe, Mercado Pago and eBay opted for leaving the coalition of companies. *See* Sergei Klebnikov, *Here Are All the Companies that Bailed on Facebook's Libra*, Forbes (Oct. 21, 2019, 9:51 AM), https://www.forbes.com/sites/sergeiklebnikov/2019/10/21/here-are-all-the-companies-that-bailed-on-facebooks-libra/#7a4fd2fe3487.

127. *See* Laura Noonan & Hannah Murphy, *Facebook in Talks with US Regulator over Digital Currency*, Fin. Times (June 2, 2019), https://www.ft.com/content/3b2084fe-83c6-11e9-b592-5fe435b57a3b.

128. *See* Libra, *supra* note 125, at 7.

129. *Id*.

may be extremely high liquidity and tradability,[130] as well as the promise of low volatility.[131] In addition, Libra promoters emphasize the potential of this initiative in reaching a significant number of adults who are "unbanked," promoting financial inclusion in developing countries lacking access to credit and cutting the costs involved in immigrants' remittances.[132]

Finally, stablecoins may enable further implementation where stability is highly desirable. For smart contracts, stablecoins are a better option than more volatile cryptocurrencies.[133] One of the most important and profitable areas would be the growing sector of so-called smart insurance; "smart travel insurance" is an area that attracted the interest of a giant company like AXA.[134]

II.
Critical Considerations of the Stablecoin Economy

A. Collateral and Issues Related to Each Category of Stablecoin

The label "stablecoin" identifies a specific group of cryptocurrencies pursuing the goal of stability, according to the respective whitepapers. Thus far, some experiments with stablecoins have failed[135] or have been traded for less than $1. This is the case for Nubits, traded for $0.50 in late March 2018,[136] or the recent case of the more established stablecoin Tether, which traded at $0.96.[137] Fur-

130. *See* Murphy & Stafford, *supra* note 124.

131. Libra, *supra* note 125, at 7. As described in Libra's whitepaper,

> [O]ne Libra will not always be able to convert into the same amount of a given local currency (i.e., Libra is not a 'peg' to a single currency). Rather, as the value of the underlying assets moves, the value of one Libra in any local currency may fluctuate. However, the reserve assets are being chosen to minimize volatility, so holders of Libra can trust the currency's ability to preserve value over time.

Id.

132. *See* Seward & De, *supra* note 126.

133. *See* Blockchain, *supra* note 21, at 8.

134. *Id.*

135. *See* Preston Byrne, *Stablecoins Are Doomed to Fail*, Preston Byrne (Dec. 10, 2017), https://prestonbyrne.com/2017/12/10/stablecoins-are-doomed-to-fail/ [https://perma.cc/479N-4BLE]; *see also* Matthew Beedham, *Two-thirds of Failed Stablecoin Projects Were Backed by Gold*, Next Web (June 27, 2019, 2:33 PM), https://thenextweb.com/hardfork/2019/06/27/stablecoin-projects-gold-failed/ [https://perma.cc/9E9Q-MU96].

136. *What Is a Stable Coin?*, *supra* note 33.

137. *See* Marie Huillet, *Tether Tanks as Traders 'Lose Trust,' Other Cryptos See Price Boost*, Cointelegraph (Oct. 15, 2018), https://cointelegraph.com/news/tether-tanks-as-traders-lose-trust-other-cryptos-see-price-boost [https://perma.cc/HK9W-W6MQ].

thermore, although an indirect benefit of stablecoins should lead to an increased stability of the cryptocurrencies, there are no empirical studies proving that this is the case.[138] On the contrary, stablecoins may be a further conductor of volatility due to the increased opportunities for speculation.[139]

An attempt to try to answer the question of whether stablecoins lead to increased stability should necessarily start with analyzing the fragility of each type of stablecoin. As already mentioned in Section II.C, the word "stablecoin" encompasses a broad range of cryptocurrencies that do not share many common characteristics, in particular the most crucial—the use of collateral. In the aftermath of the financial crisis in 2008, the lack of an adequate level of collateral raised significant concerns among regulators. Important regulations requiring increased high-quality collateral are the result of a post-crisis approach aimed at tackling systemic risk[140] and reducing the risks of contagion, in an effort to increase financial stability. Key pillars of these regulatory architectures are the regulations of derivatives and clearinghouses,[141] where collateral reduces the so-called counterparty risk, and the capital ratios provided by the Basel III Agreements and its implementing rules, such as the Capital Requirements Regulation[142] and Capital Requirements Directive IV[143] in Europe.

However, an automatic association between stablecoins and collateral would be inappropriate. The perception that a significant advancement induced by stablecoins (in particular, those collateralized with fiat currencies) would be the association of the notion of collat-

138. *What Is a Stable Coin?*, *supra* note 33. However, a recent study by Makiko Mita, Shohei Ohsawa and Hideyuki Tanaka concludes that stablecoins "cannot sufficiently ensure the constant purchasing power . . . which is a prerequisite for stablecoin." MAKIKO MITA ET AL., WHAT IS STABLECOIN?: A SURVEY ON PRICE STABILIZATION MECHANISMS FOR DECENTRALIZED PAYMENT SYSTEMS 7 (2019), https://arxiv.org/ftp/arxiv/papers/1906/1906.06037.pdf [https://perma.cc/H8FJ-CFDK].

139. *Id.* at 3.

140. *See* Rosa María Lastra, *Systemic Risk, SIFIs and Financial Stability,* 6 CAP. MKTS. L.J. 197, 199 (2011). For a discussion on defining systemic risk, see Steven L. Schwarcz, *Systemic Risk*, 97 GEO. L.J. 193, 198–204 (2008).

141. For example, the 2008 G20 in Washington, D.C., the Declaration of the Summit on Financial Markets and the World Economy, mandated national regulators to "[s]trengthen[ ] the resilience and transparency of credit derivatives markets and reduc[e] their systemic risks, including by improving the infrastructure of over-the-counter markets." Grp. of Twenty [G20], *Declaration of the Summit on Financial Markets and the World Economy* (Nov. 15, 2008), https://georgewbush-whitehouse.archives.gov/news/releases/2008/11/20081115-1.html. The European Market Infrastructure Regulation, for example, implements this mandate.

142. *See* 2013 O.J. (L 176) 1.

143. *See* 2013 O.J. (L 176) 338.

eral with the world of cryptocurrencies is erroneous. Except for collateralized stablecoins, the existence of collateral is not a distinctive feature of stablecoins as opposed to other traditional cryptocurrencies. As discussed in Part I, two different mechanisms of stabilization have emerged: stabilization via a collateral (fiat currencies or cryptocurrencies), and an algorithmic stabilization mechanism that does not require any collateral. Algorithmic (non-collateralized) stablecoins are based on a self-sustaining smart-contract framework that manages the supply of stablecoins. In this case, the only difference from traditional cryptocurrencies lies in this algorithmic mechanism designed to provide stabilization, but there is no collateral in either case. Therefore, except for this designing feature, stablecoins do not provide any additional guarantee in comparison to traditional cryptocurrencies and probably do not represent a step forward. It is not surprising that in the short-term, asset-backed stablecoins (both off-chain and on-chain) outperformed algorithmic coins.[144]

Off-chain fiat-backed stablecoins should be, in principle, more reliable due to the "real" high-quality collateral as a guarantee of stability. A structural contradiction of off-chain stablecoins, however, may be the existence of a centralized authority that issues the tokens. This structural contradiction is not easy to solve and is not limited exclusively to stablecoins. Indeed, it is common to many situations involving the implementation of blockchain, including, among others, corporate voting. More generally, this contradiction is not surprising, and characterizes almost all networks, including the internet.[145] In the context of stablecoins, the implementation of a permissioned blockchain to better manage the proxy voting system would require a "centralized" intermediary acting as a gatekeeper. Tether and Stably are examples of "centrally governed" cryptocurrencies where users have to trust the issuing company with no guarantee of "any right of redemption or exchange of Tethers by us for money."[146] As a consequence, off-chain stablecoins rely on the same paradigm of a centralized network, perpetuating the traditional centralized concept/framework of "trust" in a third party. Indeed, stablecoins require users to trust a central third party.[147]

144. *See* BLOCKCHAIN, *supra* note 21, at 4.

145. *See generally* Kevin Werbach, *The Centripetal Network: How the Internet Holds Itself Together, and the Forces Tearing It Apart*, 42 U.C. DAVIS L. REV. 343 (2008).

146. *See* Bryanov, *supra* note 34.

147. *See* Eichengreen, *supra* note 80.

However, this centralization is not counterbalanced by effective transparency regarding the effective existence of the collateral, which is helpful for the individual investors and the overall market. Similar to what happened in the context of ICOs (in particular when their new wave started), this lack of transparency mostly depends on an endemic lack of external auditing, useful to adequately prove entrepreneurs' good faith and adequate technical background. While this may apply to all the categories of stablecoins, a specific auditing for off-chain and on-chain collateralized stablecoins would be essential to prove to investors and the market the real existence and the consistency of the collateral secured at a custodial entity. For Tether, there is no third-party audit of the entity claiming that Tethers are guaranteed by a collateral equal to one U.S. dollar per coin.[148] In fact, although Tether was linked to the U.S. dollar at a 1:1 ratio,[149] significant concerns emerged about the existence and real consistency of fiat currency collateral.[150] As a consequence, Tether was traded at around $0.96.[151] Therefore, these fiat-backed cryptocurrencies have problems of transparency that also impact the costs side, encompassing high fees and delays originated by inefficiently managed peaks of demand.[152] Tether has been compared to a "Ponzi scheme," since its functioning depends on the growth of the platform—which is not guaranteed.[153] As Eichengreen explains,

> To issue one dollar's worth of Tether to you or me, the platform must attract one dollar of investment capital from you or me, and place it in a dollar bank account. One of us then will have traded a perfectly liquid dollar, supported by the full faith and credit of the U.S. government, for a cryptocurrency with questionable backing that is awkward to use.[154]

148. *Id.*

149. *See* Gareth Jenkinson, *Untethered: The History of Stablecoin Tether and How It Has Lost Its $1 Peg*, COINTELEGRAPH (Oct. 17, 2018), https://cointelegraph.com/news/untethered-the-history-of-stablecoin-tether-and-how-it-has-lost-its-1-peg [https://perma.cc/Q2BR-46YK].

150. *See* Benjamin Robertson, Matthew Leising & Andrea Tan, *Why Crypto Traders Are So Worried About Tether*, BLOOMBERG, https://www.bloomberg.com/news/articles/2018-10-14/why-crypto-traders-are-so-worried-about-tether-quicktake-q-a?utm_source=twitter&utm_content=crypto&utm_medium=social&utm_campaign=socialflow-organic (last updated Apr. 25, 2019, 9:26 PM) [https://perma.cc/2HS4-G8PC].

151. *See* Huillet, *supra* note 137.

152. *See* Sexer, *supra* note 19.

153. *See* Jason Bloomberg, *Bernie Madoff Move Over: 'Stablecoins' Have You Beat*, FORBES (Nov. 25, 2018, 11:16 AM), https://www.forbes.com/sites/jasonbloomberg/2018/11/25/bernie-madoff-move-over-stablecoins-have-you-beat/#1c294a057dab [https://perma.cc/HST5-WSFU].

154. *See* Eichengreen, *supra* note 80.

In the case of off-chain backed stablecoins, this problem is coupled with the specific need to trace off-chain operations involving fiat currencies. The newly created stablecoin USDS promises that "coin issuance/redemption transactions will either be recorded on-chain or regularly audited and submitted to the blockchain for verification, all of which is freely available for public viewing."[155] In addition, referring specifically to off-chain fiat transactions and their gap of transparency, Stably promises to "create and submit their hashes to the blockchain for later verification during audits";[156] to make publicly available on its website all the transactions and bank balances and to provide a link to publicly available transactions on the blockchain; and to "employ a reputable third-party audit firm (TBA) to conduct scheduled audits and attestations [on a periodic basis] for our reserve accounts and off-chain transactions," posted on the website when available."[157]

Further issues may emerge if fiat-backed stablecoins collapse, with users exposed to specific counterparty and third-party risks. In this context, counterparty risk relates to the problem of trusting the good will of the central managers of the money, while third-party risk depends on outside actors, who may be a threat to users (hackers or governments).[158]

For digital asset-backed stablecoins, major problems may arise depending on the digital assets on which the stablecoin is collateralized. Digital asset-backed stablecoins are generally collateralized by other cryptocurrencies or a basket of them. In this context, a major risk is represented by the "collateral volatility." For example, a stablecoin like Dai was criticized because of the over-collateralization with ETH, exposing Dai's users to the value (and the volatility) of the underlying coin.[159]

Non-collateralized stablecoins may be weak because they are based on the expectation that the platform will constantly grow, which may not be a realistic guarantee.[160] In addition, under specific condi-

155. STABLY, *supra* note 58, at 17.
156. *Id.* at 9.
157. *Id.*
158. *See* Bryanov, *supra* note 34.
159. *See* Byrne, *supra* note 135. For a different view, see Reserve Research Team, *Reserve's Analysis of the MakerDAO Protocol*, MEDIUM (Aug. 13, 2018), https://medium.com/reserve-currency/our-analysis-of-the-makerdao-protocol-4a9872c1a824 [https://perma.cc/F2HP-BLLM].
160. Eichengreen, *supra* note 80.

tions "the peg is likely to fail irrecoverably."[161] As research published by Reserve reveals, although Basis claims it implements "on-chain" stabilization, implying a complete decentralization, "their actual plan involves a period of stabilization using off-chain assets," with the consequence of potentially significant financial distress, as in the case of Tether.[162] As Reserve's research explains,

> Basis will be backed by at most 80% funding, and has made no commitments to spend that money defending the peg. Even if off-chain stabilization works when Basis's market cap is small enough, its cash reserves solution won't scale. This is particularly bad because Basis's stabilization mechanism only works if investors are confident in both a stable peg and growth. In fact, confidence is most needed during a peg break, when it is least likely to be present. With fiat currency, confidence in exchange-rate pegs is established by demonstrating assets held in reserve to back the peg. Because Basis's reserves are a function of current market demand and confidence, they are illegible and unreliable, further contributing to the potential downward spiral of value loss and lack of confidence.[163]

Furthermore, how can auditors effectively assess whether an algorithmic stabilization mechanism is adequate or not? This is similar to a problem that occurred in the context of private funds, in particular hedge funds: investment strategies and exposures were so complex that it was almost impossible for an external auditor to understand them and make any prediction in relation to liquidity and counterparty risks.

B. The Financial Relationship Between Stablecoins and Other Cryptocurrencies

Blockchain has the characteristic of being an ecosystem. As a consequence, a cryptocurrency's market value is (and will probably be) always coordinated. In addition, Bitcoin, which still is the most capitalized cryptocurrency, operates as a sort of benchmark for the other cryptocurrencies, and its interconnectedness with other cryptocurrencies is further promoted by the fact that many small cryptocurrencies are exchanged against Bitcoin. In such a context, stablecoins that are pegged to fiat currencies and may benefit from the existence

161. Nevin Freeman, *Reserve's Analysis of the Basis Protocol*, MEDIUM (May 14, 2018), https://medium.com/reserve-currency/our-analysis-of-the-basis-protocol-cf1e0713b849 [https://perma.cc/67LM-P7NW].
162. *Id.*
163. *Id.*

of collateral may break this interconnectedness between cryptocurrencies and, in particular, cryptocurrencies' dependence on Bitcoin.

In addition to financial implications, the interconnectedness between cryptocurrencies (including stablecoins) and Bitcoin also has transparency implications. An analysis of the prices in the period from March to December 2017 reveals a close relationship between Tether and Bitcoin, with Tether significantly contributing to the Bitcoin bubble.[164] Tether was able to exploit a monopoly situation in 2017 and a factual predominance in 2018, although multiple stablecoins projects emerged and were implemented. In such a context, this monopoly situation influenced the Bitcoin market price in different cryptoexchanges, compounded by the fact that the company issuing Tether was de facto controlled by Bitfinex, the biggest Asian cryptoexchange.[165] A correlation between the market price of Bitcoin and other cryptocurrencies in the "pump phase" of the bubble and the offering of Tether on the exchanges was observed; therefore, a plausible conclusion would be that Bitfinex may have artificially induced the buying of the cryptocurrencies with growing amounts of Tether.[166] In a phase of exponential rise in price, this strategy is a way to "issue" Tether with no adequate coverage in dollars to buy digital currencies and resell them at a higher price reconstituting the reserves.[167]

This leads to some consideration of the relationship between stablecoins' issuers and cryptoexchanges. As briefly mentioned in Section I.B, stablecoins may grant liquidity to exchanges.[168] Cryptoexchanges may be in a position of significant conflict of interest when deciding to list stablecoins, due to the advantages and the profits that they may extract from transactions involving the conversion of fiat versus cryptocurrencies and vice versa, requiring the implementation of stablecoins. This also provides an explanation for why cryptoexchanges have been increasingly adding stablecoins to their platforms.[169]

Further doubts about the dangerous relationship between stablecoins and cryptoexchanges have been cast by the recent allegations involving the exchange Bitfinex and its stablecoin Tether,

164. *See* Marcello Minenna, *L'esplosione della Bolla Bitcoin: Un'autopsia*, Il Sole 24 ORE (Dec. 31, 2018), https://www.ilsole24ore.com/art/commenti-e-idee/2018-12-30/l-esplosione-bolla-bitcoin-autopsia-154252.shtml?uuid=AEGaGD7G [https://perma.cc/26T4-FMHK].
165. *Id.*
166. *Id.*
167. *Id.*
168. *What Is a Stable Coin?*, *supra* note 33.
169. *See* Alexandre, *supra* note 111.

against whom the N.Y. Attorney General issued subpoenas in November 2018.[170] As the filings explain:

> Bitfinex no longer has access to over $850 million dollars of comingled client and corporate funds that it handed over, without any written contract or assurance, to a Panamanian entity called "Crypto Capital Corp.," a loss Bitfinex never disclosed to investors. In order to fill the gap, executives of Bitfinex and Tether engaged in a series of conflicted corporate transactions whereby Bitfinex gave itself access to up to $900 million of Tether's cash reserves, which Tether for years repeatedly told investors fully backed the tether virtual currency "1-to-1. . . . Bitfinex has already taken at least $700 million from Tether's reserves. Those transactions – which also have not been disclosed to investors – treat Tether's cash reserves as Bitfinex's corporate slush fund, and are being used to hide Bitfinex's massive, undisclosed losses and inability to handle customer withdrawals.[171]

Such a situation raises questions about the opportunity for an exchange to "own" a stablecoin and to list it, and imposes further thoughts (and potentially actions) on the regulatory side. These actions should serve to reduce conflicts of interests, while enhancing the essential role of exchanges and protecting stablecoins' collateral. This would contribute to safeguarding market integrity and enhancing investor protection in the context of cryptoeconomics.

C. The Qualification of Stablecoins Under Securities Law

Cryptocurrencies and ICOs have drawn the attention of securities regulators in the United States and Europe. Despite their name and their function within the market, stablecoins may still qualify as a deposit, as e-money,[172] or as securities or commodities, triggering new regulatory uncertainties about their classification similar to ICOs and cryptocurrencies.[173] Furthermore, stablecoins may raise traditional compliance issues related to Anti-Money Laundering (AML) and Know York Customer (KNY) rules. This section focuses on the quali-

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170. Press Release, N.Y. Attorney Gen., Attorney General James Announces Court Order Against "Crypto" Currency Company Under Investigation for Fraud (Apr. 25, 2019), https://ag.ny.gov/press-release/attorney-general-james-announces-court-order-against-crypto-currency-company-under [https://perma.cc/F4P8-Y7NL].

171. *Id.*

172. *See* Ben Regnard-Weinrabe et al., *Stablecoins*, HARV. L. SCH. F. ON CORP. GOVERNANCE & FIN. REG. (Feb. 10, 2019), https://corpgov.law.harvard.edu/2019/02/10/stablecoins/ [https://perma.cc/FDR4-J4ZB#8].

173. *See* Dell'Erba, *supra* note 3, at 1130; *see also* Dell'Erba, *supra* note 9 (manuscript at 35).

fication of stablecoins as securities and commodities under U.S. law and European law.

1. United States

In the United States, the same regulatory uncertainties on the classification of ICOs and cryptocurrencies that existed in 2017–2018[174] may re-emerge in the context of stablecoins. The recent decision of Basis's developers to shut down operations exemplifies this regulatory uncertainty[175] and its potentially negative consequences. Consistent with what happened for ICOs, the Securities and Exchange Commission (SEC) may qualify stablecoins not as cryptocurrencies but rather as "securities," due to the similarities they share with the concept of the "security token": a security token is backed by something tangible, including assets, profits or revenue of the company.[176] As a consequence, the SEC could be tempted to extend the securities law framework to this class of cryptoassets. After a period of inactivity,[177] in July 2017 the SEC issued the *Report of Investigation Pursuant to Section 21(a) of the Securities Exchange Act of 1934: The DAO*[178] (the "DAO Report"). In that case, the SEC applied a classic tool elaborated on by American courts, the so-called "Howey" test, to ICO tokens and concluded that DAO ICO tokens qualified as a "security" under section 2(a)(1) of the Securities Act of 1933.[179] Since

174. *See* sources cited *supra* note 173.

175. Michael del Castillo, *Crypto's Top Funded Startup Shutters Operations Following SEC Concerns*, FORBES (Dec. 13, 2018, 11:59 AM), https://www.forbes.com/sites/michaeldelcastillo/2018/12/13/sec-rules-kill-cryptos-top-funded-startup/#485ac2f22918 [https://perma.cc/PSC7-9RW4].

176. Polymath, *What Is a Security Token Offering (STO)?*, POLYMATH NETWORK (Mar. 12, 2018), https://blog.polymath.network/what-is-a-security-token-offering-sto-4e5a92bf6bca [https://perma.cc/U6QT-N64U]. In addition,

> If a crypto token derives its value from an external, tradable asset, it is classified as a security token and becomes subject to federal securities regulations. Failure to abide by these regulations could result in costly penalties and could threaten to derail a project. However, if a startup meets all its regulatory obligations, the security token classification creates the potential for a wide variety of applications, the most promising of which is the ability to issue tokens that represent shares of company stock.

Josiah Wilmoth, *ICO 101: Utility Tokens vs. Security Tokens*, STRATEGIC COIN, https://strategiccoin.com/ico-101-utility-tokens-vs-security-tokens/ (last visited Aug. 7, 2019) [https://perma.cc/X999-LCLQ].

177. *See* Dell'Erba, *supra* note 3, at 1128.

178. Report of Investigation Pursuant to Section 21(a) of the Securities Exchange Act of 1934: The DAO, Exchange Act Release No. 81207, 2017 WL 7184670 (July 25, 2017).

179. *Id.* at *8; *see* Dell'Erba, *supra* note 9 (manuscript at 20, 24).

then, the SEC gradually extended the securities regulation to ICOs and a vast majority of activities involving cryptocurrencies.[180]

Section 2(a)(1) of the Securities Act of 1933 covers a wide variety of financial instruments[181] and includes a circular definition of "security"[182] as "any interest or instrument commonly known as a 'security.'"[183] To clarify the definition of "security," the Supreme Court

180. *See* Dell'Erba, *supra* note 3, at 1128–29; Dell'Erba, *supra* note 9 (manuscript 20–24).

181. *See* JAMES D. COX, ROBERT W. HILLMAN, DONALD C. LANGEVOORT, SECURITIES REGULATION, CASES AND MATERIALS 29 (8th ed. 2017).

182. *See* Giovanni Patti, *Prodotti finanziari e contratti con i consumatori. Una recente pronuncia della Corte di giustizia a confronto con la securities law Americana*, 5 GIUR. COMM. 1015, n.27 (2011) (It.) (on file with author). The author emphasizes the presence of the "*definiendum*" within the "*definiens*".

183. Section 2(a)(1) of the Securities Act of 1933 defines "securities" in these terms:

> *The term 'security' means* any note, stock, treasury stock, security future, bond, debenture, evidence of indebtedness, certificate of interest or participation in any profit-sharing agreement, collateral-trust certificate, preorganization certificate or subscription, transferable share, investment contract, voting-trust certificate, certificate of deposit for a security, fractional undivided interest in oil, gas, or other mineral rights, any put, call, straddle, option, or privilege on any security, certificate of deposit, or group or index of securities (including any interest therein or based on the value thereof), or any put, call, straddle, option, or privilege entered into on a national securities exchange relating to foreign currency, or, *in general, any interest or instrument commonly known as a 'security'*, or any certificate of interest or participation in, temporary or interim certificate for, receipt for, guarantee of, or warrant or right to subscribe to or purchase, any of the foregoing.

Securities Act of 1933 § 2(a)(1), 15 U.S.C. § 77b(a)(1) (2012) (emphasis added). A slightly different definition of "security" is provided by the Securities Exchange Act of 1934 § 3(a)(1), 15 U.S.C. § 78c(a)(10) (2012). The Supreme Court has often considered the two definitions identical. *See* Marine Bank v. Weaver, 455 U.S. 551 (1982); Int'l Bhd. of Teamsters v. Daniel, 439 U.S. 551 (1979); United Hous. Found., Inc. v. Forman, 421 U.S. 837 (1975); Tcherepnin v. Knight, 389 U.S. 332 (1967). The Uniform Securities Act provides a definition of "security" almost identical to the one provided by the Securities Act of 1933. *See* UNIF. SEC. ACT §102(28) (UNIF. LAW COMM'N 2002). American regulators opted for a definition of security "in sufficiently broad and general terms so as to include within that definition the many types of instruments that in our commercial world fall within the ordinary concept of a security", H.R. REP. NO. 73-85, at 11 (1933). The Supreme Court emphasized the approach of Congress in adopting a broad definition of security: "In defining the scope of the market that it wished to regulate, Congress painted with a broad brush . . . [Congress enacted a definition of 'security' sufficiently broad to encompass virtually any instrument that might be sold as investment." Reves v. Ernst & Young, 494 U.S. 56, 60–61 (1990). According to this interpretation of the Supreme Court, the definition "embodies a flexible rather than a static principle, one that is capable of adaptation to meet the countless and variable schemes devised by those who seek the use of the money of others on the promise of profits." SEC v. W.J. Howey Co. (*Howey*), 328 U.S. 293, 299 (1946). "Congress therefore did not attempt precisely to cabin the scope of the Securities Acts. Rather, it enacted a definition of 'security' sufficiently broad to encompass virtually any instrument that might be sold as an investment." *Reves*, 494

intervened by explicitly providing the definition of "investment contract," one of the financial instruments listed as a security pursuant to section 2(a)(1) of the Securities Act of 1933: "an investment contract for purposes of the Securities Act means a contract, transaction or scheme whereby a person invests his money in a common enterprise and is led to expect profits solely from the efforts of the promoter or a third party . . . ."[184] In addition, the Supreme Court clarified that the notions of "investment contract" and "any interest or instrument commonly known as a 'security'" were equivalent, making the definition of "investment contract" the general definition of "security."[185]

The SEC qualified the ICO tokens as securities after assessing the constitutive elements of the investment contract, applying the so-called "Howey" test in order to ascertain the existence of the four main components characterizing a security as established in American case law: 1) the investment of money, 2) a common enterprise, 3) expectation of profits, 4) to come solely from the efforts of the promoter or a third party.[186] The Howey test is a useful tool due to its characteristic of incorporating "a flexible rather than a static principle, one that is capable of adaptation to meet the countless and variable schemes devised by those who seek the use of the money of others on the promise of profits."[187]

In the context of stablecoins, the different stabilizing mechanisms with different types of collateral are unlikely to lead to different classi-

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U.S. at 61; *see also* Miriam R. Albert, *The Howey Test Turns 64: Are the Courts Grading This Test on a Curve?*, 2 WM. & MARY BUS. L. REV. 1, 4 n.8 (2011). On the need to combine flexibility and clarity with regard to the definition of "security", see Giuliano Castellano, *Towards a General Framework for a Common Definition of "Securities:" Financial Markets Regulation in Multilingual Contexts*, 17 UNIFORM L. REV. 449, 457 (2012).

184. *Howey*, 328 U.S. at 298–99.

185. The Supreme Court has stated that "[w]e perceive no distinction, for present purposes, between an 'investment contract' and an 'instrument commonly known as a 'security.'" *Forman*, 421 U.S. at 852. This is consistent with *SEC v C.M. Joiner Leasing Corporation*, where the Supreme Court provided a more general definition of security: "many documents in which there is common trading for speculation or investment." 320 U.S. 344, 351 (1943).

186. *Howey*, 328 U.S. at 298–301; Ronald J. Coffey, *The Economic Realities of a "Security": Is There a More Meaningful Formula?*, 18 W. RES. L. REV. 367, 373 (1966). Federal courts have characterized this as a three-factor test, where the "expectation of profits" is distinct from the "efforts of the promoter or a third party." *See, e.g.*, S.E.C. v. Unique Fin. Concepts, Inc., 196 F.3d 1195, 1199 (11th Cir. 1999) ("This Court has divided the *Howey* test into the three elements: (1) an investment of money, (2) a common enterprise, and (3) the expectation of profits to be derived solely from the efforts of others.") (quotations omitted); Williamson v. Tucker, 645 F.2d 404, 417 (5th Cir. 1981) (also describing this as a three-element test).

187. *Howey*, 328 U.S. at 299.

fications of stablecoins as "securities." After a careful analysis, stablecoins backed with fiat currencies or commodities and stablecoins backed with cryptocurrencies may both qualify as securities. In the case of an off-chain stablecoin, there may be two different situations: if stablecoin is collateralized with fiat currency, this fiat currency is generally held by a custodian, a bank or a trust company's escrow account, with the value deriving from that asset; if a stablecoin is collateralized by gold or any commodity used as collateral, such a commodity, stored in a vault, will determine the value of the coins.[188] Therefore it is likely that in both scenarios stablecoins may be deemed securities, due to their similarities with "security tokens." A similar conclusion may be reached for stablecoins backed by cryptoassets: they are similar to off-chain stablecoins and derive their value from other assets. Algorithmic stablecoins rely on a mechanism with features that explicitly evoke terms and concepts characteristic of a "security": the issuance of shares and bonds coupled with the expectations that they generate in their shareholders and bondholders.[189]

Another possible way stablecoins might trigger securities laws and the definition of "security" is the one of "demand notes." Demand notes are two-party loans with no fixed term or repayment schedule,[190] with the debtor in the position to repay the creditor upon request. Demand notes are securities within the meaning of section 3(a)(10) of the Exchange Act.[191] An analysis focusing on the way stablecoins are redeemed may trigger stablecoins' qualification as a "security." In most of the cases, stablecoin purchasers deposit fiat currency with a stablecoin issuer, who provides an equivalent amount of the stablecoin. When they want to liquidate their position, stablecoin holders send the stablecoin back to the issuer, who provides an equivalent amount of fiat currency.[192]

In the near future, the regulation of cryptocurrencies and digital tokens could drastically change, in particular if the bipartisan initiative

188. Merav Ozair, *Stablecoins, Are They Coins or Security Tokens?*, ELEV8 (Oct. 17, 2018), https://www.elev8con.com/stablecoins-are-they-coins-or-security-tokens/#_edn8 [https://perma.cc/H7NA-9U9X].

189. *Id.*

190. *See Demand Note*, INVESTOPEDIA, https://www.investopedia.com/terms/d/demandnote.asp (last updated Feb. 12, 2018 [https://perma.cc/6FWY-3A5Q].

191. *See* Reves v. Ernst & Young, 494 U.S. 56, 58 (1990).

192. Jake Chervinsky & Benjamin Sauter, *Will Fiat-Backed Stablecoins Pass Legal Muster with the SEC and CFTC?*, COINDESK (Mar. 2, 2019, 11:00 AM), https://www.coindesk.com/will-fiat-backed-stablecoins-pass-legal-muster-with-the-sec-and-cftc [https://perma.cc/4KYJ-Y6PA].

promoted by Congressmen Warren Davidson and Darren Soto, the Token Taxonomy Act, is passed. The Token Taxonomy Act aims at excluding digital tokens from the definition of "security" and exempts "transactions involving the development, offer, or sale of a digital unit" under specific conditions from the Securities Act.[193] In this way, the Token Taxonomy Act implements the view that digital tokens represent an alternative asset class and provide a definition of "digital token" based on four main elements. This could affect the definition of both "traditional" cryptocurrencies and stablecoins under existing securities laws.

Another extremely relevant set of laws to take into account when discussing stablecoins is the Commodity Exchange Act (CEA); the U.S. Commodity Futures Trading Commission can also play a role in the context of stablecoins. Stablecoins may trigger two different characterizations, "commodity" or "swaps." Similar to the definition of "security," the definition of "commodity" is very broad, encompassing a wide range of products: physical commodities, such as agricultural products or natural resources, as well as currencies or interest rates.[194] Further, the definition of "commodity" encompasses "all services, rights, and interests . . . in which contracts for future delivery are presently or in the future dealt in."[195] Since 2014, former Commodity Futures Trading Commission (CFTC) Chairman Timothy Massad has stated that the agency could have jurisdiction over Bitcoin and more generally over virtual currencies, depending "on the facts and circumstances pertaining to any particular activity in question," and that derivative contracts based on a virtual currency represented "one area within our responsibility."[196] *In re Coinflip*[197] introduced a new era of "Bitcoin" as a commodity, which was a CFTC order stating that the CEA covers "all services, rights, and interests in which contracts for future delivery are presently or in the future dealt in," and that commodity has a broad definition: "Bitcoin and other virtual currencies are encompassed in the definition and properly defined as commodities."[198] The CFTC charged Coinflip with the violation of sections

193. *Id.*
194. Commodity Exchange Act § 1a(9), 7 U.S.C. § 1a(9) (2012).
195. *See id.*
196. *Testimony of Chairman Timothy Massad Before the U.S. Senate Committee on Agriculture, Nutrition & Forestry*, U.S. Commodity Futures Trading Commission (Dec. 10, 2014), https://www.cftc.gov/PressRoom/SpeechesTestimony/opamassad-6 [https://perma.cc/4DAK-PVH2].
197. *In re* Coinflip, Inc., CFTC No. 15-29, 2015 WL 5535736 (Sept. 17, 2015).
198. *Id.* at *2.

4c(b)[199] and 5h(a)(l)[200] of the CEA by "conducting activity related to commodity options contrary to Commission Regulations and by operating a facility for the trading or processing of swaps without being registered as a swap execution facility or designated contract market."[201] Specifically, Coinflip "operated an online facility named Derivabit, offering to connect buyers and sellers of Bitcoin option contracts."[202]

A second possibility is that stablecoins could be characterized as "swaps" under the CEA. The CEA defines swaps as an "option of any kind that is for the purchase or sale, or based on the value, of 1 or more interest or other rates, currencies, commodities, or other financial or economic interests or property of any kind."[203] In this second scenario, the CFTC might opt for characterizing stablecoins as "options for the purchase of, or based on the value of, fiat currencies."[204]

In the context of the large-scale implementation of stablecoins, there is no doubt that the CFTC and the interpretation of the CEA will play a crucial role. The role of the CFTC and commodities law may be even more relevant than the SEC in the regulation of stablecoins, and it may be as important as the role that the SEC and securities laws played in the context of ICOs. An example comes from Facebook's recent initiative to create GlobalCoin, a global payment network potentially based on stablecoins, and the preliminary conversations they have had with the CFTC to consider the regulatory implications of this initiative.[205]

2. *Europe*

In Europe, similar considerations in securities and commodities laws may lead to analogous conclusions for stablecoins.

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199. Section 4c(b) of the CEA makes it unlawful for any person to
> offer to enter into, enter into or confirm the execution of, any transaction involving any commodity . . . which is of the character of, or is commonly known to the trade as, an "option", "privilege,cdq;, "indemnity", "bid", "offer", "put", [or] "call" . . . contrary to any rule, regulation, or order of the Commission prohibiting any such transaction.

7 U.S.C. § 6c(b).

200. Section 5h(a)(1) of the CEA forbids any person from operating "a facility for the trading or processing of swaps unless the facility is registered as a swap execution facility or as a designated contract market . . . ." 7 U.S.C. § 7b–3(a)(1).

201. *In re* Coinflip, Inc., CFTC No. 15-29, 2015 WL 5535736, at *1 (Sept. 17, 2015).

202. *Id.*

203. 7 U.S.C. § 1a(47)(A).

204. Chervinsky & Sauter, *supra* note 192.

205. *See* Noonan & Murphy, *supra* note 127.

At the end of 2017, the European Securities and Markets Authority (ESMA) issued a statement[206] warning firms involved in ICOs of the need to meet relevant regulatory requirements, mentioning in particular the Prospectus Directive, the Markets in Financial Instruments Directive (MiFID II), the Alternative Investment Fund Manager Directive (AIFMD), and the Fourth Anti-Money Laundering Directive. Leaving aside the other regulatory texts, it is useful to refer to the Prospectus Directive and MiFID II, which take into account two general concepts: "transferrable security" and "financial instrument." Directive 2014/65 ("MiFID II Directive")[207] provides both the definitions of "transferable security"[208] and "financial instrument." With regard to the latter, MiFID II's definition of financial instrument encompasses, among other things, transferable securities and derivative contracts.[209]

A further notion to take into account under European law is that of a "financial product." European law does not explicitly define such a notion. However, Directive 2005/29 ("Unfair Commercial Practices Directive")[210] refers to financial products at Recital 10, which clarifies the scope of the directive.[211] Furthermore, the directive provides a

206. Statement, European Secs. & Mkts. Auth., ESMA Alerts Firms Involved in Initial Coin Offerings (ICOs) to the Need to Meet Relevant Regulatory Requirements (Nov. 13, 2017), https://www.esma.europa.eu/sites/default/files/library/esma50-157-828_ico_statement_firms.pdf.

207. Council Directive 2014/65, 2014 O.J. (L 173) 1 (EC) [hereinafter MiFID II Directive].

208. A transferable security is defined as any class of security

> negotiable on the capital market, with the exception of instruments of payment, such as: (a) shares in companies and other securities equivalent to shares in companies, partnerships or other entities, and depositary receipts in respect of shares; (b) bonds or other forms of securitised debt, including depositary receipts in respect of such securities; (c) any other securities giving the right to acquire or sell any such transferable securities or giving rise to a cash settlement determined by reference to transferable securities, currencies, interest rates or yields, commodities or other indices or measures.

Id. art. 4(1)(44).

209. *See id.* annex I, sec. C.

210. Council Directive 2005/29, 2005 O.J. (L 149) 22 (EC) [hereinafter Unfair Commercial Practices Directive].

211. Recital 10 of the Unfair Commercial Practices Directive states:

> This Directive accordingly applies only in so far as there are no specific Community law provisions regulating specific aspects of unfair commercial practices, such as information requirements and rules on the way the information is presented to the consumer. It provides protection for consumers where there is no specific sectoral legislation at Community level and prohibits traders from creating a false impression of the nature of products. This is particularly important for complex products with high levels of risk to consumers, such as certain financial services products.

broad definition for "product" without explicitly referring to financial products, while at the same time not excluding them: "'product' means any goods or service including immovable property, rights and obligations. . . ."[212] At the European level, the notion of "financial product" is broader than that of "financial instrument," since "financial instruments" refers only to typical instruments (mainly shares and debt instruments) with the further characteristic that they are negotiable (on a regulated market).[213] This would mean that tokens could, in principle, be qualified as financial products under the European Law—which would result in the applicability of the consumer protection regulation for those who purchase tokens.

Although the purpose of establishing a notion of "transferable security" and "financial instrument" was clearly inspired by the need to increase harmonization among the European Member States' securities laws, these notions have been transposed in the different European countries in different ways.[214] Resolving this difficulty would require a further case-by-case analysis in order to ascertain the potential qualification of ICO tokens and stablecoins as a security or a financial instrument and their treatment in each specific jurisdiction. In addition, apart from any consideration connected to the transposition of the notions of "transferable security" or "financial instrument," Member States may provide specific categories of law triggering specific obligations under each legal system.

In relation to the notion of a "financial instrument," the list contained in Annex I, section C of the MiFID II Directive refers to commodities,[215] which would allow one to refer to the rules governing commodities. The MiFID Organisational Regulation defines a "commodity" as "any goods of a fungible nature that are capable of being delivered, including metals and their ores and alloys, agricultural products, and energy such as electricity."[216] Tokens may fall within this definition, but they would not fall within the regulation if they are not derivatives. Therefore, "the fact that a token is capable of being

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> This Directive consequently complements the Community *acquis*, which is applicable to commercial practices harming consumers' economic interests.

Id. recital 10.

212. *Id.* art. 2(c).

213. *See* Patti, *supra* note 182.

214. *See* Castellano, *supra* note 183 (discussing the different meanings that securities terminology acquires in different languages).

215. *See* MiFID II Directive, *supra* note 207, annex I, sec. C(5)–(7).

216. Commission Regulation 2017/565, 2016, art. 2, 2017 O.J. (L87).

offered via an ICO has no bearing on its classification as a commodity and vice versa."[217]

To the extent that an issuer takes the view that a token is a commodity, which by the regulatory definition in the EU MiFID Organisational Regulation would require the tokens to be goods of a fungible nature that are capable of being delivered, such as metals and their ores and alloys, agricultural products and electricity, these would be outside the realm of regulation to the extent they are not derivatives. As above, the fact that a token is capable of being offered via an ICO has no bearing on its classification as a commodity and vice versa.

This regulatory scenario may be subject to significant changes, generally impacting cryptocurrencies and specifically stablecoins. The European Parliament is working on an ad hoc regulation aimed at providing new rules for ICOs in the context of crowdfunding. The draft of the regulation states that it is an opportunity for ICOs to "take[ ] a much-needed step towards imposing standards and protections in place for what is an excellent funding stream for tech start-ups."[218]

The Draft Regulation contains one of the first formal definitions of ICOs elaborated by regulators: "'Initial Coin Offering or ICO' means raising funds from the public in a dematerialized way using coins or tokens that are put for sale for a limited time by a business or an individual in exchange for fiat or virtual currencies."[219] Furthermore, the Draft Regulation opens the possibility that crowdfunding service providers may be "permitted to raise capital through their platforms using certain cryptocurrencies" if they comply with specific additional requirements provided by the regulation.[220] The Draft Regulation provides exemptions for private placements, ICOs raising in excess of €8,000,000, or ICOs that do not use a counterparty do not fall within the scope of those requirements.[221] The intention of the Draft Regulation may be to create a standard for ICOs, allowing projects to raise funds and conduct business in all the twenty-eight Member States.[222]

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217. *See* Andrew Henderson & James Burnie, *United Kingdom*, in THE FINANCIAL TECHNOLOGY LAW REVIEW 152, 1661 (Thomas A. Frick ed., 2018).

218. *See* Comm. on Econ. and Monetary Affairs, Rep. on the Proposal for a Reg. of the European Parl. and of the Council on European Crowdfunding Serv. Providers (ECSP) for Bus. (COM(2018)0113 – C8-0103/2018 – 2018/0048(COD)), at U.N. DOC. A8-0364/2018 (2018), http://www.europarl.europa.eu/doceo/document/ECON-PR-626662_EN.pdf?redirect [https://perma.cc/HE7E-WU8N].

219. *Id.* amend. 43, art. 3, point 1b.

220. *Id.* recital 15a.

221. *Id.*; *id.* amend. 48, art. 4a.

222. Nikhilesh De, *EU Lawmakers Weigh 'Standard' for ICOs Under Crowdfunding Rules*, COINDESK, https://www.coindesk.com/the-european-parliament-wants-to-

Furthermore, the European Banking Authority (EBA)[223] and the ESMA[224] called for a common regulatory framework for cryptocurrencies. While the ESMA does not mention stablecoins in its document, the EBA includes them under the category of payment/exchange/currency tokens, as distinguished from "investment tokens" and "utility tokens," after noting the lack of a common taxonomy in use by international standard-setting bodies.[225]

D. Consequences of Stablecoins for Central-Bank Initiatives: Central Bank Digital Currencies

In addition to the concerns of securities regulators, cryptocurrencies have caught the attention of central bankers. Private cryptocurrencies circulating in an economy compete with the national central bank's official currencies, as has happened in the past with other alternative money such as commodities (including gold and silver) and other goods serving as stores of values and media of exchange.[226]

Due to their supposed stability, stablecoins may potentially have great value as a medium of exchange and further innovate the payment services ecosystem, which traditionally represents "an integral part of central banking."[227] Stablecoins' potential diffusion and adoption would further increase the competition with central banks' official currencies. The possibility that giants like Facebook (with nearly 2 billion users) as well as credit institutions such as JPMorgan Chase & Co. or other important players may implement a payment system based on stablecoins would be an incredible source of disruption, and its consequences may be profound. These private initiatives certainly accelerate the debate on the public side, with governments and central banks more eager to identify potential counter-strategies. This in-

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make-icos-more-accessible/ (last updated Sept. 11, 2018, 7:56 PM) [https://perma.cc/46P2-ENDY].

223. *See Report of the European Banking Authority on Crypto-Assets*, *supra* note 119, at 17.

224. European Secs. & Mkts. Auth., *Advice: Initial Coin Offerings and Crypto-Assets* 5 (Jan. 9, 2019), https://www.esma.europa.eu/file/49978/download?token=56LqdNMN.

225. *See Report of the European Banking Authority on Crypto-Assets*, *supra* note 119, at 7.

226. *See generally* Max Raskin & David Yermack, *Digital Currencies, Decentralized Ledgers, and the Future of Central Banking* (Nat'l Bureau of Econ. Research, Working Paper No. 22238, 2016).

227. *See* BANK FOR INT'L SETTLEMENTS, CENTRAL BANK DIGITAL CURRENCIES, at iii (2018), https://www.bis.org/cpmi/publ/d174.pdf [hereinafter BIS].

cludes the issuance of an official and public[228] "stable" cryptocurrency, fully backed with central bank reserves. The hypothesis of central bank digital currencies (CBDCs) as a potential tool for central bankers to pursue their institutional missions started to be discussed in 2014;[229] the concern was that the multiplication of privately issued cryptocurrencies could undermine central banks' leading role and influence in implementing monetary policies and pursuing financial stability. Furthermore, CDBCs could be useful for those banking regulators, such as the European Central Bank (ECB), that otherwise would not be in a position to fully regulate cryptocurrencies, due to a limited mandate and scope of competence and a lack of alternative tools to pursue their goals.[230]

The term CBDC refers to "a new form of central bank money" that combines "new and already existing forms of central bank money."[231] CBDC is "a central bank liability, denominated in an existing unit of account, which serves both as a medium of exchange and a store of value,"[232] that could be account-based (implementing payments through the transfer of claims recorded on an account) or token-based (with payments involving the transfer of an object, namely a digital token).[233] Notwithstanding the characteristic of being a central bank liability, CBDC differs from other forms of money issued by central banks,[234] such as balances in traditional reserve or settlement accounts.[235] At the same time, CBDCs would be, in principle, stable

228. *See* Regnard-Weinrabe et al., *supra* note 172 (distinguishing "private" from "public" (referring to CBDCs) stablecoins).

229. *See* JP Koning, *Fedcoin*, MONEYNESS (Oct. 19, 2014, 1:28 PM), http://jpkoning.blogspot.com/2014/10/fedcoin.html [https://perma.cc/G69B-29XR].

230. *See* Hossein Nabilou, *Central Bank Digital Currencies: Preliminary Legal Observations*, J. BANKING REG. (forthcoming 2019), https://ssrn.com/abstract=3329993.

231. BIS, *supra* note 227, at 3.

232. *Id*.

233. MANCINI-GRIFFOLI ET AL., *supra* note 13, at 4. Token-based CBDCs and account-based CBDCs have different characteristics. As the IMF explains, token-based CBDCs

> could extend some of the attributes of cash to the digital world. CBDC could provide varying degrees of anonymity and immediate settlement. It could thus curtail the development of private forms of anonymous payment but could increase risks to financial integrity. Design features such as size limits on payments in, and holdings of, CBDC would reduce but not eliminate these concerns.

Id. Account-based CBDCs "could increase risks to financial intermediation. It would raise funding costs for deposit-taking institutions and facilitate bank runs during periods of distress. Again, careful design and accompanying policies should reduce, but not eliminate, these risks." *Id.*

234. BIS, *supra* note 227, at 5–6.

235. MANCINI-GRIFFOLI ET AL., *supra* note 13, at 7.

and would grant many of the advantages generally associated with cryptocurrencies, open to design choices that may have great benefits. The idea of CBDC as a governmental initiative to enter "into the issuance of non-cash money for public usage" is not new, and James Tobin created a deposited currency system in 1935, which he described as "the delegation to the private sector the 'government's sovereign right to coin money.'"[236] In Tobin's view, putting the Federal Reserve in the position to offer deposits directly to the public (deposited currency accounts transferable by wire, check or gyro type payments to other accounts within the system) served as a remedy for the physical defects of central bank money.[237] Furthermore, CBDCs would not be the first governmental initiatives aimed at issuing non-cash money; the postal savings banking systems put in place in the nineteenth and the twentieth centuries are an antecedent in this sense.[238]

CBDCs can potentially serve as alternatives to cryptocurrencies, in particular stablecoins. As Kevin Rutter emphatically stated, "'CBDC, not bitcoin,' is the new 'blockchain, not bitcoin.'"[239] Not surprisingly, a long list of governments and central bankers have considered or started new projects in the field, including the India, Japan, Russia, Ukraine, Switzerland, the Republic of the Marshall Islands, China, Estonia, Iran and Sweden.[240] Petro, the cryptocurrency backed

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236. *See* JP KONING, R3, FEDCOIN: A CENTRAL-BANK ISSUED CRYPTOCURRENCY 1, 11 (2016), https://www.r3.com/wp-content/uploads/2018/04/Fedcoin_Central_Bank_R3.pdf [https://perma.cc/2M8A-MUMH]. A further example is the so-called 1933 Chicago Plan:

> The 1933 Chicago Plan, named after a group of University of Chicago economists who wanted to avoid a repeat of the Great Depression, proposed the creation of 'deposit banks.' These institutions would be required to keep a 100% reserve of dollars, ensuring that sudden redemption requests by depositors could always be met. As for the traditional practice of matching savers with lenders, the Chicago economists called for the establishment of 'investment trusts.

Id. at 10.

237. *Id.* at 11.

238. *Id.* at 1.

239. Kevin Rutter, *The Era of Central Bank Digital Currencies Is Within Reach*, COINDESK (Dec. 8, 2018, 10:00 AM), https://www.coindesk.com/the-era-of-central-bank-digital-currencies-is-within-reach [https://perma.cc/NU77-X7LZ].

240. *See* Stephen O'Neal, *CBDCs of the World: The Benefits and Drawbacks of National Cryptos, According to Different Jurisdictions*, COINTELEGRAPH (June 19, 2019), https://cointelegraph.com/news/cbdcs-of-the-world-the-benefits-and-drawbacks-of-national-cryptos-according-to-different-jurisdictions [https://perma.cc/R5JX-5JJ6]; Stephen O'Neal, *Central Bank-Issued Digital Currencies: Why Governments May (or May Not) Need Them*, COINTELEGRAPH (Oct. 25, 2018), https://cointelegraph.com/news/central-bank-issued-digital-currencies-why-governments-may-or-may-not-need-them [https://perma.cc/UY4C-HA3M].

by Venezuelan oil and launched in 2018, can probably be considered part of this list as a first attempt to create a fully backed and public cryptocurrency. At the international level, the Bank of International Settlement[241] and the International Monetary Fund published important contributions to the discussion,[242] and very recently the Monetary Authority of Singapore (MAS), the Bank of England and the Bank of Canada have considered cross-border interbank payments and settlements, in part based on CBDCs.[243] The timing of all these initiatives is not accidental; a major crisis affected the capitalization of cryptocurrencies, favoring the growth, both in terms of popularity and value capitalization, for stablecoins.

From a technical perspective, a central bank would be in the position to create a token-based or an account-based digital currency. The first option would require simply using Ethereum's ERC20 or ERC223 token standards for implementing a smart contract[244] or with so-called colored coins, or alternatively developing a new blockchain, with the opportunity in all cases to issue central bank cryptocurrency on a public blockchain.[245] By buying and selling any token at par, the central bank would "ensure parity between a crypto fiat unit and central bank reserves," with the valuation strictly correlated to the central bank's credibility.[246] The second option, the account-based option, does not deem necessary the creation and reliance on a blockchain infrastructure; central banks could simply allow citizens to open accounts with them for the purpose of making their payments with central bank electronic money instead of recurring to commercial bank deposits.[247] A major benefit with this choice would be the satisfaction

241. *See* BIS, *supra* note 227.
242. MANCINI-GRIFFOLI ET AL., *supra* note 13.
243. BANK OF CANADA, BANK OF ENGLAND, & MONETARY AUTH. OF SINGAPORE, CROSS-BORDER INTERBANK PAYMENTS AND SETTLEMENTS: EMERGING OPPORTUNITIES FOR DIGITAL TRANSFORMATION 27 (2018), https://www.mas.gov.sg/-/media/MAS/ProjectUbin/Cross-Border-Interbank-Payments-and-Settlements.pdf [hereinafter CANADA, ENGLAND & SINGAPORE REPORT].
244. For a comparison of the two standards, see Leonid Beder, *The New ERC223 Token Standard*, MEDIUM (Dec. 5, 2017), https://medium.com/kinblog/the-new-erc2023-token-standard-8dddbf1a5909. For a technical protocol describing such standards, see *ERC20 Token Standard*, ETHEREUM WIKI https://theethereum.wiki/w/index.php/ERC20_Token_Standard (last updated Dec. 4, 2018) [https://perma.cc/C7R4-Z2FK].
245. Berentsen & Schar, *supra* note 36, at 103. The authors explain "colored coins" as, "one could attach additional value components to fractions of existing cryptoassets, such as Bitcoin. The additional value—in this case, fiat currency—would then be part of a specific fraction of a Bitcoin (or more precisely an unspent transaction output) and could be represented and traded on the Bitcoin blockchain." *Id.*
246. *Id.*
247. *Id.* at 101.

of the population's need for virtual currency while eliminating counterparty risk.[248]

Different policy reasons support a central bank's decision to issue CBDCs. There may be benefits related to financial inclusion; in a context where cash may disappear, digital currencies may be the only viable option to connect businesses and people located in remote and marginalized regions where banks are not physically present.[249] In addition, CBDCs may increase the efficiency of the currency function as well as the efficiency and safety of retail and large-value payment systems.[250] Furthermore, in an economic context where payment innovations including privately issued e-money and digital currency have proliferated, central banks may have an interest in using an instrument with the characteristics of CBDCs that may be helpful to pursue its traditional institutional goals in monetary policy and financial stability.[251]

Traditional reserves are available exclusively to institutional operators and generally settle wholesale interbank payments only.[252] CBDCs could target retail payments and would be widely available in a form different from physical cash.[253] Similar to cryptocurrencies, CBDCs would be available twenty-four hours a day, while traditional cash is limited to central bank operating hours.[254] By being widely available, it could be easily used by a country's residents, as well as foreign individuals and organizations situated abroad, for person-to-person, person-to-business and business-to-business transactions of any amount.[255] Therefore, CBDCs have the potential to disintermediate the existing system, which is based on commercial banks acting as intermediaries. This would depend on the design options, since a CBDC could be transferred either on a peer-to-peer basis or through a designated intermediary, such as a central bank, a commercial bank or even a third-party agent.[256] These flexible design features

248. *Id.*

249. *See* Christine Lagarde, *Winds of Change: The Case for New Digital Currency*, IMF (Nov. 14, 2018), https://www.imf.org/en/News/Articles/2018/11/13/sp111418-winds-of-change-the-case-for-new-digital-currency.

250. *See* BEN S.C. FUNG & HANNA HALABURDA, BANK OF CANADA STAFF DISCUSSION PAPER, CENTRAL BANK DIGITAL CURRENCIES: A FRAMEWORK FOR ASSESSING WHY AND HOW, 2–3 (Nov. 2016), https://ssrn.com/abstract=2994052.

251. *Id.* at 3.

252. MANCINI-GRIFFOLI ET AL., *supra* note 13, at 7.

253. BIS, *supra* note 227, at 4; *see also* MANCINI-GRIFFOLI ET AL., *supra* note 13, at 7.

254. BIS, *supra* note 227, at 5.

255. MANCINI-GRIFFOLI ET AL., *supra* note 13, at 7.

256. BIS, *supra* note 227, at 6; *see* MANCINI-GRIFFOLI ET AL., *supra* note 13, at 14.

would then bear on the degree of anonymity provided, with token-based CBDCs having the potential to be fully anonymous, like cash.[257] CBDCs thus have the potential to provide more anonymity than existing cryptocurrencies, which are not anonymous due to the necessary intermediation of individuals and organizations that leave a digital footprint by using cryptowallets.[258] The central bank may also take into account the risks of fraudulent activity associated with full anonymity and choose to only offer full anonymity with strict and low limits on CBDC holdings, or to render the currency not anonymous.[259] Similar to other digital central bank liabilities, CBDCs may also pay positive and negative interests, and this is relevant for them to serve as a store of value.[260]

According to Nouriel Roubini, who is traditionally against blockchain and cryptocurrencies, CBDCs have the potential to displace cryptocurrencies for many of these reasons.[261] Cryptocurrencies, and stablecoins more recently, have been viewed as disruptors potentially capable of disintermediating any kind of centralized authority, including central banks.[262] However, the significant efforts that may be implemented to absorb these innovations[263] may lead to other scenarios, including a non-disruption of central banks by cryptocurrencies, namely by stablecoins. This would not be unexpected, especially taking into account an antecedent like fintech; the multiplication of fintech innovations was supposed to disrupt many established financial institutions operating in banking and finance. In that case, the significant efforts put in place led to internalizing such innovations with changes in the business model and services offered that reflect the changed conditions. Venture capitalists are another great example of actors capable of internalizing new technologies in their business model, with some firms issuing shares in the form of tradeable digital

257. *See* sources cited *supra* note 256.

258. Nouriel Roubini, *Why Central Bank Digital Currencies Will Destroy Cryptocurrencies*, PROJECT SYNDICATE (Nov. 19, 2018), https://www.project-syndicate.org/commentary/central-banks-take-over-digital-payments-no-cryptocurrencies-by-nouriel-roubini-2018-11.

259. MANCINI-GRIFFOLI ET AL., *supra* note 13, at 29; *see* BIS, *supra* note 227, at 6.

260. Roubini, *supra* note 258.

261. *Id.*

262. BIS, *supra* note 227, at 11.

263. *See* Rainer Michael Preiss, *National Government Digital Currencies Versus Globally Distributed Cryptocurrencies: In Depth*, COINTELEGRAPH (May 21, 2018), https://cointelegraph.com/news/national-government-digital-currencies-versus-globally-distributed-cryptocurrencies-in-depth [https://perma.cc/A8CZ-XCBX].

assets.[264] In a similar way, CBDCs may be a tool that central banks and governments could use to prevent their disruption and to continue playing a central role even in the new paradigm of digital economy, where the rate at which the tokenization of real assets is expected to grow exponentially.

Indeed, the role that CBDCs would have in the economy would not significantly differ from the one for which cryptocurrencies were created and for which their improved model, i.e. stablecoins, was proposed. CDBCs and stablecoins share some similarities, and therefore a co-existence between cryptocurrencies, in particular stablecoins and CBDCs, is unlikely to occur. A CBDC would bridge the existing gap separating the real and the digital economies and the fiat and the digital currency;[265] this is the main purpose that a stablecoin would serve in the mind of their creators.

Assuming that stablecoins and CBDCs share the same function and co-exist in the digital economy, why should a hypothetical economic actor opt for stablecoins instead of CBDCs? A stablecoin's private issuer would have to compete with a central banker in terms of credibility, auditing, reserves and so on—there may not be sufficient reasons for preferring a stablecoin in lieu of a CBDC.

Furthermore, it is interesting to note that CBDCs have the potential to be truly "universal," to adopt the terminology of the Bank of Canada, the Bank of England and the Monetary Authority of Singapore.[266] Indeed, the 2018 report issued by the Bank of Canada, the Bank of England and the Monetary Authority of Singapore refers to a "single, universal Wholesale CBDC backed by a basket of currencies" issued by the participating central banks.[267] This universality would be a further reason to believe that CBDC would be capable of disrupting the disruptors, i.e. privately issued cryptocurrencies.

However, some critics have emerged against CBDCs executed on the blockchain, mostly due to the properties of blockchain. Although central bank money in electronic form may have significant advantages, a reputed central bank should not have any incentive in issuing

264. *See* Laura Shin, *This VC Is Sure Venture Capital Is About to Be Disrupted*, FORTUNE (Apr. 18, 2017, 12:30 PM), https://www.forbes.com/sites/laurashin/2017/04/18/this-vc-is-sure-venture-capital-is-about-to-be-disrupted/#3ed0bc12324e [https://perma.cc/ZW42-3H7L].

265. Connie Wang, *A Central Bank Digital Currency Is Created Primarily for Replacing Existing Stablecoins, Says Expert*, 8BTC (June 14, 2018, 4:59 PM), https://news.8btc.com/a-central-bank-digital-currency-is-created-primarily-for-replacing-existing-stablecoins-says-expert [https://perma.cc/8Z9J-MSVF].

266. CANADA, ENGLAND & SINGAPORE REPORT, *supra* note 243, at 32, 36–40.

267. *Id.* at 36.

a cryptocurrency, due to the high reputational risks related to the anonymity mechanisms underlying the cryptocurrency (it would be embarrassing for a central bank that a drug cartel would use its cryptocurrency for illegal purposes). At the same time, issuing a cryptocurrency would generate a disincentive for commercial banks to implement "know your customer" and "anti-money laundering" regulations in a situation where the central bank would not de facto implement them. There are also major concerns related to emerging unpredictable operational risks, due to the relative novelty of blockchain technology.[268]

Furthermore, critics argue that the demand for anonymous payments could be satisfied by the private sector with cryptocurrencies, which would be a protection for citizens from bad governments, with the need of a transparent payment system serving as a protection from governments from bad citizens.[269] In a system where different forms of money have always coexisted, a hybrid solution would continue to serve different purposes. Former IMF Managing Director Christine Lagarde expressed her concern about the risk that excessively popular cryptocurrencies would stifle innovation and advocated for a hybrid solution where private and public initiatives can effectively cooperate:

> What if, instead, central banks entered a partnership with the private sector—banks and other financial institutions—and said: you interface with the customer, you store their wealth, you offer interest, advice, loans. But when it comes time to transact, we take over. This partnership could take various forms. Banks and other financial firms, including startups, could manage the digital currency. Much like banks which currently distribute cash. Or, individuals could hold regular deposits with financial firms, but transactions would ultimately get settled in digital currency between firms. Similar to what happens today, but in a split second. All nearly for free. And anytime.[270]

Conclusion

With the increasing tokenization of real assets, it will be crucial to bridge the gap between the real world and the digitized world, as well as between cryptocurrencies and fiat currency. To do this, a stable cryptocurrency will be important, as stability is necessary for blockchain to function and grow as an infrastructure, and for cryptocurrencies to fully implement the three features generally associated

268. Berentsen & Schar, *supra* note 36, at 104.
269. *Id.*
270. *See* Lagarde, *supra* note 249.

with traditional currency: a store of value, a medium of exchange, and a unit of account.

However, past stablecoins have failed or were traded for less than $1, and there is no empirical evidence that they may be sustainable in the long term or that they do not increase volatility by increasing opportunities for speculation.

Furthermore, stablecoins are not a homogeneous category and encompass three main categories: off-chain collateralized stablecoins, which are tied to fiat currency as a form of collateral; on-chain collateralized stablecoins, which are collateralized with a cryptocurrency or a basket of cryptocurrencies; and algorithmic stablecoins, based on a self-sustaining smart-contract framework that manages the supply of stablecoins. All three categories of stablecoins present some problems. Off-chain collateralized stablecoins count on a centralized structure and require an adequate level of auditing to solve the problems of transparency afflicting the vast majority of the existing cryptocurrencies. On-chain collateralized stablecoins still depend heavily on traditional cryptocurrencies; therefore, it is highly uncertain whether this type of collateral, still highly volatile, can for itself solve the problems of volatility. Finally, algorithmic stablecoins implement a seigniorage mechanism, whose outcome is still uncertain, especially because it would require a continuous growth of the network to be sustainable.

In addition to the uncertainties related to the designing options, further sources of uncertainty exist in the relationship between stablecoins, other cryptocurrencies, and their potential regulatory framework. With regard to the first problem, evidence of the role of Tether in the Bitcoin bubble is a major concern. The unclear relationship between the exchange ownership and Tether ownership raises unresolved conflicts of interest. With regard to the second problem, the regulatory uncertainties characterizing the wave of cryptocurrencies and ICOs between 2017 and 2018 have not been fully solved. Although in a hypothetical taxonomy stablecoins would fall under the category of payment tokens (therefore not securities), they may still be susceptible to securities and commodities laws in Europe and the United States.

Finally, stablecoins may accelerate a "public decision" by governments and central bankers to design and issue an official CBDC (token based or account-based), whose utility and function is fungible with stablecoins. In this case, different uncertain scenarios may emerge, in particular official CBDCs may disrupt the disruptors (both traditional cryptocurrencies and stablecoins). An alternative scenario would be that a hybrid solution based on the complementarity of pri-

vate anonymous cryptocurrencies and public digital currencies may be found, as advocated by some academics and the former Managing Director of the IMF Christine Lagarde.[271]

All in all, stablecoins have emerged as a new tool in the digital economy and a key part of a broad market transformation: from securities with ICOs, payment systems, central banking activities, and general monetary policy. Understanding both the stablecoin's utility and its (many) problems will prove crucial in creating a stable cryptocurrency market.

271. *Id*.