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Virtual Currencies in the Eurosystem: Challenges Ahead

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This article is the slightly modified version of a policy contribution that was prepared for the Committee on Economic and Monetary Affairs of the European Parliament (ECON) as an input for the Monetary Dialogue of 9 July 2018 between ECON and the President of the European Central Bank (<http://www.europarl.europa.eu/committees/en/econ/monetary-dialogue.html>). Copyright remains with the European Parliament at all times.

I. Introduction

Since the launch of Bitcoin in 2009, Virtual Currencies (VCs) utilizing Distributed Ledger Technology (DLT), particularly ‘blockchain’ data structures, have moved into mainstream awareness and onto the regulatory agenda.¹ While VCs were not, in the early years, considered much of a risk to either the financial or real economy or to monetary policy, developments since 2017 have heightened central banks’ and regulators’ sense of vigilance—particularly (i) Bitcoin’s (brief) rise to nearly US \$20,000 per bitcoin, and (ii) the unprecedented volume of early venture capital raised in Initial Coin Offerings (ICOs) outside the regulated financial services industry.² At the time of writing, 1,604 VCs were listed on one prominent website, with a nominal total market capitalization of US \$419 billion.³ These are startling numbers because they have risen from zero since the launch of Bitcoin in 2009, because a massive explosion in number and value

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1. See Dirk A. Zetsche, Ross P. Buckley, Douglas W. Arner, & Linus Fohr, *The ICO Gold Rush: It's a Scam, It's a Bubble, It's a Super Challenge for Regulators* 2-4 (European Banking Institute, Working Paper Series 2017-011, 2018), https://papers.ssrn.com/sol3/papers.cfm?abstract_id=3072298&download=yes.

2. See *id.* at 19. Bitcoin and Ether are of particular importance. See BITCOIN, <https://bitcoin.org/en/> (last visited Oct. 30, 2018); see also ETHER, <https://www.ethereum.org> (last visited Oct. 30, 2018).

3. See COIN MARKET CAP, <https://coinmarketcap.com/>, (last visited May 11, 2018). This figure changes daily.

has occurred in the past three years, and because, despite significant volatility in the VC markets, these figures continue to grow.

The development of the VC market to date has largely been a matter of private initiative, often motivated by a techno-libertarian ideological outlook that stresses the private creation of money and adopts a skeptical position towards state interference in economic arrangements generally, which translates into a skeptical position towards central banks in particular.⁴ More recently, however, central banks around the world have begun to explore the affordances of DLT as a source of new tools in monetary policy.

Questions exist about VCs' status, their role in the Eurosystem, and the proper approach for regulators and central bankers to take. To date, most regulators have adopted a 'watch and wait' strategy as the market develops⁵ in order not to stifle beneficial innovation—and bearing in mind that VCs are a cross-border phenomenon. Certain jurisdictions have been more proactive than others. The US Securities and Exchange Commission (SEC), for example, has adopted a proactive but fairly permissive strategy focused on applying the requirements for the valid issue of securities to these new financial instruments; regulators in China and South Korea, on the other hand, have placed a moratorium on ICOs.⁶ Thailand recently approved a decree on digital assets.⁷ Generally, the first wave of regulatory action has been to warn consumers and to apply existing regulations to VCs. In the next wave, we expect to see express regulation of VCs (and their related technologies) directly, through various means; for example, the draft of legislation currently slated in Malta.⁸

In this paper, we explore the challenges VCs might raise for central banks in the Eurosystem, both in their money creation and oversight roles. The structure of the paper is as follows: Section II defines VCs and the technology on which they rest, differentiates VCs from more familiar financial instruments such as cash, book-money, and e-money, and sets out

4. See generally Jon Baldwin, *In digital we trust: Bitcoin discourse, digital currencies, and decentralized network fetishism*, PALGRAVE COMM'N (2018), <https://www.nature.com/articles/s41599-018-0065-0.pdf>.

5. See Marco Dell'Erba, Marco, *Initial Coin Offerings. A Primer. The First Response of Regulatory Authorities*, N.Y.U. J. OF L. & BUS. 3, (July 7, 2017), <https://ssrn.com/abstract=3063536>.

6. See, e.g., 中国银行保险监督管理委员会 [CHINA BANK INSURANCE SUPERVISION AND ADMINISTRATION COMMISSION], (Nov. 4, 2018) <http://www.cbrc.gov.cn/chinese/newIndex.html> (China), translated in Wolfie Zhao, *China's ICO Ban: A Full Translation of Regulator Remarks*, COINDESK (Sept. 7, 2017 2:17 PM), <https://www.coindesk.com/chinas-ico-ban-a-full-translation-of-regulator-remarks/>.

7. 135 Raadchakidjaa [Royal Thai Gov't Gazette] pt.33a p. 43-70 (B.E. 2561, May 13, 2018), translated in Emergency Decree on Digital Asset Businesses, LINKLATERS, https://www.sec.or.th/EN/SECInfo/LawsRegulation/Documents/actandroyal/digitalasset_decree_2561_EN.pdf. The Decree was published in the Government Gazette on 13 May 2018 and came into force on 14 May 2018. See *Thailand enacts emergency decrees on digital assets*, EY (May 21, 2018), <https://www.ey.com/gl/en/services/tax/international-tax/alert—thailand-enacts-emergency-decrees-on-digital-assets>.

8. See, e.g., Virtual Financial Assets Act 2018, C778 (2018) (Malta).

the features that differentiate VCs from each other in legally relevant ways. This section is designed to highlight the legally-relevant features of VCs and set the stage for a more detailed examination of VCs and monetary law in Section III. We emphasize that it is more accurate to talk about ‘crypto-assets’ than about ‘cryptocurrencies.’ Further, we introduce in this section the ‘border problems’ that VCs may raise as alternative financial instrument, issued by new kinds of entities, which exist in a virtual realm that challenges regulatory frameworks based on territorial jurisdiction. Finally, we explain the ideological project that has driven the creation and early growth of VCs and provide a sketch of earlier regulatory responses around the world.

Section III then explores the main challenges raised by privately issued VCs. These are: (i) a direct challenge to the monetary sovereignty of central banks in their money creation role, (ii) the threat of a vector of financial contagion of systemic relevance to central banks in their oversight role, and (iii) conceptual challenges to definitions (i.e. of categories such as ‘money,’ ‘currency,’ and ‘security’) that are presupposed in the distribution of regulatory competence—but are, both as a matter of legal and economic theory, contentious. Finally, we examine the challenges inherent in regulating a revolution in financial technology, including the distribution of regulatory tasks and combatting financial crime and tax evasion, and explore the need for central banks to adopt technological tools themselves in order to control new forms of technologically-mediated financial activity.

While the bulk of our analysis is concerned with privately issued VCs, in Section IV we briefly address the challenges raised in the Eurosystem by the prospect of central bank issued virtual currencies (CBVCs).⁹ Our provisional analysis explores the reasons for which central banks might wish to issue VCs, sets out the most important design features for central banks to consider when doing so, and argues that national central banks (NCBs) in the Eurosystem lack the competence to issue VCs unilaterally.

We conclude in Section V that VCs require a proactive regulatory response and that certain VCs could warrant prohibition now or in the future. Ideally, a harmonized European approach to the regulation of VCs is desirable to prevent regulatory arbitrage by market participants and a ‘race to the bottom’ by national regulators.

II. Definition and Focus

Although it is reflexive to ask whether VCs are properly seen as ‘currency’ or ‘securities,’ as further discussed below, it is not desirable to attempt to place VCs into such legal categories at the outset. Legal categories are not merely descriptive of reality, but prescribe what objects are legally cognizable, often by means of a *numerus clausus*.¹⁰ The assignment of an

9. The term ‘central bank digital currency’ (CBDC) is more established in the literature, but we use VC in keeping with the ECON Committee’s terms of reference.

10. This begins at a fundamental level. For example, a Japanese court has ruled that bitcoins are not cognizable as ‘things’ capable of ownership under Art. 85 of the Japanese Civil Code,

object to one category (or none) initiates a whole cascade of further legal consequences. A recurring theme in our analysis is that many VCs straddle the traditional legal categories and possibly reveal conceptual problems with those categories. In other words, legal categorization is a second step that should only be taken once a descriptive apprehension of the subject matter is gained.¹¹

A. FINDING A TERMINOLOGY

Broadly defined, VC tokens are *digital representations of value*.¹² VC tokens are used by some people as a means of payment for goods and services, but many people use them primarily as a store of value that more approximates a speculative asset than a unit of money.¹³ Others function like vouchers for access to software or other goods or services at a future date.¹⁴

The literature is moving to distinguish, in particular, between (i) VCs called ‘currencies’ because they are intended to function as such, (ii) VCs more similar to traditional ‘securities’ or ‘crypto-assets’ and (iii) VCs that provide access to an application or service, which are more similar to vouchers (utility tokens). Further classes of VC token may emerge in the future, but we consider that most innovations could be captured through the creation of subcategories within the three first mentioned. The borders between these categories are often permeable, the actual use of a VC token may change over time, and VCs potentially raise some basic questions in the definition of money, currency, securities, and commodities themselves.¹⁵

Definitions are important, but difficult, because *legal* categories such as ‘money’ sometimes overlap or stack in their *economic* function; for example, traditional money systems used commodities (precious metal) as the token of

with consequences for the insolvency of a major VC exchange. See *Japan court rules against Bitcoin compensation plea*, BBC, (Aug. 7, 2015) <https://www.bbc.com/news/technology-33816664>; 民法（第一編第二編第三編）[CIVIL CODE (PART I, PART II, AND PART III)], Act No. 89 of 1896, Art. 85, *translated in JAPANESE LAW TRANSLATION*, <http://www.japaneselawtranslation.go.jp/law/detail?id=2057&vm=04&re=02>.(Japan). Several European codifications take a similar approach to the definition of ‘things’.

11. See, e.g., Jason G. Allen, *What’s Offered in an ICO? Digital Coins as Things*, SSRN, 1, 16, 23, (Mar. 13, 2018), <https://ssrn.com/abstract=3140499>.

12. Some VCs are used not as a representation of value at all, but as the placeholder or storage medium for some other information, for example recording intellectual property rights. We will not consider these non-financial use cases in any detail.

13. See Salomon Fiedler, Klaus-Jurgen Gern, Dennis Herle, Stefan Kooths, Ulrich Stolzenburg, Luci Stoppok, *Virtual Currencies*, EUROPEAN PARLIAMENT, 10, (June, 2018), http://www.europarl.europa.eu/cmsdata/149902/KIEL_FINAL%20publication.pdf.

14. See Kenneth Rapoza, *Is It Too Late To Make Your Fortune In Cryptocurrency ICOs?*, FORBES (Feb. 8, 2018, 3:42 PM), <https://www.forbes.com/sites/kenrapoza/2018/02/08/is-it-too-late-to-make-your-fortune-in-cryptocurrency-icos/#32bddcd1fa5f>.

15. See Seoyoung Kim & Sumon Mazumdar, *Cryptocurrencies Demystified and the SEC’s Regulatory Stance*, ABA (Aug. 25 2018), <https://www.americanbar.org/groups/litigation/committees/securities/articles/2018/summer2018-cryptocurrencies-demystified-and-the-secs-regulatory-stance/>.

the monetary unit, whereas modern ‘fiat’ systems use securities (banknotes, a type of promissory note) as the token of the monetary unit.¹⁶ The advent of VCs demands concretization of these definitions in a new and challenging context.

Although we use the term ‘VC,’ we do not accept that any VC should necessarily be called a ‘currency.’ Where it is necessary to distinguish the individual unit of a VC from the totality of software and human organization that creates and maintains it, we refer to the individual unit of a VC as a ‘VC token’ as distinct from a ‘VC scheme.’ Our analysis focuses on VCs that function (or could function) in a manner of systemic relevance to the Eurosystem, in respect both of central banks’ role in the creation and management of money and in their oversight of the financial and monetary system. But so far VCs—understood as ‘crypto-assets’—are characterized in national legal terms in the Eurosystem, as we further explore in Section 2. Further, as a class of securities (or an analogue of securities), ‘crypto-assets’ may be of significance to central banks’ oversight of the financial system.

B. DISTRIBUTED LEDGER TECHNOLOGY

The VCs that have come to our attention in recent years are all based on Distributed Ledger Technology (DLT), a relatively new, and rapidly evolving, approach to recording and sharing data across multiple data stores.¹⁷ A distributed ledger is a database for storage of data (including executable programs) that is replicated over a peer-to-peer network and that enables multiple parties to share the database and modify data (i.e. effect transactions) in a safe and secure way, even if they don’t know or trust each other.¹⁸ DLT came into the spotlight with the 2009 launch of Bitcoin on the world’s first operational ‘blockchain.’ A blockchain is a form of DLT data structure that (i) records transactions across a distributed network of computers, (ii) combines data about the subject matter of the transaction (including previous transactions) with data about the transferee and transferor in a ‘block’ in a ‘chain,’ (iii) uses cryptographic means to prevent tampering with the chain, and (iv) relies on nodes in the network to verify

16. See Jason Hall, *Fiat Currency: What it is and Why It’s Better Than a Gold Standard*, THE MOTLEY FOOL (Dec. 5th 2015, 6:00 AM) <https://www.fool.com/investing/general/2015/12/06/fiat-currency-what-it-is-and-why-its-better-than-a.aspx>.

17. See World Bank Group, *Distributed Ledger Technology (DLT) and Blockchain*, THE WORLD BANK (2017), IV, <http://documents.worldbank.org/curated/en/177911513714062215/pdf/122140-WP-PUBLIC-Distributed-Ledger-Technology-and-Blockchain-Fintech-Notes.pdf>. While every blockchain is a DLT, not every DLT is a blockchain. See Philip Treleaven, Richard Gendal Brown, and Danny Yang, *Blockchain technology in Finance*, IEEE COMPUTER SOC’Y, 15 (Sept. 2017) <https://www.computer.org/csdl/mags/co/2017/09/mco2017090014.pdf>.

18. Dr. Garrick Hileman and Marcel Rauchs, *Global Blockchain Benchmarking Study*, CAMBRIDGE CENTRE FOR ALT. FIN., 13, (2017), [https://www.ey.com/Publication/vwLUAssets/ey-global-blockchain-benchmarking-study-2017/\\$File/ey-global-blockchain-benchmarking-study-2017.pdf](https://www.ey.com/Publication/vwLUAssets/ey-global-blockchain-benchmarking-study-2017/$File/ey-global-blockchain-benchmarking-study-2017.pdf).

transactions, often through some kind of game-theory informed incentive mechanism.¹⁹

Not everything that matches the description of a VC utilizes this kind of data structure. There are also digital representations of value that are kept in centralized ‘accounts’ and circulate within the game-world of a Massive Multiplayer Online Role-Playing Games (MMORPGS) such as Linden Labs’ *Second Life*. So-called Linden Dollars (L\$), for example, are the currency of a significant economy²⁰ which interacts with the ‘real’ economy in various ways.²¹ These ‘VCs’ have some historical connection to our subject matter—for example, the insolvent VC exchange ‘Mt. Gox’ began its life as a MMORPG-related exchange.²² L\$ and similar VCs are not, in our view, significant to the Eurosystem; they do, however, serve as a useful counterpoint when considering the interaction between ‘virtual’ financial systems and the ‘real-world’ financial system, not least because they are the subject of an emergent literature in their own right.

C. VCS AND EXISTING FINANCIAL INSTRUMENTS

It is useful at the outset to compare VCs with existing financial instruments (broadly construed), as VCs display a number of hybrid features. The ‘world of alternatives’ contains alternatives to money/currency, alternatives to credit/finance (such as peer-to-peer lending platforms and crowdfunding) and alternatives to payments/exchange. VCs sit somewhere in between the alternatives to money and the alternatives to payments/exchange, while exhibiting features of securities (crypto-assets). This complex characterization does not fit easily with established legal concepts.

VCs resemble *currency* (i.e. cash, consisting of banknotes and coins) in that they are (typically) exchanged ‘peer-to-peer’ in a decentralized manner rather than through the accounting system of a central institution.²³ To date,

19. *See id.* at 15.

20. *See id.* at 13-16, 21.

21. In 2010, the *Second Life* economy peaked at about USD 500 million GDP. Martin Bryant, *Think Second Life died? It has a higher GDP than some countries*, THE NEXT WEB, (Nov. 7, 2015), <https://thenextweb.com/insider/2015/11/07/think-second-life-died-it-has-a-higher-gdp-than-some-countries/>.

22. L\$ are directly purchased with USD using conventional payment channels such as credit card. L\$ are also tradable for USD and other VCs (including other in-game VCs) on exchanges. *See* Rob Berger, *How to Earn a Second Income in Your ‘Second Life,’* DOUGH ROLLER, (Nov. 5, 2017), <https://www.doughroller.net/earn-extra-income/how-to-earn-a-second-income-in-your-second-life/>. The USD:L\$ exchange rate fluctuates, but generally sits around 250:1. *See id.* L\$ are bought and sold offline in so-called ‘real world trades.’ *Id.* From 2008, VAT has been charged on income (in L\$) from in-game assets purchased from Linden Labs by European customers. *See* SECOND LIFE, <http://secondlife.com/corporate/vat.php> (last visited Nov. 4, 2018).

23. To date, most non-currency payment systems use some kind of central accounting and clearing system, with the exception of some e-money systems that store value locally on a ‘smart’ card or device. On currency-based, account-based, and note-based payment systems, *see* J.S. Rogers, *The New Old Law of Electronic Money*, 58 SMU L. REV. 1253 (2005), *available at*

non-cash payment systems have generally used some kind of central clearing, while Bitcoin was presented as an ‘electronic cash’ system.²⁴ But VCs are distinguished from currency (i) in that they are created, transferred, and stored digitally rather than physically, (ii) in that they are issued by a private entity rather than a central bank or other public authority, and (iii) in that they are not ‘legal tender.’

Some VCs like Bitcoin resemble *commodities*, including commodity-based currency systems like the gold standard, bi-metallism (gold and silver), and even the par value regime or gold-USD standard adopted by the original IMF Articles of Agreement,²⁵ in that supply is limited and by definition subject to great volatility and potential speculation if the demand far exceeds supply. On the other hand, a commodity like gold has an intrinsic value²⁶ and a physical representation, while VCs exist in ‘virtual’ reality only. The only commodity in a VC like bitcoin is a ‘chain of digital signatures,’ i.e. a set of data that looks as much like an accounting ledger as a ‘token’.²⁷

Some VCs resemble cashless, account-based payment systems such as ‘book money’²⁸ or bank deposits, because they are electronic representations of value issued by a private entity. But VCs differ from book money (i) because no system of reserve is necessarily in place in any VC scheme, (ii) because there is no central bank to act as lender of last resort, and (iii) because VCs are not necessarily the liability of any person, whereas book money is, by definition, the liability of a commercial bank.²⁹

<https://lawdigitalcommons.bc.edu/cgi/viewcontent.cgi?referer=https://www.google.com/&httpsredir=1&article=1039&context=lsfp> According to FATF, ‘Virtual Currencies Key Definitions and Potential AML-CFT Risks’ (2014) <http://www.fatf-gafi.org/media/fatf/documents/reports/Virtual-currency-key-definitions-and-potential-aml-cft-risks.pdf>. (p.4): “virtual currency is a digital representation of value that can be digitally traded and functions as (1) a medium of exchange; and/or (2) a unit of account; and/or (3) a store of value, but does not have legal tender status in any jurisdiction. . .”

24. See generally Satoshi Nakamoto, *Bitcoin: A Peer-to-Peer Electronic Cash System*, BITCOIN, <https://bitcoin.org/bitcoin.pdf> (last visited Jan. 27, 2019).

25. The value of currency of each participating member was defined in terms of gold or alternatively in terms of the US Dollar of July 1, 1944, which had a fixed gold value equal to USD 35. See Michael D. Bordo & Robert N. McCauley, *Triffin: dilemma or myth?*, *Bank for International Settlements*, 3 (Bank for International Settlements, Working Paper, No. 684, 2017), <https://www.bis.org/publ/work684.pdf>.

26. Indeed, one of the reasons for the collapse of the par value regime was that there was a private market in addition to the public gold-USD standards and the value of gold in the private market kept increasing from the 1940s to the 1970s when the Bretton Woods par value regime was finally abandoned. See, e.g., ROSA MARIA LASTRA, *INT’L FIN. AND MONETARY L.* 407, Ch. 12, (2015).

27. See Nakamoto, *supra* note 24.

28. ‘Book money’ (often derived from German *Buchgeld*) refers to bank deposits that function, in an account-based payment system such as a giro, as quanta of ‘money’. See *Bank Giro Transfer*, INVESTOPEDIA, <https://www.investopedia.com/terms/b/bankgirotransfer.asp> (last visited Oct. 23, 2018).

29. See Anna Issac, *Future of Bitcoin limited by having no lender of last resort, BNP Paris claims*, THE TELEGRAPH, (Nov. 20, 2017, 3:10 PM) <https://www.telegraph.co.uk/business/2017/11/20/future-bitcoin-limited-having-no-lender-last-resort-bnp-paribas/>; see also James Surowiecki,

VCs also approximate *electronic money*³⁰ and private payment systems such as PayPal insofar as they are digital representations of value that are issued by private entities and move outside the more traditional intermediaries of the payment system (i.e. commercial banks).³¹ But PayPal credit and electronic money are (i) both denominated in a 'sovereign fiat' unit of account, (ii) are, again, by definition the liability of a known, licensed entity.³² Innovations in payment systems like M-Pesa in Kenya are different from the notion of VCs in that they rely also on fiat money and are rooted in obligational relationships.³³ VCs understood as alternatives to currency are not fiat money and are not legal tender, nor are they based on fiat money in this way.

VCs are, thus, distinguishable from the conventional types of financial instrument in a number of ways, but particularly by (i) their use of DLT (in particular blockchain data structures) to facilitate peer-to-peer exchange; (ii) their issuance by an entity outside the traditional monetary system of central banks, commercial banks, and licensed financial intermediaries; (iii) their denomination in a novel unit of account rather than a fiat monetary unit.³⁴

D. DIFFERENTIATING VCS

VCs differ according to (i) the technical features chosen by developers and (ii) the way that VC tokens behave as economic objects in the market.³⁵ Here, we provide an overview of what are, in our view, the most important differentiators, and explain their legal and policy relevance. We treat technical and economic features together, as the choice of a technical parameter is not an economically neutral one. For example, the choice to limit the total number of bitcoins that will be created on the Bitcoin blockchain has two economic implications: first, it creates incentives for

Bitcoin would be a calamity, not an economy, MIT TECH. REV., (April 10, 2018) <https://www.technologyreview.com/s/610783/bitcoin-would-be-a-calamity-not-an-economy/>.

30. Council Directive 2009/110, 2009 O.J. (L 267) 8 (EC).

31. See Surowiecki, *supra* note 29.

32. See *Report on Electronic Money*, EUROPEAN CENT. BANK, 15 (Aug. 1998), <https://www.ecb.europa.eu/pub/pdf/other/emoneyen.pdf>; see Gareth W. Peters, Efstathios Panayi, & Ariane Chapelle, *Trends in cryptocurrencies and blockchain technologies: a monetary theory and regulation perspective*, J. OF FIN. PERSP. 7 (2015).

33. See generally Claire Alexandre, *10 Things You Thought You Knew about M-PESA*, CGAP (Nov. 22, 2010), <http://www.cgap.org/blog/10-things-you-thought-you-knew-about-m-pesa>.

34. See *Central bank digital currencies*, BANK FOR INT'L SETTLEMENTS 5-6 (Mar. 2018), <https://www.bis.org/cpmi/publ/d174.pdf>; *EBA Opinion on 'virtual currencies'*, EUROPEAN BANKING AUTH., EBA/Op/2014/08, 11-12, <https://www.eba.europa.eu/documents/10180/657547/EBA-Op-2014-08+Opinion+on+Virtual+Currencies.pdf>. A table of comparisons is annexed to the original report on which this paper is based. See Rosa Maria Lastra & Jason Grant Allen, *Virtual Currencies in the Eurosystem: Challenges Ahead*, EUROPEAN PARLIAMENT, 52 (July 9, 2018), http://www.europarl.europa.eu/cmsdata/150541/DIW_FINAL%20publication.pdf.

35. See generally Arjun Kharpal, All you need to know about the top 5 cryptocurrencies, CNBC (Dec. 14, 2017), <https://www.cnbc.com/2017/12/14/bitcoin-ether-litecoin-ripple-differences-between-cryptocurrencies.html>.

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users to hoard bitcoins as speculative assets rather than spending them as a medium of exchange; second, if Bitcoin were to achieve monetary status within an economy despite this feature, it would eventually cause price volatility as the rigid money supply interacted with an expanding or contracting real economy. (Indeed, this seems to have been the intention of its creator(s)).

The following list provides a high-level overview. We will return to the most important points in more depth in the course of our substantive analysis in the sections to follow.

- i. Who issued the VC? Is the issuer public or private? How is the issuer organized and governed? (So far VC issuers have been overwhelmingly private entities. As a new category of financial entities, they fit poorly with traditional capital markets and prudential regulation.)
- ii. Is the VC software proprietary or open-source? How is the software developed and distributed? Who is responsible for, e.g., security updates or responding to cyber-attacks?
- iii. Where was the VC issued? How do existing national, regional, and international regimes of consumer protection, prudential regulation, capital control, tax evasion, anti-money-laundering, etc., apply to it?
- iv. How does the VC operate in the market? What is its (i) intended and (ii) actual economic function?
- v. Who maintains the VC's ledger, and how? Does the VC utilize a 'trustless' (or 'permissionless') system or do some nodes have special authorization to update the ledger? How does this affect the VC scheme's internal governance?
- vi. Are users of the VC 'anonymous' (actually pseudonymous) or identified with 'real-world' data points?
- vii. Is the VC backed with a reserve of real-world assets? Are VC tokens pure 'digital commodities' or do they represent (i) tangible commodity or (ii) a reserve of fiat currency?
- viii. How does the VC interact with the real-world financial economy? Are VC tokens convertible, and if so how? What intermediaries are at the interface between the VC and the real-world economy?
- ix. How do users hold and trade the VC? Do they hold VC tokens directly in a 'wallet' (e.g. computer storage device) or are 'their' tokens held by a fiduciary intermediary? Are trades recorded 'on-chain' in real time or are trades effected 'off-chain' followed by a settlement procedure? What role do the 'tokens' play in the technical functioning of the accounting system?
- x. How is the volume of the VC supply determined? Are the decisions taken by humans or are they algorithmic? Are those algorithms subject to change? By whom? What factors are taken into account?

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E. BORDER PROBLEMS

A metaphor of *border problems* guides our analysis. Goodhart and Lastra explore the two main borders in the aftermath of the 2008 Global Financial Crisis: (i) the border between regulated and unregulated entities, and between regulated and unregulated activities, and (ii) the border between national jurisdictions.³⁶

When the border between the regulated and the unregulated is punctured, the regulated economy faces risks originating in the unregulated space. The border becomes problematic when (i) unregulated entities start engaging in regulated activities (such as an ICO that amounts to a securities issue) or (ii) regulated entities start engaging in unregulated activities (such as a regulated financial services provider trading in VCs or using VCs as the underlying asset of a regulated product, such as a collective investment scheme). Such border crossovers increase the risk of contagion, for example when a liquidity crisis in the unregulated space affects a regulated entity's position in the regulated space.

Transactions in VCs constitute a new frontier of financial activity: VC schemes may constitute 'grey' currency issues, securities issues, and payment rails, for example, which operate in parallel to traditional (regulated) financial services. Much can be done to enforce this border by extending it. For example, the United States Securities Exchange Commission (SEC) has taken a proactive stance by treating many ICOs as the issue of securities despite their issuers' attempt to avoid engaging in a regulated activity at all.³⁷ US regulators have also been proactive in applying certain banking regulations to VC-based payments providers.³⁸ In general, however, regulated activities are defined in legal instruments that typically predate the advent of DLT and VCs. Unregulated activities undertaken by unregulated entities can pose a challenge for regulators to the extent that they *ought* to be regulated on grounds such as investor protection, financial crime prevention, or to maintain monetary sovereignty (e.g. by applying anti-counterfeiting laws to alternative currency schemes³⁹), but it is not always straightforward to apply existing regulatory frameworks to them. For example, there may be disagreement between regulators and courts as to the nature of certain VCs under existing banking, securities, or commodities trading legislation.

With regard to the second border problem, Goodhart and Lastra observe that the transnational nature of financial activity and the national basis of

36. Charles A. E. Goodhart & Rosa M. Lastra, *Border Problems*, 13(3) J. INT'L ECON. L. 705 (2010).

37. See, e.g., SEC, No. 81207, REP. OF INVESTIGATION PURSUANT TO SECTION 21(A) OF THE SECURITIES EXCHANGE ACT OF 1934: THE DAO 1, 2, 11 (2017), <https://www.sec.gov/litigation/investreport/34-81207.pdf>.

38. See, e.g., I.R.S. Gen. Couns. Mem. FIN-2013-G001 (Mar. 18, 2013), <https://www.fincen.gov/sites/default/files/shared/FIN-2013-G001.pdf>.

39. This was the fate of the 'Liberty Dollar' and 'E-gold'. For a libertarian critique, see generally, Kevin Dowd, *New Private Monies: A Bit-Part Player?*, INST'T. OF ECON. AFFAIRS, (2014), <https://ssrn.com/abstract=2535299>.

regulatory oversight can encourage sub-optimal outcomes.⁴⁰ VCs are, again, by nature trans-jurisdictional and make national regulations more difficult to enforce. This compounds with the first border problem because, for example, there may not be a readily identifiable entity in any jurisdiction which can easily be brought under national jurisdiction.

These border problems are exacerbated by a third border—that between ‘cyberspace’ and the ‘real world.’ Some VC schemes purport to create a new form of business entity that operates in a non-jurisdictional space.⁴¹ Developers are working on automated, decentralized applications that replace traditional corporate structures in ways that disrupt conventional oversight models and pose real risks of corporate governance and market abuse.⁴² For example, ‘The DAO’ is a collective investment vehicle structured as a ‘Distributed Autonomous Organization,’⁴³ a kind of organization supposedly without human organs, which came to prominence in 2016 when it was subject to a large-scale hacking attack.⁴⁴

In a seminal article from the mid-1990s, Johnson and Post argued that, because modern computer-based communications systems cut across territorial borders, undermining the connection between legally significant online phenomena and physical locations, we need to develop laws adapted to a ‘space’ bounded by screens and passwords instead of geographical borders.⁴⁵ While we do not endorse this kind of argument, we do think that VCs underline the urgency of re-thinking axioms such as jurisdiction and territoriality to discover their contemporary relevance,⁴⁶ and call for a fundamental re-examination of legal conceptions such as ‘ownership’ and ‘possession’ in the context of immaterial assets such as VC tokens.⁴⁷ Some of these questions are novel, while others are long-standing.⁴⁸

40. See Goodhart & Lastra, *supra* note 36, at 6.

41. See Primavera De Filippi, *We Must Regulate Bitcoin. Problem Is, We Don't Understand It*, WIRED (Mar. 1, 2016, 1:09 PM), <https://www.wired.com/2016/03/must-understand-bitcoin-regulate/>.

42. See Aaron Wright & Primavera De Filippi, *Decentralized Blockchain Technology And The Rise of Lex Cryptographia*, SSRN, 3 (Mar. 12, 2015), https://papers.ssrn.com/sol3/papers.cfm?abstract_id=2580664.

43. See, e.g., Vitalik Buterin, *DAOs, DACs, DAs and More: An Incomplete Terminology Guide*, ETHEREUM BLOG, (May 6, 2014), <https://blog.ethereum.org/2014/05/06/daos-dacs-das-and-more-an-incomplete-terminology-guide/>; *The DAO of Accrue*, THE ECONOMIST, (May 19, 2016), <https://www.economist.com/finance-and-economics/2016/05/19/the-dao-of-accrue>.

44. It is controversial whether the event was a ‘hack,’ but the majority of ‘The DAO community seems to have taken the view that it was. See, e.g., David Siegel, *Understanding the DAO Attack*, COINDESK, (June 27, 2016), <https://www.coindesk.com/understanding-dao-hack-journalists/>.

45. David R. Johnson & David Post, *Law and Borders—The Rise of Law in Cyberspace*, 48 STANFORD L. REV. 1367, 1370, 1378 (1996).

46. See David G. Post, *How the Internet is making jurisdiction sexy (again)*, 25(4) INT’L J. L. & INFO. TECH. 248 (2017).

47. See Allen, *supra* note 11, at 1, 15, 21.

48. It is a novel question how I ‘possess’ a bitcoin on a distributed ledger. Bitcoin, for example, is a ‘protocol for the allocation of permissions, which are denominated in bitcoins, and

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These three borders are important because they frame the strategy that has been taken by many regulators in the early days of the VC market, which has been to ‘watch and wait’ and to begin with the analogic application of existing regulations. But many financial regulations presuppose (and are directed towards) financial intermediaries. While analogic reasoning and teleological interpretation can go some way to bringing new market practices and technologies under existing norms, and while their application to certain VCs will be easier than others,⁴⁹ this approach may be exhausted before an optimal regulatory position is reached.

For example, in a 2014 Opinion on VCs, the European Banking Authority (EBA) recommended a ‘shielding’ approach until such time as a comprehensive European regime is established for regulating VCs.⁵⁰ This approach accepts the fact that only risks that arise in the interaction between VC schemes and the regulated financial services sector can be mitigated; risks internal to VC schemes cannot.⁵¹ The containment aspect of the strategy consists in the EBA’s position that national supervisory authorities should discourage regulated entities from “buying, holding, or selling VCs, thereby ‘shielding’ regulated financial services from VCs.”⁵² Another regulatory measure is to reinforce the borders through voluntary compliance by constructing ‘sandboxes’ in which VC developers can innovate safely—and under the supervision of the regulator.⁵³

The shielding approach is only as strong as the borders between regulated and unregulated activities and entities. Especially where new activities and entities spring up in cyberspace, bright lines are difficult to maintain. VCs present an acute ‘cyberspace border problem’ because they may not even have a readily identifiable issuing or controlling entity at all (as in the case of Bitcoin). As a distributed software application, Bitcoin will prove itself to be quite resilient against any direct regulatory efforts so long as a community of users exist who ascribe value to the application’s functions.⁵⁴ In our view,

... tied to system-specific addresses,’ but it is unclear what this means for the private monetary law of any given jurisdiction. See PAUL ANNING, ET AL., *THE LAW OF BITCOIN*, 185 (Stuart Hoegner ed., 2015). But the question how I ‘possess’ a corporate bond on Clearstream or a euro in my (electronic) bank account is not completely straightforward either. P. J. Rogerson, *The Situs of Debts in the Conflict of Laws—Illogical, Unnecessary and Misleading*, 49(3) *CAMBRIDGE L.J.* 441 (1990); see, e.g., Joseph H. Sommer, *Where is a Bank Account?*, 57 *MD. L. REV.* 1 (1998).

49. For example, the application of payment services laws to intermediaries that hold VC tokens on behalf of users and process trades off-chain would appear to be more straightforward than the application of the laws to VC tokens held directly by users and processed only on-chain.

50. *EBA Opinion on ‘virtual currencies,’ supra*, note 34, at 44.

51. *See id.* at 6.

52. *See id.* at 44.

53. See, e.g., *FinTech Regulatory Sandbox*, MONETARY AUTH. OF SINGAPORE, <http://www.mas.gov.sg/Singapore-Financial-Centre/Smart-Financial-Centre/FinTech-Regulatory-Sandbox.aspx> (last modified Jan. 9, 2017).

54. See, Nassia Matsa, *MBA view: will bitcoin regulation undermine its value?*, *FIN. TIMES* (May 16, 2018), <https://www.ft.com/content/5a9d757e-5836-11e8-bdb7-f6677d2e1ce8>; see also Yves Mersch, Member of the Executive Board of ECB, Speech at the 39th meeting of the Governor’s

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these border problems make regulation at the European level especially important. This brings into relief questions about the division of responsibilities and competences in the Eurosystem concerning the regulation and oversight of privately issued VCs and concerning the potential issuance of central bank-issued VCs.

F. THE POLITICS OF THE CRYPTOCURRENCY MOVEMENT

The architecture of the modern monetary system and the political economy it expresses have evolved from the early-modern birth of central banking,⁵⁵ and the rise of VCs coincides with a dispersed but growing dissatisfaction with the existing monetary system. It is no coincidence that Bitcoin was launched in the immediate aftermath of the 2008 crisis, to which governments and central banks responded with unconventional monetary policies, or that Bitcoin embodies an express attempt to replace fiat money with a peer-to-peer payment system denominated in a digital token whose scarcity is algorithmically secured against political interference. The rise of VCs thus exacerbates a long-standing disagreement in macro-economic policy regarding the desirability of a flexible money supply and of the optimal degree of political influence over the creation of money.⁵⁶ The pendulum has shifted throughout history from flexibility to stability and from stability to flexibility when it comes to monetary and exchange rate policies. With regard to the latter, the case for flexibility was forcefully made by Milton Friedman in a seminal contribution in 1953,⁵⁷ at a time in which exchange rate stability was the foundation of the IMF par value regime and has been, of course, a key rationale for the adoption of the euro. But some argue that flexibility in exchange rate policy (in particular, the possibility of devaluing a national currency) could have been a useful policy instrument for some of the Eurozone Member States affected by the recent sovereign debt crisis had they kept their own national currencies. It is also interesting to observe that the preamble to the US Federal Reserve Act talks about the objective “to furnish an *elastic* currency,” not a *stable* currency (even though subsequent revisions to the Act have added the objective of stability with the establishment of the Federal Open Market Committee in 1933).

Bitcoin is not regulated by any authority; the supply of bitcoins is based on an algorithm which structures its decentralized peer-to-peer transaction

Club Bodrum, Turkey (May 14, 2018), (transcript available <https://www.ecb.europa.eu/press/key/date/2018/html/ecb.sp180514.en.html>).

55. See CHRISTINE DESAN, *MAKING MONEY: COIN, CURRENCY, AND THE COMING OF CAPITALISM* (2015); see also LASTRA, *supra* note 26, at 29.

56. See Max Raskin & David Yermack, *Digital Currencies, Decentralized Ledgers, and the Future of Central Banking* 1 (National Bureau of Econ. Research, Working Paper No. 22238, 2016).

57. See MILTON FRIEDMAN, *ESSAYS IN POSITIVE ECONOMICS* 157 (1953).

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system.⁵⁸ This feature of Bitcoin (and many of its ‘Altcoin’ successors) is often praised within a broadly American libertarian interpretation of the Austrian School of economics, i.e. one that minimizes the role of political decision-making in determining the money supply, that posits money as something almost naturally occurring and politically neutral, emphasizes commodity scarcity as a counter to inflation, and praises competition between currencies.⁵⁹

Even more broadly, this ties into an ideology in which human institutions (such as governments and central banks) are to be replaced by deterministic technological processes that provide a neutral and self-sustaining framework for individual flourishing.⁶⁰ The radical possibilities of this project are currently compounded by the promise of Artificial Intelligence (AI). Bitcoin evangelists typically position themselves as underdogs and outsiders, ‘cypher punks’ who aim to transform society through the use of disruptive technologies rather than direct political mobilization. The VC movement can thus be seen as the latest technological instantiation of a broader project called by some scholars the ‘Californian Ideology.’⁶¹ This is an eclectic ideology and its elements are not distributed homogeneously through the VC movement.⁶² In broad terms, however, it is the product of the collision and synthesis of neo-liberalism, counter-culture radicalism, and technological determinism.⁶³ With all the internal contradictions that entails, the California Ideology combines a New Left anti-corporate ethos and faith in the Internet as a forum for new forms of community with a conservative libertarian faith in the ability of information technologies to facilitate voluntary exchange between individuals outside the sphere of state control.⁶⁴ Needless to say, the libertarian strand of this movement is inimical both to national and supra-national monetary policy and to conventional financial institutions and structures.⁶⁵

While this is a significant aspect of the VC movement, it is important not give this ideological project too much credence. Actors with more

58. Derek A. Dion, *I’ll Gladly Trade You Two Bits on Tuesday for a Byte Today: Bitcoin Regulating Fraud in the E-conomy of Hacker-Cash*, 2013 U. ILL. J.L. TECH. & POL’Y 165, 167 (2013); see generally, Nakamoto, *supra* note 24.

59. See, e.g., Charles A.E. Goodhart, *The two concepts of money: implications for the analysis of optimal currency areas*, 14 EUR. J. POL. 407 (1998).

60. See, e.g., Primavera di Filippi & Benjamin Loveluck, *The Invisible Politics of Bitcoin: Governance Crisis of a Decentralised Infrastructure*, 5 INTERNET POLICY REV. 3, (Sept. 30, 2016), <https://policyreview.info/node/427/pdf>; Jeremy M. Sklaroff, *Smart Contracts and the Cost of Inflexibility*, 166 U. PA. L. REV. 263 at 270.

61. See Richard Barbrook & Andy Cameron, *The Californian Ideology*, MUTE (Sept. 1, 1995), <http://www.metamute.org/editorial/articles/californian-ideology>.

62. See *id.*

63. See *id.*

64. See *id.*

65. An idea of the literature influential on this demographic is gleaned from the reading list of the self-styled ‘Satoshi Nakamoto Institute.’ See *Literature*, SATOSHI NAKAMOTO INST., <https://nakamotoinstitute.org/literature/> (last visited Nov. 4, 2018).

conventional economic motivations are increasingly attracted to launch VC schemes or purchase VC tokens, and we expect these players to behave in more conventional ways.⁶⁶ Further, DLT offers possibilities for governmental actors including NCBs and the ECB, as well.⁶⁷ Taking the techno-libertarian manifestos at face value potentially distracts from the challenges and opportunities of DLT within conventional political, economic, and legal structures.

Despite the libertarian rhetoric, VC schemes have a political economy, and a sociological picture of it is gradually emerging.⁶⁸ An early Opinion by the EBA, for example, identified the following players involved in the creation and maintenance of a VC scheme: (i) users, (ii) merchants, (iii) VC exchanges, (iv) scheme governance authorities (often highly informal), (v) trade platforms, (vi) processing service providers, (vii) wallet providers/custodians, (viii) inventors, (ix) technical service providers, (x) information providers, and (xi) miners.⁶⁹ Events such as the Mt. Gox insolvency⁷⁰ and the DAO 'hack'⁷¹ illustrate that this political economy is substantially shaped by human decision-making.

A more recent, comprehensive benchmarking survey by Hileman and Rauchs found that VCs introduced four new categories of financial industry player into the landscape: (i) exchanges, (ii) wallets, (iii) payments service providers, and (iv) miners.⁷² The most important players in this political economy are VC exchanges. These are the sites at which most users participate in the VC economy by purchasing VC tokens, either with other VC tokens or with units of *fiat* currency.⁷³ As the channel of convertibility, these are probably the most important potential vector of financial contagion into the mainstream financial system.⁷⁴ At the time of the study, Europe had the largest number of exchanges, so appropriate regulation

66. See Chance Barnett, *Inside the Meteoric Rise of ICOs*, FORBES (Sept. 23, 2017), <https://www.forbes.com/sites/chancebarnett/2017/09/23/inside-the-meteoric-rise-of-icos/#2ae31f65670c>.

67. See *Distributed Ledger Technology*, EUROPEAN CENT. BANK (2018), <https://www.ecb.europa.eu/pub/annual/special-features/2016/html/index.en.html>.

68. See Abraham J.B. Cable, *Institutionalized Disruption: The Rise of the Reformer Startup*, 12 HASTINGS BUS. L.J. 1 at 4, 8-9.

69. *EBA Opinion on Virtual Currencies*, EUROPEAN BANKING AUTH. at 13-15 (July 4, 2014), <https://www.eba.europa.eu/documents/10180/657547/EBA-Op-2014-08+Opinion+on+Virtual+Currencies.pdf>

70. See Alexandra Harney & Steve Stecklow, *Twice Burned - How Mt. Gox's Bitcoin Customers Could Lose Again*, REUTERS (Nov. 16, 2017), <https://www.reuters.com/investigates/special-report/bitcoin-gox/>.

71. See Joon Ian Wong & Ian Kar, *Everything You Need To Know About the Ethereum Hard Fork*, QUARTZ (July 18, 2016), <https://qz.com/730004/everything-you-need-to-know-about-the-ethereum-hard-fork/>.

72. See Garrick Hileman & Michel Rauchs, *2017 Global Blockchain Benchmarking Study*, CAMBRIDGE CENTRE FOR ALT. FIN. at 27 (Sept. 22, 2017) https://papers.ssrn.com/sol3/papers.cfm?abstract_id=3040224.

73. See *EBA Opinion on Virtual Currencies*, *supra* note 69, at 14.

74. See *id.*

would seem to be particularly important here.⁷⁵ In particular, exchanges that hold VC tokens on behalf of their users and offer ancillary services are a priority, as they pose the greatest risk of market abuse and/or financial contagion.⁷⁶

Hileman and Rauchs also found that the lines between these players were blurred, and that there was currently a trend of convergence towards ‘universal’ VC businesses.⁷⁷ Increasingly, this political economy is also involving traditional financial institutions, for example as investment funds look to VCs as assets or commercial banks establish banking relationships with exchanges.⁷⁸ Some recent VC ventures also seem to be moving towards a higher degree of centralization.⁷⁹ It is perhaps ironic that business models in the VC space tend to be gravitating towards a centralized and regulated model, when VCs such as Bitcoin were conceived counter to centralization and (public) regulation.

G. EARLY REGULATORY RESPONSES

In this section, we give a brief overview of the kind of regulatory responses to VCs that can be observed to date. The first step in determining how VC schemes should be regulated is to answer the question how VC tokens themselves should be characterized under existing law. In the first instance, this has taken place mostly in the form of administrative decisions, and mostly in the context of securities law, with a particular focus on ICOs because these are massive fundraising events in which many retail and institutional investors take part.⁸⁰ In addition, there have been a number of judicial decisions applying existing legal categories. Increasingly, we expect to see more legislative initiatives directed at different aspects of VC schemes.

First, it is convenient to note that there is a concentration of VC schemes in key jurisdictions.⁸¹ In a recent study, W.A. Kaal found that most ICOs

75. See Hileman & Rauchs, *supra* note 72, at 81.

76. See *id.* at 32.

77. See *id.* at 25.

78. See *id.* at 80.

79. For example, the largest ICO fundraising round so far is by ‘EOS,’ which promises to be a platform provider (like Ethereum) on which developers can launch other applications (including VCs) with more efficient transaction processing. This efficiency is won by a greater concentration of power within specially authorised nodes. See Brady Dale, *EOS is Coming, If Anyone Can Figure Out How to Vote*, COINDESK (May 30, 2018), <https://www.coindesk.com/eos-coming-anyone-can-figure-vote/>.

80. See Barnett, *supra* note 66.

81. See Wulf A. Kaal, *Initial Coin Offerings: The Top 25 Jurisdictions and Their Comparative Regulatory Responses*, STANFORD J. OF BLOCKCHAIN L. & POL’Y, (Feb. 2, 2018), https://papers.ssrn.com/sol3/papers.cfm?abstract_id=3117224. The summary of regulatory developments that follows draws on sources that were current at the time of writing in May 2018, as an input for the European Parliament Monetary Dialogue with ECB President Mario Draghi in July 2019, and it has been published in its original form. For an up to date review, see in particular Michel Rauchs *et al*, Cambridge Centre for Alternative Finance 2nd Global Cryptoasset Benchmarking Study (December 2018), <https://www.jbs.cam.ac.uk/faculty->

had occurred in twenty-five jurisdictions.⁸² The lion's share (both by number and value) had taken place in the top five jurisdictions (United States, United Kingdom, Russian Federation, Switzerland, and Singapore).⁸³ More than half of the twenty-five were in Europe (United Kingdom, Switzerland, Lithuania, Gibraltar, Germany, Ukraine, France, Spain, Poland, Liechtenstein, Luxembourg, Serbia, Slovakia, and Sweden).⁸⁴ Eight allowed ICOs with no regulation, twelve allowed ICOs with light regulation, four allowed ICOs with heavy regulation, and one (China) banned ICOs outright.⁸⁵ Regulations affecting ICOs ranged from instruments controlling the ICO process itself, to those regulating VCs generally, DLT generally, VC exchanges, setting out a compliance program for ICOs, to those regulating securities generally.⁸⁶ Securities laws are the most common source of norms applied to VC token issues in ICOs.⁸⁷ While many regulators have warned investors not to purchase VCs, few have attempted to prohibit them from doing so.⁸⁸

1. *Administrative Decisions*

As explained earlier, most regulators have taken a watch and wait strategy, and most first steps have consisted in the analogue application of existing regulations.⁸⁹

As already noticed, the SEC has been pro-active in applying securities regulations to emissions of and dealings with VC tokens and has determined that a number of prominent VC tokens are 'securities' under the Securities Exchange Act 1934.⁹⁰ More recently, the SEC has announced its position that the tokens in the two largest VC schemes, bitcoins and ether, are not securities.⁹¹ This position is shared by the Commodities and Futures Trading Commission,⁹² and now by at least one District Court.⁹³ Other US

research/centres/alternative-finance/publications/2nd-global-cryptoasset-benchmark-study/#.XFGaz817mUk and Michel Rauchs *et al*, CCAF Global Cryptoasset Regulatory Landscape Study (forthcoming February 2019), which together give a granular view of developments current at the time of publication.

82. See Kaal, *supra* note 81.

83. This section draws on a recent study that reviewed the legal treatment of VCs in the top 25 jurisdictions in which VCs have been issued in ICOs: *See id.*

84. *See id.*

85. *See id.* (Figure 6).

86. *See id.*

87. *See id.*

88. See Kaal, *supra* note 81.

89. *See id.*

90. See Report of Investigation Pursuant to Section 21(a) of the Securities Exchange Act of 1934: The DAO, Exchange Act Release No. 81207, July 25, 2017, at 1.

91. See Bob Pisani, *Bitcoin and Ether Are Not Securities*, CNBC (June 14, 2018), <https://www.cnbc.com/2018/06/14/bitcoin-and-ethereum-are-not-securities-but-some-cryptocurrencies-may-be-sec-official-says.html>.

92. The US Commodity Futures Trading Commission declared "virtual currencies to be a "commodity" subject to oversight under its authority". See *CFTC Backgrounder on Oversight of and Approach to Virtual Currency Futures Markets*, US COMMODITY FUTURES TRADING

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regulators, such as the Financial Crimes Enforcement Network, have been proactive in applying AML measures under the Bank Secrecy Act 1970 to ‘administrators’ and ‘exchangers’ of VC tokens (but not to users).⁹⁴ Although it is clear that no VC satisfies the strict definition of a ‘currency’ because it is not legal tender in any jurisdiction, the latter implicitly treats VC tokens as having some ‘monetary’ property.⁹⁵ Most recently, a county tax collector in Florida has announced that he will accept taxes in Bitcoin.⁹⁶ Actually this is not entirely accurate, as the payments will be converted into USD using an exchange, so the announcement does not mean very much beyond the implication of Bitcoin in a mainstream payments system.⁹⁷

Turning to the Eurozone, German *Bundesanstalt für Finanzdienstleistungsaufsicht* (BaFin) has not reached a final position on the status of VCs.⁹⁸ The BaFin has issued a binding decision on the classification of VC tokens in 2016, treating them as a ‘unit of account’ under § 1(1) of the *Kreditwesengesetz*, analogous to foreign currencies and private media of exchange.⁹⁹ More recently, BaFin has advised that ICOs of VCs are subject to securities law according to the rights attached to the tokens, which must be assessed on a case by case basis.¹⁰⁰ The French *Autorité des Marchés Financiers* (AMF) has taken the position that VCs are not readily categorized in French law, and has accordingly implemented a program to explore the scope of future regulation through (i) promoting best practices within the existing legislative framework, (ii) extending the scope of legislation to classify VCs as securities, and (iii) propose *ad hoc* legislation.¹⁰¹ The AMF has also opined that VC-based derivatives require authorization. As Dell’Erba observes,

COMMISSION (Jan. 4, 2018), https://www.cftc.gov/sites/default/files/idc/groups/public/@custom_erprotection/documents/file/background_under_virtual_currency01.pdf. In December 2017 the Chicago Mercantile Exchange and the Chicago Board Options Exchange (CME) launched Bitcoin future contracts. See, e.g., Evelyn Cheng, *Bitcoin Debuts On The World’s Largest Futures Exchange, And Prices Fall Slightly*, CNBC (Dec. 17, 2017), <https://www.cnbc.com/2017/12/17/worlds-largest-futures-exchange-set-to-launch-bitcoin-futures-sunday-night.html>.

93. See Brendan Pierson, *Virtual Currencies Are Commodities, US Judge Rules*, REUTERS (Mar. 6, 2018), <https://uk.reuters.com/article/us-usa-cftc-bitcoin/virtual-currencies-are-commodities-us-judge-rules-idUKKCN1GI32C>.

94. See I.R.S. Gen. Couns. Mem., *supra* note 38, at 1.

95. See *id.*

96. See Joel Greenberg, *Joel Greenberg Accepts Bitcoin and Bitcoin Cash for Payments through BitPay*, SEMINOLE CTY. (May 14, 2018), <http://www.seminoletax.org/forms/bitcoin-announcement.pdf>.

97. See *id.*

98. See *Virtual Currency*, BAFIN (Mar. 28, 2016), https://www.bafin.de/EN/Aufsicht/FinTech/VirtualCurrency/virtual_currency_node_en.html.

99. See *id.*

100. Bafin, *Supervisory Classification Of Tokens Or Cryptocurrencies Underlying ‘Initial Coin Offerings’ (ICOs) As Financial Instruments In The Field Of Securities Supervision* (Advisory Letter Ref. No. WA 11-QB 4100-2017/0010), https://www.bafin.de/SharedDocs/Downloads/EN/Merkblatt/WA/dl_hinweisschreiben_einordnung_ICOs_en.pdf?jsessionid=47741C233E9A50ED71B9B1596A01F0B5.2_cid290?__blob=publicationFile&v=2.

101. See Marco Dell’Erba, *Initial Coin Offerings. A Primer. The First Response of Regulatory Authorities*, 14 N.Y.U. J. OF L. & BUS. 1109 (2017).

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France is one of the only countries to date that has followed conventional consultation practices with regards to VCs.¹⁰² The Spanish *Comisión Nacional del Mercado de Valores* (CNMV) takes the view that for the time being (until further EU harmonization in this area is achieved), a case-by-case ‘substance over form’ approach is needed.¹⁰³ The CNMV considers that a significant number of the operations structured as ICOs should be treated as offerings of transferable securities, because they give rise to rights similar to those of traditional securities and, thus, should be subject to the legal framework applicable to securities in the EU, including MIFID II, the Prospectus Directive and the Alternative Investment Funds Directive.¹⁰⁴ The Bank of Lithuania has taken the position that securities and AML laws apply to VC schemes and has discouraged investors from purchasing VC tokens.¹⁰⁵ Financial institutions in Lithuania are required to insulate their VC-related activities from their other activities.¹⁰⁶

ESMA has recently adopted new product intervention measures on the provision of contracts for difference (CFDs) and binary options, including *inter alia* leverage limits on cryptocurrencies.¹⁰⁷

The UK Financial Conduct Authority (FCA) has taken the position that VCs may be regulated as securities according to the rights acquired with the VC token, as determined on a case-by-case analysis.¹⁰⁸ The FCA has acknowledged a lack of jurisdiction where a VC scheme is launched overseas, and that certain financial uses of DLT could circumvent existing regulations.¹⁰⁹

The Swedish Financial Supervisory Authority issued four prospectuses with regard to certificates linked to crypto-currencies in 2015, 2016, 2017 and in May 2018 (all XBT Provider AB).¹¹⁰ The latest prospect concerns not

102. *See id.* at 22

103. *See* Joint Press Release, CNMV & Banco de España, Joint Press Statement By CNMV & Banco De Espan~a On “Cryptocurrencies” And “Initial Coin Offerings” (ICOs), (Feb. 8, 2018), <http://www.cnmv.es/Portal/verDoc.axd?t{6f310cc7-6b39-4405-a8f7-70d2b1e682d1}> (distinguishing between ‘security tokens’ and ‘utility tokens’); *see also* Press Release, CNMV, CNMV Considerations On Cryptocurrencies And ICOs Addressed To Market Professionals (Feb. 8, 2018), <http://www.cnmv.es/Portal/verDoc.axd?t{62395018-40eb-49bb-a71c-4afb5c966374}>. We are grateful to CNMV President Sebastián Albella and CNMV Director Raquel García Alcobilla for helpful comments as regards the work of the CNMV in this area.

104. *See id.*

105. *See* Kaal, *supra* note 81.

106. *See id.*

107. *See* Press Release, European Securities and Markets Authority, ESMA Adopts Final Product Intervention Measures On CFDs And Binary Options (June 1, 2018), <https://www.esma.europa.eu/press-news/esma-news/esma-adopts-final-product-intervention-measures-cfds-and-binary-options>.

108. *See Discussion Paper On Distributed Ledger Technology*, UK FIN. CONDUCT AUTH. at 25 (April, 2017), <https://www.fca.org.uk/news/press-releases/fca-publishes-feedback-statement-distributed-ledger-technology>.

109. *See id.* at 23.

110. *See Base Prospectus*, XBT PROVIDER AB (May 17, 2018), <https://fintelegram.com/wp-content/uploads/2018/08/XBT-Provider-AB-Base-Prospectus.pdf>.

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only bitcoin and Ethereum, but also LiteCoin, Bitcoin Cash, Ethereum Classic, Ripple, Neo and “a basket of combination of these”.¹¹¹ None of these new certificates have yet been traded with.¹¹² The latest approved prospect has been passported to the UK.¹¹³

The Swiss Financial Market Supervisory Authority (FINMA) has promulgated guidelines according to which VC tokens will be treated as securities where it satisfies the relevant definitions in Swiss law.¹¹⁴ According to paragraph 3.3 of the ICO Guidelines published by the Swiss Financial Market Supervisory Authority (FINMA):

The issuing of tokens that are analogous to equities or bonds can also result in prospectus requirements under the Swiss Code of Obligations. FINMA has no direct responsibility in this area but expects ICO organisers to themselves clarify these requirements. According to the draft Financial Services Act (FinSA) prospectus requirements will become part of supervisory law (Art. 37 Draft FinSA). The Swiss Code of Obligations and FinSA provide for a number of different exceptions and exemptions.¹¹⁵

Further afield, the Central Bank of the Russian Federation initially took a critical view of VCs, but has since determined that regulation would be premature and has taken a very permissive approach to ICOs, VCs, and DLT.¹¹⁶ In early 2018 the Ministry of Finance introduced a Digital Assets Regulation Bill that defined various aspects of the VC economy.¹¹⁷ The Monetary Authority of Singapore issued guidance in 2017 stating the approach of treating VC tokens as securities if they are linked to an ownership or security interest.¹¹⁸ The Australian Securities and Investment Commission is currently determining whether the Corporations Act 2001 (Commonwealth) (which governs corporations law and many aspect of capital markets law) applies to VCs, for example as ‘managed investment schemes.’¹¹⁹ The Commission has instituted an ‘Innovation Hub’ to keep track of the market and help innovators navigating the regulatory landscape.¹²⁰

111. *See id.*

112. *See id.*

113. *See id.*

114. *See Guidelines For Enquiries Regarding The Regulatory Framework For Initial Coin Offerings (ICOs)*, FINMA at 6 (Feb. 16, 2018), <https://www.finma.ch/en/~media/finma/dokumente/dokumentencenter/myfinma/1bewilligung/fintech/wegleitung-ico.pdf?la=en&hash=9CBB35972F3ABCB146FBF7F09C8E88E453CE600C>.

115. *See id.*

116. *See Kaal, supra* note 81.

117. *See id.*

118. *See id.*

119. *See id.*

120. *See id.*

2. *Judicial Decisions*

Like these administrative decisions, the thrust of many early judicial decisions has been to bring VC schemes under existing securities law.¹²¹ But we can observe a tendency to accept the claim that VC tokens are a means of payment in some early decisions. In our view, courts in the near future are likely to (or ought to) take a more nuanced approach to the treatment of VC tokens and schemes.

In *SEC v Trendon T. Shavers and Bitcoin Savings and Trust*,¹²² for example, the US District Court (E.D. Texas) had to decide whether payments of bitcoins could constitute an ‘investment of money’ to determine whether bitcoin-denominated investments were ‘securities’ under US law.¹²³ The court found that it was ‘clear that Bitcoin can be used as money’ as it could be used to purchase goods or services, notwithstanding that it was not legal tender.¹²⁴ The court stressed the fact that bitcoins were exchangeable for ‘conventional currencies’ such as USD and euro: ‘Therefore, Bitcoin is a currency or form of money, and investors wishing to invest in BTSC provided an investment of money.’¹²⁵ This decision should not necessarily be read as an endorsement of Bitcoin’s bid for money status, as the main thrust of the decision was to treat investments in the fund as ‘securities’.¹²⁶ More recently, a District Court judge ruled that VC ‘can be regulated by CFTC as a ‘commodity,’ as [v]irtual currencies are “goods” exchanged in a market for a uniform quality and value.’¹²⁷ In our view, it will be some time before we have a consistent line of authorities emerging in any jurisdiction, especially as cases are brought before the courts with different specific questions in mind—i.e. relating to theft, fraud, tax, investor protection, counterfeiting, for example.

In its 2015 decision in *Skatteverket v David Hedqvist*, Case C-264/14, the Court of Justice of the European Union (CJEU) held that certain exchange transactions between fiat currency and Bitcoin were *prima facie* liable to VAT, but exempt under Art. 135(e) of the *VAT Directive 2006/112/CE* as ‘transactions . . . concerning currency, bank notes and coins used as legal tender.’¹²⁸ The Court held that the VAT was intended to ‘alleviate the difficulties connected with determining the taxable amount and the amount of VAT deductible which arise in the context of financial transactions.’¹²⁹

121. See *CFTC v. McDonnell*, 287 F.Supp.3d 213 (2018); see also *SEC v. Shavers*, No. 4:13-CV-416, 2013 WL 4028182 (E.D. Tex. Aug. 6, 2013).

122. See *Shavers*, 2013 WL 4028182 at *2.

123. See *id.* (using the first limb of the test from *SEC v. W.J. Howey & Co.*, 328 U.S. 293, 298-99 (1946)).

124. See *id.*

125. See *id.*

126. See *id.*

127. See *McDonnell*, 287 F.Supp.3d at 228.

128. See *Skatteverket v. Hedqvist*, C-264/14, July 16, 2015, at ¶ 6, <http://curia.europa.eu/juris/celex.jsf?celex=62014CJ0264&lang1=en&type=TEXT&ancre=>

129. See *id.* at ¶ 36.

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These difficulties, it said, could also arise in transactions involving VCs; to deny the exemption would ‘deprive it of part of its effect.’¹³⁰ What is noteworthy about this judgment is that the Court refused to exempt the transactions under Art. 135(d), which covers transactions ‘concerning deposit and current accounts, payments, transfers, debts, cheques and other negotiable instruments.’¹³¹ The VC, it said, was ‘a contractual means of payment’ and could not be regarded as a ‘current account or a deposit account, a payment or a transfer.’¹³² It further differentiated the VC tokens from ‘debts, cheques and other negotiable instruments’ and instead characterized it as a ‘direct means of payment between the operators that accept it.’¹³³ It thus treated bitcoins as ‘analogous to other convertible currencies as regards their use in the real world.’¹³⁴ It would have been possible for the Court to achieve the same result under the exemption in Art. 135(f), which covers transactions ‘in shares, interests in companies or associations, debentures and other securities’.¹³⁵ This was perhaps based on an error in the Court’s apprehension of how bitcoins are actually used; bitcoins are not generally used as a medium of exchange at all but as a speculative store of value, and, with respect, should have been treated as such.

As already mentioned, one Japanese court has ruled¹³⁶ that bitcoins are incapable of ownership because they do not satisfy the legal definition of a ‘thing,’ as Japanese law defines things as (i) tangible, spatio-temporal entities that can (ii) be made subject to one’s exclusive control. This left the company’s creditors with damages claims rather than claims based in ownership.¹³⁷ (This is implicitly at odds with the regulatory position taken by the SEC that bitcoins are akin to ‘commodities’). The question is important because about 200,000 bitcoins are still in the possession of the company; as the USD price of bitcoins has increased significantly since the exchange filed for insolvency, at current valuations all the company’s debts could be paid with a large surplus to return to shareholders.¹³⁸

130. *See id.* at ¶ 51.

131. *See id.* at ¶ 6.

132. *See id.* at ¶ 42.

133. *See id.* at ¶¶ 38, 42.

134. *See id.* at ¶ 12.

135. *See id.* at ¶ 6.

136. *See* Kyodo News, *Bitcoins Lost In Mt. Gox Debacle ‘Not Subject To Ownership’ Claims: Tokyo Court*, JAPAN TIMES (Aug. 6, 2015), <https://www.japantimes.co.jp/news/2015/08/06/national/crime-legal/bitcoins-lost-in-mt-gox-debacle-not-subject-to-ownership-claims-tokyo-court-rules/#.W9YII2YXIE5>.

137. *See id.*

138. *See* Justin Sabin & Bryce Suzuki, *The Magic of Mt. Gox: How Bitcoin Is Confounding Insolvency Law*, BCLP GRID: GLOBAL RESTRUCTURING AND INSOLVENCY DEVS. (Nov. 28, 2017), <https://bclpgrid.com/the-magic-of-mt-gox-how-bitcoin-is-confounding-insolvency-law/>.

3. *Legislative Acts*

Certain US states have passed or are in the process of passing laws that regulate one or the other aspect of DLT in ways that may be of relevance to VCs. Delaware corporate law now specifically recognizes blockchain maintenance of corporate records provided that those records are converted into clearly legible paper form within a reasonable time and that securities registers kept in this manner are used to prepare the list of shareholders or record share transfers.¹³⁹ The law removes the mention of ‘officers’ in charge of the securities register or records ‘maintained’ by the corporation and instead provides for records “administered by or on behalf of the corporation” to ensure that DLT can be used for these purposes.¹⁴⁰ Reforms in Arizona and Nevada ensure that market participants can use DLT for purposes of corporate record-keeping and contracting, for example by stipulating expressly that blockchain-based transactions count as ‘digital signatures’ for legal purposes.¹⁴¹

The Gibraltar Financial Services (Distributed Ledger Technology Providers) Regulations 2017¹⁴² address DLT, VCs, and VC exchanges. This is a facilitative, principles-based instrument that seeks to encourage financial innovation using DLT while ensuring standards by closing up the perceived regulatory gap.

One of the most impressive legislative projects to date is a bundle of legislation in Malta.¹⁴³ The Maltese Financial Services Authority has prepared a Virtual Financial Assets Bill (VFA Bill), which is currently being debated in Parliament.¹⁴⁴ The aim of the Bill is to create a regulatory framework applicable to ICOs as well as entities offering services, such exchanges, in relation to digital assets falling outside scope of the existing financial regulation, when such activity is carried out in or from within Malta.¹⁴⁵ The objective underlying the VFA Bill is to create a framework that supports the innovation and new technologies for financial services in

139. See Catherine Simard, *Delaware Provides Legal Clarification For Blockchain Maintenance Of Corporate Records – The View From Canada*, NORTON ROSE FULBRIGHT (Sept. 2018), <http://www.nortonrosefulbright.com/knowledge/publications/155384/delaware-provides-legal-clarification-for-blockchain-maintenance-of-corporate-records-the-view-from-canada>.

140. *See id.*

141. *See* ARIZ. REV. STAT. ANN. § 44-7061(A) (2017).

142. *See Financial Services (Distributed Ledger Technology Providers) Regulations 2017*, No. 4401 GILBRALTAR GAZETTE (Oct. 12, 2017), <https://www.triay.com/wp-content/uploads/2017/10/Financial-Services-Distributed-Ledger-Technology-Providers-Regulations-2017.pdf>.

143. We are grateful to Christopher P. Buttigieg of the Malta Financial Services Authority and to Pauline Lanzon of the Central Bank of Malta for furnishing us with helpful information about the Maltese legislative program in this regard.

144. *See* Parliament of Malta, C 778, *An Act To Regulate The Field Of Initial Virtual Financial Asset Offerings And Virtual Financial Assets And To Make Provision For Matters Ancillary Or Incidental Thereto Or Connected Therewith*, May 22, 2018, <http://justiceservices.gov.mt/DownloadDocument.aspx?app=lp&itemid=29079&l=1>.

145. *See id.*

the area of VCs, whilst ensuring effective investor protection, financial market integrity and financial stability.¹⁴⁶

The objectives of financial regulation are achieved through minimum transparency requirements applicable to ICOs and governance, conduct and prudential requirements applicable to persons involved in VC activity. This regulation is based on the high-level principles enshrined in existing EU financial services legislation in relation to the provision of investment services, financial markets and prevention of market abuse. Furthermore, the VFA Bill and underlying framework aims at implementing the fifth anti-money laundering directive with regard to virtual currencies.¹⁴⁷ The VFA Bill was published in the *Government Gazette of Malta*¹⁴⁸ together with two corresponding bills, the Malta Digital Innovation Authority Bill (MDIA Bill) and the Innovative Technology Arrangements and Services Bill (ITAS Bill).¹⁴⁹ The objective of the MDIA Bill is to provide for the establishment of an authority to be known as the Malta Digital Innovation Authority, to support the development of technology innovation, and exercise regulatory functions regarding technology arrangements including distributed or decentralized ledger technology. The aim of the ITAS Bill is to provide for the regulation of designated innovative technology arrangements, as well as of designated innovative technology services. Overall the aim of the three Bills is that of ensuring a higher degree of consumer protection in this field.

III. Privately Issued Virtual Currencies

In this section, we discuss some of the issues raised by privately issued VCs in the context of the Eurosystem in more detail. Again, not everything called a ‘VC’ is accurately called a ‘currency’ at all. VCs generally fall into four main use cases: (i) use as speculative digital assets, (ii) use as media of exchange, (iii) use as payment rails (e.g. for fiat to fiat payments), and (iv) non-financial uses (e.g. ‘notarial’ recordkeeping of intellectual property ownership or personal identity).¹⁵⁰ In the context of the three financial use cases, we discuss (i) the direct challenge to central bank control over the money supply posed by VCs intended to operate as ‘currencies’; (ii) the potential for VCs negatively to impact the financial system, and (iii) the potential impact of VCs on central bank monetary policy.

Some uses obviously correspond to legal categories—a VC token used as a speculative asset obviously resembles a ‘security,’ and a VC used as a medium of exchange obviously resembles a ‘currency,’ for example. But the task of characterization is complicated because (i) the relevant legal

146. *See id.*

147. *See id.*

148. *See Government Notices Published in Govt. Gazette No. 19,994 of 22nd May 2018*, 614 Gov. MT. (May 22, 2018), <https://gov.mt/en/Government/Government%20Gazette/Government%20Notices/Pages/2018/05/gov-notices-2205.aspx>.

149. *See id.*

150. *See Hileman & Rauchs, supra* note 72, at 105.

categories are indeterminate, especially in the context of supranational law, (ii) many VC tokens show hybrid features, and (iii) VC tokens may be used differently than intended by their issuer. In this section, we aim to provide a clearer basis for approaching legal categorization. Not only is this important to guide national and European regulators as they apply existing regulations to VCs and their issuing or controlling entities; it is also necessary to identify blind spots in national and European regulations themselves.

A. A DIRECT CHALLENGE

A number of private VCs position themselves as direct competitors to the traditional monetary system. Bitcoin, for example, was intended to pose a direct challenge to the Eurosystem in both its money supply and monetary policy role by providing an alternative form of currency to central bank liabilities (circulating as currency) and commercial bank liabilities backed with fractional reserves of central bank money (circulating as book-money in non-cash payment systems). The question is: How credible is this challenge?¹⁵¹

It is *prima facie* credible to the extent that digital payment instruments are increasingly more convenient than physical currency for a wide range of transactions; in many Member States, the use of cash is observed to be in decline.¹⁵² If VC-based payment systems were used to the exclusion of cash and book-money, VCs could take whole economies outside the conventional monetary system, which would in turn erode both commercial banks' role in the monetary system and central banks' power over the money supply and monetary policy.¹⁵³ This would affect the Eurosystem's core regulatory tasks of maintaining systemic stability, maintaining efficiency and security in payment systems, and implementing monetary policy.¹⁵⁴

In our view it is fairly clear that VCs are not currently used as a medium of exchange (or means of payment) in nearly sufficient quantities to pose a credible direct threat. The startling growth of Bitcoin and other VCs suggests that there is some demand for VC-based payments. But in our view, this demand is driven more by an appetite for non-traditional speculative assets than by a desire for money outside the conventional monetary system. This appetite is perhaps driven by the immense liquidity in the capital markets at present, as a result of unconventional monetary policy tools such as Quantitative Easing (QE). Indeed, despite the startling growth in the number (and nominal market capitalization) of VCs, it appears that most VCs are being used not as currency substitutes at all.¹⁵⁵

151. See Andrea O'Sullivan, *How Do Cryptocurrencies Affect Monetary Policy?*, COINCENTER (June 20, 2018), <https://coincenter.org/entry/how-do-cryptocurrencies-affect-monetary-policy>.

152. See Hileman & Rauchs, *supra* note 72, at 88.

153. See Markets Committee, *Central Bank Digital Currencies*, BANK FOR INT'L SETTLEMENTS COMM. ON PAYMENTS AND MARKETS INFRASTRUCTURES at 7 (Mar. 2018), <https://www.bis.org/cpmi/publ/d174.pdf>

154. See Hileman & Rauchs, *supra* note 72, at 90.

155. See *id.* at 35.

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Bitcoin transaction numbers have fallen in recent months, from about 400,000 per week in late 2017 (when prices peaked at close to US \$20,000) to about half that in March 2018.¹⁵⁶ This is very small in comparison to other payment systems like Visa, which processes some 65,000 transactions per second.¹⁵⁷ The recent drop in Bitcoin transactions perhaps also suggests that many of these transactions are in the nature of financial trades rather than retail or wholesale payments, which is consistent with our view that most users do not in fact use their bitcoins as a medium of exchange but rather as a digital asset that they hope will appreciate in value to yield speculative gains.¹⁵⁸

Although it is not everything,¹⁵⁹ a thing's function as a medium of exchange is probably the most important factor in determining a thing's money status. This is precisely the function in which Bitcoin, in particular, performs most poorly, and no conventional VC performs very well at all.¹⁶⁰ This is likely to remain the case for at least three reasons:

- i. VC payments are generally slow compared to conventional electronic payment systems. Bitcoin is orders of magnitude slower than traditional payment systems; other (newer) VCs are significantly faster than Bitcoin but still much slower than e.g. Visa, e-money payments, or even commercial bank transfers using modern transfer systems.¹⁶¹ This is due to the cost of trustlessness, i.e. the complex processes used to verify transactions in the absence of a trusted intermediary such as a bank.
- ii. There is a limited supply of bitcoins (and many other VCs), and generally there is no equivalent to a central bank which can coordinate the supply of VC tokens to the needs of the economy transacting in them. This incentivizes holding as a speculative asset over use as a medium of exchange.
- iii. Permissionless blockchains generally use a massive amount of computing power and energy per transaction. One recent study estimates that Bitcoin uses as much energy as certain countries (2.55 gigawatts and growing) although it powers a tiny economy.¹⁶² In other

156. See Bloomberg, *Bitcoin Transaction Volume Is Puzzling Investors*, FORTUNE (Mar. 2, 2018), <http://fortune.com/2018/03/02/bitcoin-price-transaction-volume/>.

157. See *Visa Fact Sheet*, VISA (Aug. 2017), <https://usa.visa.com/dam/VCOM/global/about-visa/documents/visa-facts-figures-jan-2017.pdf>.

158. See Olga Kharif, *Bitcoin's Use in Commerce Keeps Falling Even as Volatility Eases*, BLOOMBERG (Aug. 1, 2018), <https://www.bloomberg.com/news/articles/2018-08-01/bitcoin-s-use-in-commerce-keeps-falling-even-as-volatility-eases>.

159. See generally Geoffrey Ingham, *The Nature of Money*, 5 ECON. SOCIOLOGY: EUROPEAN ELECTRONIC NEWSLETTER 17, 19 (2004), <https://www.econstor.eu/bitstream/10419/155831/1/vol05-no02-a2.pdf>.

160. Ripple, which provides an RTGS system, has issued VC tokens but operates quite differently and does not claim to displace currency in retail payments in the monetary system.

161. See *Visa Fact Sheet supra* note 157.

162. See Alex de Vries, *Bitcoin's Growing Energy Problem*, 2 JOULE 801 (2018), [https://www.cell.com/joule/fulltext/S2542-4351\(18\)30177-6](https://www.cell.com/joule/fulltext/S2542-4351(18)30177-6).

words, Bitcoin's qualification as a currency would entail a global environmental disaster under current conditions.

The importance of these technical limitations is revealed by current market developments. One response is to add 'layers' to the Bitcoin technology stack. For example, wallets and exchanges that process transactions off-chain increase the efficiency and transaction speed of a permissionless VC like Bitcoin. But they do this only by adding features of centralization and intermediation to a (supposedly) decentralized and disintermediated payment system. In so doing, they depart from the core ethos of the cryptocurrency movement and exacerbate the need for regulatory control as they create parallel financial institutions in a shadow payments system. Ironically, one of the layers to be built on the Bitcoin stack might even be physical tokens: One company is now issuing 'smart' banknotes for digital assets.¹⁶³ Bitcoin notes are already available in Singapore.¹⁶⁴ These 'banknotes' are physical (so-called 'cold-storage') devices for private keys associated with a number of bitcoins.¹⁶⁵ They are similar to e-money stored locally on a 'smart card' or other device, but the value the store is not in fiat money but Bitcoin, and, more importantly, they are designed not for electronic transfer but physical exchange.¹⁶⁶ Their existence speaks powerfully to the inefficiency of the Bitcoin 'electronic cash' system.

It is important to note that these failures may be avoided by other VCs in the future. Transaction speed and efficiency is a hotspot of innovation in the VC developer community, and any given VC's status would have to be reassessed if it started to act more like money. In other words, despite our functional-empirical rejection of the direct challenge, the Eurosystem must take VCs seriously, monitor the VC market closely, and model various contingencies in order to intervene in a timely and effective manner in case things do ever change.

Indeed, when addressing the credibility of the direct challenge, it is important to separate (i) the *conceptual* reasons why a given VC is not 'money' (or could not replace conventional money) and (ii) the *empirical* reasons why a given VC has not acquired money status (or has not acquired it yet). In our view, there is significant disagreement and indeterminacy in the concept of 'money' that makes it difficult to reject the direct challenge on conceptual grounds, even if the answer is (still) fairly clear on empirical grounds.¹⁶⁷ We expand on this theme in Section 2.3, below.

163. TANGEM, <https://tangem.com> (last visited Nov. 4, 2018).

164. See Kevin Helms, *Bitcoin Smart Banknotes Launched in Singapore*, BITCOIN NEWS (May 4, 2018), <https://news.bitcoin.com/bitcoin-smart-banknotes/>.

165. See JP Buntinx, *Tangem Brings Physical Bitcoin Banknotes to Singapore*, NULLTX (May 7, 2018), <https://nulltx.com/tangem-brings-physical-bitcoin-banknotes-to-singapore/>.

166. See *id.*

167. See Ingham, *supra* note 159.

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Without begging questions, in our view the concept of money must look at a token's legal status and economic functions, which traditionally include (i) a commonly accepted medium of exchange, (ii) a unit of account, (iii) a store of value and standard of deferred value and (iv) a means of payment.¹⁶⁸ Of these, functioning as a medium of exchange and means of payment seem to us to be the most important for the purposes of our discussion.¹⁶⁹ Indeed, 'money' and 'payment systems' are conceptually connected; money seems to be something that emerges from a payment system, whether that is a payment system that uses physical tokens (e.g. currency) or other representations of value (e.g. account based payment systems). Thus, while we think it is clear on empirical grounds that neither Bitcoin nor any other VC has (yet) acquired money status, the conceptual back door remains open to changes in the operation of the VC market.

B. VCS AS A VECTOR OF FINANCIAL CONTAGION

Whether considered as money-like or as security-like, a VC may pose a risk of contagion in the 'real world' financial system by spreading liquidity problems into the latter. The risk of financial contagion follows on from our border metaphor; as ECB Vice-President Yves Mersch said in a recent interview, 'bridges' between the virtual world and the real world can be a vector for contagion.¹⁷⁰ A collapse in the virtual world can drain liquidity from real world financial institutions, which could become a concern for central banks as the system's lenders of last resort.¹⁷¹

In our view, contagion is most likely to spread through (i) growth of the *VC-based payments system* to systemically relevant proportions, or (ii) exposure to *VC assets* whose volatility could spread liquidity problems to the regulated sector.¹⁷² Though the literature on contagion is rather extensive, and a lot has been published in the context of the 2008 crisis and its aftermath,¹⁷³ not much has been written to date about the risk of contagion

168. See Arthur Nussbaum, *Basic Monetary Conceptions in Law*, 35 MICH. L. REV. 865, 866-67 (1937); see also ROSA M. LASTRA, *INTERNATIONAL FINANCIAL AND MONETARY LAW*, 12-3, OXFORD UNIV. PRESS (2d ed. 2015).

169. See Nussbaum, *supra* note 168, at 868; see also LASTRA, *supra* note 168, at 12-3.

170. See Yves Mersch, Member of the Exec. Bd. of the ECB, *Virtual Or Virtueless? The Evolution Of Money In The Digital Age*, Official Monetary and Financial Institutions Forum (Feb. 8, 2018).

171. See *id.*

172. See *id.*

173. See European Central Bank, *Financial Stability Review*, at 134, Dec. 2009, <https://www.ecb.europa.eu/pub/pdf/other/financialstabilityreview200912en.pdf>; see Jaen-Claude Trichet, President of the European Central Bank, *Clare Distinguished Lecture in Economics and Public Policy: Systemic Risk* (Dec. 10, 2009); see John B. Taylor, Senior Fellow at the Hoover Institution, Stanford University, *Dinner Keynote Speech at the Conference on Financial Innovation and Crises*, Federal Reserve Bank of Atlanta: *Systemic Risk and the Role of Government* (May 12, 2009); see Anna Gelpern, *Financial Crisis Containment*, 41 CONN. L. REV. 1051 (2009); see Erik F. Gerding, *Code, Crash, and Open Source: The Outsourcing of Financial Regulation to Risk Models and the Global Financial Crisis*, 84 WASH. L. REV. 127 (2009); Amir E. Khandani, Andrew W. Lo & Robert C. Merton, *Systemic Risk and the Refinancing Ratchet Effect* (Harvard Business

of VCs.¹⁷⁴ Any risk can grow to systemic proportions when its negative impact extends beyond an individual institution, affecting or threatening to affect other institutions, potentially creating a disruption in the monetary system and associated problems in the real economy.¹⁷⁵ The most important developments to watch, therefore, are (i) the size of the VC payments system and (ii) the degree of entanglement between the VC payments system and existing economies.

1. *Contagion from the Shadow Payments System*

It can be argued that there are three kinds of payment systems currently in operation: (i) currency (banknotes representing central bank liabilities, with legal tender status), (ii) deposit account transfer systems (e.g. check and giro payment systems by which commercial bank liabilities are transferred from one ledger to another), and (iii) note transfer systems (e.g. written debt instruments issued by commercial banks without legal tender status).¹⁷⁶ As Rogers correctly argues, e-money should probably be regarded as a modern form of (iii) rather than as something categorically novel.¹⁷⁷

If VCs do not (yet) pose a direct threat to the primacy of traditional money, but if regulators are unwilling (or unable) to ban VCs in the European payments ecosystem altogether, they will continue to function as payment systems (albeit not very good ones, or ones that make crime, financial crime, and tax evasion more difficult to investigate and prosecute).¹⁷⁸ The default choice, then, is for VCs to form part of a more complex payments system in which VCs compete with traditional money. The question then becomes one of the terms on which private VCs should be allowed to exist and operate.

Awrey and van Zwieten draw attention to the fact that every payments system has both a liquidity function and a storage function.¹⁷⁹ Failures in both can cause problems for the wider financial system and for the real economy.¹⁸⁰ Systemic risk is heightened by the possibility that VC-based payment providers bundle their payments services with other financial services, in particular, by operating a kind of fractional reserve policy to create a supply of money-like payment instruments on the basis of a reserve

School, Working Paper 10–023, 2009); See Steven L. Schwarcz, Systemic Risk, 97 GEO. L.J. 193 (2008); see Adriano Lucatelli, *Finance and World Order: Financial Fragility, Systemic Risk and Transnational Regimes* 70-3, (Westport Connecticut: Greenwood Press 1997).

174. For a recent analysis on systemic implications, see Saule T. Omarova, *New Tech v. New Deal: FinTech as a Systemic Phenomenon* (Cornell Law School Research Paper No. 18-39, 2018).

175. See Saule T. Omarova, *New Tech v. New Deal: Fintech as a Systemic Phenomenon*, 36 YALE J. ON REG. (forthcoming 2019).

176. See James Steven Rogers, *The New Old Law of Electronic Money*, 58 SMU L. REV. 1253, 1254 (2005).

177. *Id.*

178. See Dan Awrey & Kristin van Zwieten, *The Shadow Payment System*, 43 J. CORP. L. 775, 779 (2018).

179. *Id.* at 778.

180. See *id.* at 805.

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of VC assets that are not even guaranteed by the technical limitations on the VC itself.¹⁸¹ The conventional tools for regulating payment service providers—portfolio restrictions, private third-party insurance, the mandatory outsourcing of storage functions to regulated entities (i.e. commercial banks), and the use of fiduciary ring-fencing mechanisms—are all directed towards problems with the storage function.¹⁸² These tools do not, however, address systemic liquidity risks.¹⁸³

Although unregulated activities performed by unregulated entities are theoretically insulated from the regulated financial system, the VC economy is not wholly self-contained. A 2017 study of VCs found that two-thirds of payments in 2016 were from fiat to VC; fiat to fiat payments via VC accounted for twenty-seven percent of payments, and VC to VC payments only accounted for six percent.¹⁸⁴ The apparent diversity in the VC market is also partly illusory.¹⁸⁵ Bitcoin plays a foundational role, as does Ether.¹⁸⁶ Many VCs are only purchasable in Bitcoin or Ether, and VCs running on the Ethereum platform require Ether to run.¹⁸⁷ The price of other VCs is, accordingly, not insensitive to price of these two VCs.¹⁸⁸ Thus, while the VC economy has grown at a startling pace and shows signs of further growth,¹⁸⁹ it is difficult to cash out (especially if there were a crisis, e.g. precipitated by unfavorable regulation or discovery of security problems).

Awrey and van Zwieten therefore suggest a separation of storage and liquidity functions.¹⁹⁰ The VC “shadow payment[s] system represents a new frontier in institutional design and regulation,” which may require more hands-on regulatory intervention.¹⁹¹ Matters cannot be left to private contractual agreement and/or industry self-regulation, they argue, because of some structural features of the VC market, in particular because many early VC payments services providers: (i) are unknown, or lack well developed corporate personality, capacity, and governance systems, and (ii) are techno-libertarian in outlook, and possibly run by actors convinced that they are operating in a space that is (and should remain) free of national (or

181. *See id.*

182. *Id.* at 808.

183. *Id.*

184. GARRICK HILEMAN & MICHEL RAUCHS, GLOBAL CRYPTOCURRENCY BENCHMARKING STUDY 10 (2017).

185. *See id.* at 34.

186. *Id.*

187. So-called “gas” is a measurement of the computational processing power needed to perform an action on the Ethereum platform, but there is no token for “gas,” so units of gas are paid in units of Ether. *See, e.g.*, Jeff Coleman, Comment to *Ethereum Stack Exchange*, STACK EXCHANGE, (Jan. 20, 2016, 5:51 PM), <https://ethereum.stackexchange.com/questions/3/what-is-meant-by-the-term-gas>.

188. *See* HILEMAN & RAUCHS, *supra* note 184, at 18.

189. *See id.* at 5.

190. Awrey & van Zwieten, *supra* note 178, at 808.

191. *Id.*

supra-national) regulation.¹⁹² This may change as more conventional players enter the space, but in the meantime even up-to-date payments regulations, such as the Second Payments Services Directive (EU) 2015/2366,¹⁹³ which gives wide latitude to the industry to design institutional features and minimizes systemic risks, may not be appropriate to the VC payments industry.

2. *Contagion from Risky Digital Assets*

The risk of contagion also rests on the possibility that regulated entities have assumed positions that expose them to VC price fluctuations either by: (i) purchasing assets themselves, (ii) lending to investors who have purchased VC assets, or (iii) structuring regulated products such as derivatives on the basis of an underlying VC asset.¹⁹⁴ The basis of the risk of contagion is the well-known and extraordinary volatility of the price of VC tokens.¹⁹⁵ For example, the first quarter of 2018 saw VC tokens lose value almost across the board; Bitcoin, in particular, fell from record heights in late 2017 from almost \$20,000 US dollars to their value at the time of writing of around \$7,000 US dollars.¹⁹⁶

The conventional approach is to regulate systemically important entities, provide publicly supported protections for activities within the regulated space, and allow unregulated entities to fail.¹⁹⁷ But the border is porous, and so this strategy is not always straightforward.

At present, mainstream financial institutions in Europe have been rightly cautious about exposing themselves to the VC market.¹⁹⁸ But the boundary between the protected and unprotected parts of a payment system, and the existence of greater regulatory constraints on the protected part, incentivizes a cycle of flows into the unregulated part of the system during expansions.¹⁹⁹ In order to pursue business opportunities, those in the regulated sector will seek to open up connected operations in the non-regulated sector to catch opportunities there. Conversely, in times of crisis, we expect flows out of the unregulated sector, which could cause significant liquidity problems for entities operating in that space. To date, VC-based payment companies have

192. *Id.* at 808-09.

193. Directive 2015/2366 of the European Parliament and of the Council of 25 November 2015 on Payment Services in the Internal Market, amending Directives 2002/65/EC, 2009/110/EC and 2013/36/EU and Regulation (EU) No 1093/2010, and Repealing Directive 2007/64/EC, 2015 O.J. (L 337) 35.

194. See Yves Mersch, *Virtual or Virtueless? The Evolution of Money in the Digital Age*, EUROPEAN CENTRAL BANK (Feb. 8, 2018), <https://www.ecb.europa.eu/press/key/date/2018/html/ecb.sp180208.en.html>.

195. *Id.*

196. Matthew J. Belvedere, *Bitcoin Bull Tom Lee Wants Wall Street to Know He Didn't Cut His Year-End Forecast*, CNBC (last updated Jul. 6, 2018, 8:31 AM), <https://www.cnbc.com/2018/07/05/fundstrats-tom-lee-cuts-his-year-end-bitcoin-forecast-to-20000.html>.

197. See Awrey & van Zwieten, *supra* note 178, at 795-96.

198. See Mersch, *supra* note 194.

199. See *id.*

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experienced difficulty in establishing and maintaining relationships with conventional banks and payment networks.²⁰⁰ Given the record profits that have been made in VC speculation, however, this position is susceptible to change. Recently, Barclays UK established a banking relationship with a major US-based VC exchange, Coinbase.²⁰¹ This will make it easier for UK-based individuals and firms to purchase VCs with GBP directly.²⁰² One analyst has been quoted to the effect that there is “a wall of institutional money just waiting for the right conditions . . . to enter the market.”²⁰³

VC-based derivatives, in particular, seem to be a beachhead for forays by regulated entities into the VC space. Structuring products such as derivatives could cause a regulated entity to become exposed based on underlying asset; investors and their lenders could also be exposed if they leverage their acquisition of VC assets.

The EBA has recommended that national authorities “discourage credit institutions, payment institutions and e-money institutions from buying, holding, or selling VCs.”²⁰⁴ The EBA’s seminal 2014 Opinion sketched out a full suite of regulations for VCs (based on the VC market at the time).²⁰⁵ The Opinion evaluated such a full suite as too expensive proportionate to the risk then posed by VCs, and suggested an approach of containment and active monitoring by default.²⁰⁶ As the VC payments sector grows, it will demand regulation—especially as (i) more retail customers are exposed to VC assets, (ii) more conventional financial institutions are exposed to VC assets, and (iii) the number of de facto intermediaries (such as wallet and exchange providers) grows.

In our view, it is essential that regulators within the Eurosystem take proactive steps to ensure that the VC-based shadow payment system is not allowed to grow to a size, or to a degree of entanglement with conventional payment networks, such that it could pose a credible risk of contagion. One question in this regard is whether the Eurosystem should focus on protecting the system *from* VCs, or whether it also has to play a role in protecting users’ interests *within* the VC economy.²⁰⁷ The more retail investors become exposed in the VC market, and the more this exposure

200. See Tommy Wilkes & Emma Rumney, *Bitcoin Exchange Reaches Deal With Barclays for UK Transactions*, REUTERS (Mar. 14, 2018, 11:58 AM), <https://www.reuters.com/article/us-crypto-currencies-barclays/bitcoin-exchange-reaches-deal-with-barclays-for-uk-transactions-idUSKC N1GQ2JD>.

201. *Id.*

202. *Id.*

203. Philip Stafford & Hannah Murphy, *London Remains Wary of Jumping on Crypto Bandwagon*, FIN. TIMES (May 25, 2018), <https://www.ft.com/content/391d15ae-5f47-11e8-9334-2218e7146b04>.

204. EUROPEAN BANKING AUTHORITY, EBA OPINION ON ‘VIRTUAL CURRENCIES’ 5-6 (2014).

205. *See id.* at 39-44.

206. *See id.* at 5.

207. See PHILIPP HACKER, CORPORATE GOVERNANCE FOR COMPLEX CRYPTOCURRENCIES? A FRAMEWORK FOR STABILITY AND DECISION MAKING IN BLOCKCHAIN-BASED ORGANIZATIONS 5 (2017).

could affect their real-world position (e.g. their ability to repay a mortgage or save for retirement), the more important it would seem.²⁰⁸

C. CONCEPTUAL CHALLENGES RAISED BY VCS

Perhaps the main challenge in regulating any new technologically-mediated financial practice is to bring it within the legal system's existing categories. Once an adequate picture of a VC's technical and economic features has formed, it is necessary to classify the VC token as a legal object.²⁰⁹ Once it has been classified as a legal object, it must be determined which type of legal object it is.²¹⁰ Often, the only approach (in advance of legislative initiative) is to do one's best to include the new artefacts and practices within the current definitions through analogical application.²¹¹ Generally, this standard mode of legal development is adequate. The approach can, however, be exhausted before a satisfactory regulatory framework has been achieved,²¹² and we perceive this risk to be particularly high in the context of VCs.

1. *The Problem of Res Digitales*

As mentioned earlier, before VC tokens can be characterized as anything else, they need to be characterized as objects of property rights.²¹³ Recent commentators in French law, for example, have labelled bitcoins as '*objets juridiques non identifiés*'.²¹⁴ This is an accurate interim assessment, but is not a stable long-term position for any legal system. If VC tokens could not be legally the object of property rights at all, there would be an unacceptable divergence between the legal system and economic expectations.²¹⁵

Every legal system somehow accommodates VC tokens, but the method of accommodation differs from jurisdiction to jurisdiction, and this opens up room for regulatory divergence.²¹⁶ For example, legal systems based on a certain reading of the Gaiian Institutes define 'things' capable of ownership as tangible objects only.²¹⁷ This has traditionally raised problems such as the

208. *See id.* at 18.

209. *See* J.G. Allen, *Property in Digital Coins*, EUR. PROP. L. J. (forthcoming 2019).

210. *See id.*

211. *See, e.g.*, Frank H. Easterbrook, *Cyberspace and the Law of the Horse*, 1996 U. CHI. LEGAL F. 207, 207 (1996).

212. *See id.* at 208.

213. *See* Allen, *supra* note 209, at 6.

214. Myriam Roussille, *Le Bitcoin: Objet Juridique Non Identifié*, 159 BANQUE & DROIT 27 (2015).

215. *See* Shawn Bayern, 'Dynamic Common Law and Technological Change: The Classification of Bitcoin' (2014) *Bitcoin*, 71 WASH. & LEE. REV. ONLINE 22, 34 (2014).

216. *See Is Bitcoin Legal?*, NEWS BTC (Mar. 29, 2018), <https://www.newsbtc.com/is-bitcoin-legal/>.

217. *See* George L. Gretton, *Ownership and its Objects*, 71 THE RABEL J. COMP. AND INT'L PRIV. L. 802, 821 (2007) (Ger). Legal systems that follow this Pandectist reading include Germany, Japan, and Poland.

characterization of company shares or electricity for the purposes of property law. There are solutions to these problems, but the systemic cost of those solutions is often ignored. In any case, VC tokens present a potentially hard case. Japanese law, for example, has been applied to deny that bitcoins are capable of being owned in Japanese law, which has had implications for a multi-billion-dollar insolvency proceeding over a major VC exchange.²¹⁸ Similar issues could potentially arise in Europe, which could make the European insolvency landscape more complex and create incentives for forum shopping.

Whether they are considered to be money and/or securities, VC tokens are a class of digital, immaterial objects whose existence and growing economic importance brings some conceptual problems in the structure of European legal systems into relief. We might call them *res digitales* in contrast to the traditional civilian categories of *res corporales* and *res incorporales*.²¹⁹ Despite their economic importance, immaterial objects are not well accounted for in the property law of any European legal system.²²⁰ We have not yet had a European-level discourse on the categorization of immaterial objects, and in many jurisdictions there is not even a linguistic framework for describing and categorizing them for internal purposes.²²¹ In our view, it should be a priority for NCBs and the ECB to encourage the rational treatment of VC tokens in European legal systems, as this could provide a stumbling block to the effective regulation of VCs in Europe.

2. *VCS as Money*

The traditional neglect of immaterial objects has contributed to the fact that modern legal definitions of money have generally focused on banknotes' and coins' physical properties for the purposes of legal categorization.²²² VCs do not, therefore, raise entirely novel problems;²²³ also problematic is the conceptual position of book money, i.e. the commercial bank liabilities that form the bulk of the broad money supply. The economic significance of book money makes it necessary for monetary law to explain how bilateral obligations can come to circulate as a medium of payment. The problem is merely sharpened in the context of VCs schemes like Bitcoin, in which the tokens are not the obligation of anyone at the time of emission.²²⁴

Thus, the next conceptual problem is encountered when asking 'Is a bitcoin (or any other VC token) a unit of "money" or a security?'

218. See *Japan Court Rules Against Bitcoin Compensation Plea*, BBC NEWS SERVICES (Aug. 7, 2015), <https://www.bbc.com/news/technology-33816664>.

219. See PRZEMYSŁAW PALKA, *VIRTUAL PROPERTY: TOWARDS A GENERAL THEORY* 154 (2017).

220. See Rogers, *supra* note 176, at 1253.

221. Christian von Bar, *Gemeineuropäisches Sachenrecht Band I* (Beck 2015), 311, 314-315.

222. See Rogers, *supra* note 176, at 1254.

223. See *id.*

224. See MARCIN SZCZEPANSKI, *BITCOIN: MARKET, ECONOMICS AND REGULATION* 4 (European Parliamentary Research Serv. 2014).

Categorization entails important consequences: the ‘transfer’ of a VC token on a blockchain from one public key to another public key will have different tax implications, for example, depending on whether it is treated as a unit of currency or as a security; likewise, VC schemes are subject to securities regulations, such as prospectus disclosure, if they are categorized as securities.²²⁵ Just as importantly, the distribution of oversight competences within the Eurosystem and within the national regulatory systems of Member States is determined according to these definitions.²²⁶

As we described above, much of the early regulatory response to VCs has been to bring ICOs under the legal regimes applicable to the issue of securities.²²⁷ Given our judgment that many VCs currently function as securities, this is an appropriate response. But securities regulations are not sufficient on their own; what we have called utility tokens, for example, are not securities in the traditional sense, and the SEC has recently announced the view that the two most important VC tokens, bitcoins and ethers, are more in the nature of digital commodities than securities.²²⁸ Further, there are issues with securities law itself, and we discuss a few complications in the European securities law context below. In addition, we have seen that certain authorities, including the CJEU, have deemed certain VCs to be more akin to currencies, and that some national regulators have given credence to VCs’ payment function, which renders them at least money-like.²²⁹

In general, we recommend that regulators take a functional approach rather than conducting only formal analyses,²³⁰ not least because such a functional approach allows regulators working in divergent national legal systems to aim towards a more consistent European approach. Such a functional approach should, in our view, be followed up with a conceptual analysis of the basic categories, at least when those categories begin to diverge from the social and technological context they purport to describe and which they are designed to regulate.

a. Differing Conceptions of Money

Whether one wishes to argue that a given VC token is or is not a unit of money, it is necessary to define the term. But lawyers and economists have

225. See Alina Vardanian, *Is Bitcoin a Currency, a Security, or a Commodity?*, CINDX (Jul. 4, 2018), <https://medium.com/cindx/is-bitcoin-a-currency-a-security-or-a-commodity-its-all-of-these-74b0b962e6d1>.

226. See EUROPEAN CENTRAL BANK, EUROSYSTEM OVERSIGHT POLICY FRAMEWORK 1 (2016).

227. See WULF A. KAAL, INITIAL COIN OFFERINGS: THE TOP 25 JURISDICTIONS AND THEIR COMPARATIVE REGULATORY RESPONSES 10 (2018).

228. Anna Irrera, *U.S. SEC Official Says Ether Not a Security, Price Surges*, REUTERS (Jun. 14, 2018, 3:09 PM), <https://www.reuters.com/article/cryptocurrencies-ether/us-sec-official-says-ether-not-a-security-price-surges-idUSL1N1TG1TF>.

229. See Hamza Ali, *Italy Crypto Traders Still Need Tax Answers*, BLOOMBERG (Sep. 4, 2018), <https://www.bna.com/italy-crypto-traders-n73014482247/>.

230. See Bayern, *supra* note 215, at 33-34.

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traditionally approached money from different starting points. Lawyers conventionally look to whether a medium of exchange is legal tender in the jurisdiction, i.e. whether subjects are required to accept it as final payment for debts ('means of payment').²³¹ This definition is accepted to be narrower than economic definitions of money, but lawyers' concerns are narrower, and have traditionally centered on the procedural question of what counts as a final settlement of legal obligations.²³²

Economists, on the other hand, have generally taken a broader approach, taking also into account the process of money creation via the banking system and the recognition of bank deposits as the largest part of money supply (so-called 'M1').²³³ The functional approach makes it possible to see money-ness as more of a spectrum than a binary property, and to accept various forms of money operating side by side in an economic system (e.g. cash and book money).²³⁴ Empirically, much of what fits the economic definition of money is created by private commercial banks. The empirical circle is usually squared with the principle of states' monetary sovereignty by pointing to the hierarchical relationship between different forms of money implicit in the practice of fractional reserve banking and central banks' ultimate control over the money supply and lender of last resort role.²³⁵

In our view, an integrated legal and economic definition is desirable. In the first instance, the strict legal approach must give way to the reality that payment systems change over time, that currency is less important as a medium of exchange than it was in the past, and that the bulk of the money supply exists only as demand deposits on commercial bank ledgers.²³⁶ If cash were to disappear from a country's payment system, that society would not suddenly become moneyless;²³⁷ any definition of money committed to this conclusion is, in our view, unsustainable. As Charles Proctor rightly notes, "as the available means of payment multiply, the meaning of 'money' must broaden."²³⁸ As such, legal definitions are beginning to move towards a more functional approach, as well. In parallel to this development, the function of money as a store of value was increasingly recognized by lawyers and economists as one of its key foundations in the latter part of the

231. See e.g. F.A. MANN, *THE LEGAL ASPECT OF MONEY* 5 (Oxford University Press, 5th ed., 1992).

232. See *id.*

233. See Arthur Nussbaum, *Basic Monetary Conceptions in Law*, 35 MICH. L. REV. 865, 867-68 (1937).

234. See Bayern, *supra* note 215, at 33-34.

235. See Stephanie Bell, *The Role of the State and the Hierarchy of Money*, 25 CAMBRIDGE J. ECON. 149, 159-60 (2001).

236. See Henry Sidgwick, *What is Money?*, THE FORTNIGHTLY REVIEW, Jan.-June 1879, at 563, 566.

237. See Karl Olivecrona, *THE PROBLEM OF THE MONETARY UNIT* 136-38 (The MacMillan Company ed., 1957).

238. CHARLES PROCTOR, *MANN ON THE LEGAL ASPECT OF MONEY* 9 (Oxford University Press, 6th ed., 2005). See also Simon Gleeson, *The Legal Concept of Money* (Oxford University Press, 2018).

twentieth century, leading to the widespread adoption of laws that gave primacy to the price stability mandate of independent central banks.²³⁹

The contribution from law to economics, on the other hand, is in part to explain how the thing used as the money-token exists and behaves as an object of legal commerce (see section 2.3.1, above). This is straightforward in the case of cash, which has a physical manifestation; it has become increasingly tricky as money has dematerialized over the past century with the use of information communications technology in payment systems—first the introduction of the telegraph, then computerized recordkeeping, then the Internet, and now DLT.²⁴⁰

Rather than taking a dogmatic approach to VCs' money status, we think it is preferable to ask how VCs fit into (and/or change) the existing payment ecosystem. The three types of payment system (currency, bank accounts, and bank notes) are used to create both narrow money (i.e. currency and electronic central bank liabilities), generally created by public central banks, and broad money (i.e. bank liabilities), the preponderance of which is created by private commercial banks. The question thus becomes whether any given VC should be considered part of the broad money supply, or whether it should be kept insulated from even the economic definition of money despite its use as a money-like instrument in a payment system.

Finally, it bears noting an obvious but often-neglected fact: the currency we now use takes the form of bearer securities.²⁴¹ Fundamentally, therefore, it seems to us that something can be a security and be money at the same time; some securities (but not others) circulate as a medium of exchange in a payment system, just as some tangible commodities (but not others) circulate as a medium of exchange, and those that so circulate seem to acquire money status in a commodity money system.

239. Antonio Sainz de Vicuña, for example, advocates an 'institutional theory of money', in which money is not limited to 'cash', but encompasses a dematerialized concept (called 'scriptural money', which includes demand deposits with credit institutions). This is based on the small proportion of money physically represented in banknotes and coins, as compared with the generalized use of the banking system for holding money and for payments. The wide acceptance and use by society of scriptural money is based on an institutional framework of two pillars: (i) an independent central bank that ensures the stability of the purchasing capacity of money and its sound use as means of payment, and (ii) a legislative framework that supports such independence, the solvency and liquidity of credit institutions, and the reliability of scriptural money as means of payment. See Antonio Sainz de Vicuña, 'An Institutional Theory of Money' in M. Giovanoli and D. Devos (eds), *International Monetary and Financial Law: The Global Crisis* (2010) 517. Antonio Sainz de Vicuña, 'The Concept of Money in the XX1st Century,' in a paper presented at the MOCOMILA meeting in Tokyo on 1 April 2004 stated: 'A currency is trusted by society and markets, when there is an institutional framework that ensures preservation of purchasing capacity, i.e. price stability. Money is then defined as the dematerialized "commodity" produced and managed by central banks that serves the function of store of value.'

240. See DOUGLAS ARNER, JANOS BARBERIS & ROSS BUCKLEY, *THE EVOLUTION OF FINTECH: A NEW POST-CRISIS PARADIGM?* (U. New South Wales L. Res. Series, 2016).

241. See *Scottish and Northern Ireland Banknotes*, BANK OF ENG. (Oct. 2, 2018), <https://www.bankofengland.co.uk/banknotes/scottish-and-northern-ireland-banknotes>.

b. The Abandoned Middle Ground

We have already noted the divergence between legal and economic approaches to the definition of money. But economic conceptions themselves of money are not homogeneous. Theories generally fall into two broad strands. Broadly stated, orthodox or commodity theories of money stress (i) the historical use of commodities (paradigmatically precious metal) as the token of the monetary unit and (ii) the bottom up creation of money systems by economic agents use of a commodity to ease the burdens of barter exchange.²⁴² Heterodox or credit theories of money, on the other hand, stress: (i) the importance of legislative fiat giving tokens (whether metal, paper, or digital) the status of money and (ii) top down creation of money within constituted politico-legal order, for example by the state's decree that certain tokens and not others are legal tender for all payment of all debts, including tax payments to the state.²⁴³ In these theories, the guarantee that a token can be used to pay one's obligations to the state gives money a stable value because we all owe obligations to the state.²⁴⁴

Commodity theories are conceptually sophisticated but tend to proceed from abstract assumptions about the nature of economic transactions that are not always empirically robust. They lend themselves well to mathematical modeling but are criticized by credit theorists as being falsified by the historical, anthropological, and sociological evidence.²⁴⁵ Credit theories have the virtue of being generally better supported by extrinsic evidence and are generally more attractive to lawyers as they stress role of law and constituted political authority in the creation of money. Indeed, the commodity theory does not provide the best explanation of the money system we actually have, in which paper tokens and electronic records of no intrinsic value are given money status by legislative fiat; our system is probably better explained by credit theories of money that emphasize the role of the state.

Current efforts to theorize the place of VCs in the monetary landscape are confounded by the path-dependency of these established schools of thought. As Goodhart observes, the theory about optimal currency areas (such as the Eurozone) is based on orthodox commodity theories, in particular the notion that optimal currency areas are formed by the needs and efficient preferences of market participants.²⁴⁶ The Eurosystem, however, rather shows that currency integration is often a matter of top-down political will rather than spontaneous market convergence, and strong populist objection to euro bolsters the notion that it is a top-down rather than bottom-up

242. See Kian Lua, *ESSAYS IN MONETARY THEORY AND POLICY: ON THE NATURE OF MONEY* (4) (New Economic Perspectives, posted on Dec. 24, 2013), <http://neweconomicperspectives.org/2013/12/essays-monetary-theory-policy-nature-money-3-2.html>.

243. See *id.*

244. See *id.*

245. See *id.*

246. See Charles A.E. Goodhart, *The Two Concepts of Money: Implications for the Analysis of Optimal Currency Areas*, 14 *EUR. J. POL. ECON.* 407, 407 (1998).

phenomenon.²⁴⁷ On the other hand, state-centric credit theories of money leave us with little to say about the tokens that circulate within a private payment network such as a VC scheme.

In effect, there is a kind of lost theoretical middle ground, namely private credit theories of money. Theorists committed to the idea that communities can create money through their own choice and action have too often tied themselves to a commodity theory of money that does not explain the use of tokens with no intrinsic value; theorists committed to the idea that worthless tokens can be endowed with value by a community and circulate as ‘real’ money have too often tied themselves to a state-centric view that excludes the possibility of private fiat currencies. In consequence, many VC advocates tend to position VC tokens as ‘commodities’ with some kind of intrinsic value in virtue of their algorithmically-determined scarcity.²⁴⁸ But that generally misses the point that even commodities only become money when they are given that status (whether through custom or legislative fiat), in virtue of which they acquire an exchange value separate to their use-value. As Karl Elster correctly observed a century ago, “money is created in the same instant in which the good ends its conceptual existence.”²⁴⁹

In our view, VCs make it necessary to ask why, if payment systems give rise to money, private payment systems do not give rise to private money (or at least something money-like)?²⁵⁰ The answer to this question will require some concessions from the perspective of either camp.

c. Monetary Competition

Despite these fundamental disagreements, it is fair to say that, from an economic perspective, various forms of money coexist in a hierarchy in our monetary system as presently constituted, in which a central bank is generally accepted to sit at the apex.²⁵¹ This has been the case since the political settlement between private money creation and public authority in the 17th century, leading to the creation of the Bank of England—a model which has since been exported to many other jurisdictions.²⁵² Commodity theorists and credit theorists explain this fact in different ways and evaluate it differently. In particular, some commodity theorists disapprove of central

247. *See id.* at 417.

248. This position has potentially been bolstered by the recent SEC ruling that bitcoins and ethers are not securities, and are more like commodities, under US law: *see* <https://www.reuters.com/article/cryptocurrencies-ether/us-sec-official-says-ether-not-a-security-price-surges-idUSL1N1TG1TF>. *See* Irrera, *supra* note 228.

249. KARL ELSTER, „KAUFKRAFT“ UND „GELTUNG“ DES GELDES, 115 JAHRBÜCHER FÜR NATIONALÖKONOMIE UND STATISTIK 243, 247 (1920) (Ger).

250. *See* S.P. ALTMANN, ZUR DEUTSCHEN GELDLEHRE DES XIX JAHRHUNDERTS’, DIE ENTWICKLUNG DES DEUTSCHEN VOLKSWIRTSCHAFTSLEHRE IM XIX JAHRHUNDERT, FESTGABE FÜR SCHMOLLER 33 (Leipzig 1908) (Ger.), *translated in* HOWARD SYLVESTER ELLIS, GERMAN MONETARY THEORY 1905—1933 25 (Harvard University Press, 1936).

251. *See* Bell, *supra* note 235, at 159-60.

252. *See generally*, CHRISTINE DESAN, MAKING MONEY: COIN, CURRENCY, AND THE COMING OF CAPITALISM Chap. 1 (Oxford University Press, 2015).

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banks' position at the top of the hierarchy and advocate a form of monetary competition.²⁵³ These ideas have also found purchase among VC advocates who see the entry of VCs into the payments (and possibly monetary) system as an opportunity to force competition even against the political power that bolsters central banks' position at the top of the hierarchy.²⁵⁴ Thus, VCs potentially break in through the conceptual back door noticed earlier.

The first point to make is that the state monopoly over money creation is weaker than some textbook accounts suggest. As stated above, the vast majority of the broad money supply is created by private commercial banks taking deposits and/or making loans; broad money's link to public authority is through commercial banks' holding of fractional reserves of central bank money (cash and central bank accounts) and the central bank's role as lender of last resort to commercial banks in crisis. (Again, on some strict legal definitions, this broad money is not 'money' at all—but, as we have discussed above, such a definition is hardly practical and is increasingly difficult to defend.) The replacement of cash as the main medium of payment increases this trend.

Hayek's theory of the denationalization of money and free competition between private issuers of money is particularly important to understanding the potential impact of VCs (and the ambitions of many VC innovators).²⁵⁵ Hayek advocated the free choice in currency, opening up the provision of currency to competition from both the private sector and from foreign issuers of currency.²⁵⁶ According to Hayek, the value of the currencies could be related to a rule (different from a monetary base) such as convertibility to a basket of commodities.²⁵⁷ In a system of free banking, there would be no need for a central pool of reserves, as an individual commercial bank would

253. See LAWRENCE H. WHITE, *COMPETING MONEY SUPPLIES* <http://www.econlib.org/library/Enc/CompetingMoneySupplies.html> (last visited Jan 27, 2019).

254. See JESUS FERNANDEZ-VILLAVARDE & DANIEL SANCHES, *CAN CURRENCY COMPETITION WORK?* 42 (2018).

255. Hayek prefaces his essay at page 13 with the observation that it is 'hopeless' to search for a politically feasible solution to 'what is technically the simplest problem, namely to stop inflation.' See F.A. HAYEK, *DENATIONALISATION OF MONEY—THE ARGUMENT REFINED* 13 (The Institute of Economic Affairs, 3rd ed. 1990).

256. See *id.* at 85.

257. Hayek's proposals were clearly defined in *Denationalisation of Money* in 1976. See F.A. HAYEK, *DENATIONALISATION OF MONEY* (The Institute of Economic Affairs 1976). Though his concern about this subject goes back to 1937. See F.A. HAYEK, *MONETARY NATIONALISM AND INTERNATIONAL STABILITY* (The Graduate Institute of International Studies, 1937). Or, even before, as one of his students at the London School of Economics, Vera Smith, published in 1936 *The Rationale of Central Banking*. See VERA C. SMITH, *THE RATIONALE OF CENTRAL BANKING AND THE FREE BANKING ALTERNATIVE* (Liberty Press, 1936), paying special attention to the role of note-issuing. Hayek's argument was "refined" (according to his own words in 1978. See F.A. HAYEK, *DENATIONALISATION OF MONEY* (The Institute of Economic Affairs, 2nd ed. 1978), becoming more radical, envisioning private fiat monies; and redefined in 1986 ("Market Standards for Money"), with a more realistic view on the impracticability of some aspects of his proposals, at least in a near future.

keep its own reserves, and be responsible for the convertibility of its own—note and deposit—liabilities.²⁵⁸

The development of VCs, such as Bitcoin, is a modern example of competition in the provision of currency. As discussed earlier, a key motivation for this cryptocurrency is to place the process of money creation beyond the reach of central banks, thus challenging their monopoly of currency issue and providing an alternative (some argue cheaper and more efficient) means of exchange and payment than those offered by banks and card companies.²⁵⁹ As noted, the VC movement is strongly influenced by libertarian ideas about spontaneous private ordering and a skepticism towards state control generally, which translates to skepticism about central bank monetary policy.²⁶⁰ On this view, privately issued VCs should successfully compete with the existing monetary system or at least provide a diverse market of private currencies to which individuals and firms can turn as an alternative.²⁶¹

In this context, is it important to note that central banks' role is currently the subject of a crisis of societal legitimacy, as non-majoritarian institutions

258. The free banking proposals however raise major economic issues and complex problems, in terms of stability, sufficiency and other factors, which exceed the scope of this study. An additional difficulty in assessing the practical success of these theories is the lack of sufficient evidence supporting their arguments. For a comprehensive study of the free banking cases, see KURT SCHULER, *THE WORLD HISTORY OF FREE BANKING: AN OVERVIEW* (Routledge, 1992). However, the often-cited historical experience of Scotland, from 1716 to 1845, widely surveyed by White, was not that stable and successful, according to Goodhart. See Charles A.E. Goodhart, *The Two Concepts of Money: Implications for the Analysis of Optimal Currency Areas*, 14 EUR. J. POL. ECON. 407, 407 (1998). Among other representatives of the new generation of the free banking school, the work by White, Glasner and Selgin has been significant. See L.H. WHITE, *FREE BANKING IN BRITAIN: THEORY, EXPERIENCE AND DEBATE 1800-1845* (The Inst. of Econ. Affairs, 2nd ed. rev. and ext'd, 2008) (1984) (defining 'free banking' as 'the system under which there are no political restrictions on the business of issuing paper currency convertible into full-bodied coin.');

LAWRENCE H. WHITE, *COMPETITION AND CURRENCY: ESSAYS ON FREE BANKING AND MONEY* (New York University Press, 1989); see also GEORGE A. SELGIN, *THE THEORY OF FREE BANKING* (Cato Inst., RDowman & Littlefield, 1988); DAVID GLASNER, *FREE BANKING AND MONETARY REFORM* (Cambridge University Press, 1989).

259. For a currency that is not backed by any central authority, Bitcoin's value lies in people's confidence to use it. But trust is built over time. As reported in the Financial Times of February 26, 2014, following fears of \$400 million theft after Bitcoin's oldest exchange, Mt Gox, went dark, some Bitcoin advocates said that they are building the towers and bridges of tomorrow's finance, and that they put themselves at risk in doing so. See Ruairidh Villar, Sophie Knight & Brett Wolf, *Bitcoin Exchange Mt. Gox Goes Dark in Blow to Virtual Currency*, REUTERS (Feb. 25, 2014, 8:21 PM), <https://www.reuters.com/article/us-mtgox-website/bitcoin-exchange-mt-gox-goes-dark-in-blow-to-virtual-currency-idUSBREA1O07920140226>; see also Wolfgang Münchau, *Our Flawed Financial System is Reflected in Bitcoin*, FINANCIAL TIMES (Mar. 3 2014); John Gapper, *Bitcoin Needs to Grow Out of its Obsessive Adolescence*, FINANCIAL TIMES (Mar. 13, 2014), <https://www.ft.com/content/4407b284-a9d0-11e3-8bd6-00144feab7de>.

260. See Goodhart, *supra* note 258, at 425.

261. See *id.*

in an increasingly populist political environment.²⁶² In Europe, populist resistance to central bank independence is also aligned with anti-European movements.²⁶³ VCs are thus intervening in European politics at a particularly delicate time.

While the idea of monetary competition is a respectable intellectual position, and while there is already a great diversity in the money supply, these private monies still fall within the umbrella of the official monetary system. Mature, if not completely effective, oversight and control is exercised by institutions invested with public authority, including central banks, prudential regulators, and capital markets regulators. The entire volume of broad money is *prima facie* taxable.²⁶⁴ In our view, a proliferation of unsanctioned private currencies antagonistic to this system would be inimical to the Eurosystem and parasitic on the states in which their users reside, to the extent that users attempt to insulate their VC transactions and holdings from regulation and taxation. As noticed earlier, the simplicity of the algorithm behind the computer system at the heart of Bitcoin (a fixed formula to control the supply of Bitcoins) contrasts with the complexity of economic policymaking and human behavior, not to mention the inherent vulnerabilities of Bitcoin and the need to comply with anti-money laundering legislation and other rules governing payments made adopting this new math-based currency.²⁶⁵

3. *VCs as Securities in Harmonized European Law*

The next conceptual problem is that the definition of securities is less straightforward than it appears, especially in the European context where the term is defined differently in different languages, against the background of national legal systems. As Castellano notes, the concept of securities is itself complex, implying aspects of investment, negotiability, and value.²⁶⁶ But different legal systems use different terms (e.g. *valeurs mobilières/titres financiers*, *Wertpapiere*, securities, etc.) to denote this complex concept.²⁶⁷ The definition of each national term is colored not only by the etymology of the term chosen, but also by the unique history and systemic structure of the legal system in question.²⁶⁸ This is especially the case in the Civilian

262. See Charles Goodhart & Rosa Lastra, *Populism and Central Bank Independence*, 29 OPEN ECON. REV. 49, 55 (2018).

263. *Id.* at 51.

264. See Omri Marian, *Are Cryptocurrencies Super Tax Havens?*, 112 MICH. L. REV. FIRST IMPRESSIONS 38, 45 (2013).

265. For a recent discussion of some of the problems associated with Bitcoin, see *inter alia*, John Authers, *Time to Take the Bitcoin Bubble Seriously*, FIN. TIMES (Dec. 11, 2013); John Gapper, *Bitcoin is far more than a Currency for Speculators*, FIN. TIMES (Feb. 5, 2014); Jean-Pierre Landau, *Beware the Mania for Bitcoin, the Tulip for the 21st Century*, FIN. TIMES (Jan. 16, 2014).

266. See G.G. Castellano, *Towards a General Framework for a Common Definition of "Securities"*: *Financial Markets Regulation in Multilingual Contexts*, 17 UNIF. L. REV. 449, 449 (2012).

267. *Id.* at 456.

268. *Id.*

jurisdictions on the Continent, which generally place a high value on axiomatic fundamental principles and the systemic coherence of the codified law.²⁶⁹

Different jurisdictions also take different approaches to the task of definition itself. For example, US law provides an open catalogue of securities, structured around the economic distinction between debt securities and equity securities, which emphasizes securities' nature as negotiable investments.²⁷⁰ The contours of this economic approach have been fleshed out by judicial development of the extensive but non-exhaustive list, for example the well-known *Howey* test.²⁷¹ In the UK, by way of contrast, the Financial Services Act 2000 emphasizes the transferability of securities, in line with the harmonized European approach, and the relevant statutory instruments provide a closed catalogue of securities, which authorized regulatory agencies may amend as needed.²⁷²

In the European context, the Markets in Financial Instruments Directive 2004/39/EC (MiFiD) defines 'transferable securities' as equity securities, debt securities, and a residual category.²⁷³ This has been transposed into national law in various ways, using terms endogenous to the relevant system.²⁷⁴ Although there is a common conceptual core to all definitions of securities, the national terms all denote a different (i.e. narrower or broader) set of financial instruments actually circulating in the market; further, all have a different position within the law of obligations and the law of property of the relevant national legal order. Castellano notes that even harmonized definitions such as those found in MiFiD, the Market Abuse Directive 2003/6/EC, and the Prospectus Directive 2003/71/EC appear susceptible of different interpretations among Member States.²⁷⁵ As such, 'the linguistic and conceptual divergences between national legal systems' are the root of a series of problems that focus attention on the role of legal harmonization and standardization, fostered respectively by EU policymakers and International Organization of Securities Commissions (IOSCO) standard-setters.²⁷⁶

In our view, the majority of VCs are more properly characterized as speculative assets than as currency, and many should be regulated as securities. Further, the application of existing statutory definitions to any given VCs is entirely possible within the canon of interpretation of any given European legal system. But the differences between the definitions themselves, and the differences between national legal systems' canons of interpretation, give rise to the possibility of substantial divergences opening

269. *Id.* at 479.

270. *Id.* at 464-65.

271. *SEC v. W.J. Howey Co.*, 328 U.S. 293 (1946).

272. Castellano, *supra* note 266, at 466.

273. *Id.* at 473.

274. *Id.* at 463, 466-67.

275. *Id.* at 474.

276. *Id.* at 471, 475.

up in the regulation of any given VC token within Europe—even under harmonized securities law. This, in turn, increases the risk of jurisdictional arbitrage and makes the European-level regulation of VCs as cryptoassets even more important.

D. REGULATING A REVOLUTION

The Eurosystem is effectively called upon to regulate a revolution in the design and delivery of financial services.²⁷⁷ This is not confined to VCs, but VCs are representative of many of the regulatory challenges raised by Fintech.²⁷⁸ In our view, this raises a number of challenges for NCBs, the ECB, and other regulatory bodies. In this section, we discuss (i) the need to define regulatory tasks clearly within the multilateral Eurosystem, (ii) the need to address VCs potential for facilitating financial crime and tax evasion, and (iii) the need to assess the scope for regulatory technology in addressing the risks posed by VCs and other financial technology innovations by market participants.

1. *Defining Regulatory Tasks*

Perhaps one of the major difficulties facing the Eurosystem in the context of VCs is the definition of regulatory tasks. ECB President Draghi took the position (in the Q&A session of the last meeting of the Committee Economic and Monetary Affairs) that it is not part of the ECB's role to regulate VCs such as Bitcoin, and that the ECB would lack the competence to prohibit or regulate VCs such as Bitcoin.²⁷⁹ In his answer, President Draghi took a functional approach, by first asking what material risks VCs pose to economy based on (i) size, (ii) user acceptance, and (iii) impact on the real economy.²⁸⁰ All three, he opined, indicated it was premature to consider Bitcoin as a means of payment, and therefore premature to regulate VCs as such. The ECB would need to consider the matter further with the benefit of analysis and discussion.²⁸¹ Generally, he said, the ECB's main focus was on cyber risks associated with VCs rather than on the systemic challenges posed by VCs themselves.²⁸²

It is necessary for the ECB and the NCBs of the Eurosystem, the regulatory and supervisory agencies involved in the regulation of crypto assets/VCs in the Eurosystem, and other NCBs and competent institutions

277. See Dirk A. Zetzsche et al., *Regulating a Revolution: From Regulatory Sandboxes to Smart Regulation*, 23 *FORDHAM J. CORP. & FIN. L.* 31 (2017).

278. See Douglas W. Arner et al., *FinTech, RegTech, and the Reconceptualization of Financial Regulation*, 37 *NW. J. INT'L L. & BUS.* 371, 376 (2017).

279. EC – Audiovisual Service, *LIVE EP Committee on Economic and Monetary Affairs Monetary Dialogue with Mario DRAGHI, President of the European Central Bank*, EC (Sept. 25, 2017), <https://ec.europa.eu/avservices/video/player.cfm?sitelang=en&ref=1143771>.

280. *Id.*

281. *Id.*

282. *Id.*

within the ESCB/EU at large to identify their respective roles in relation to VCs as the space evolves, and to ensure that there are no gaps. Again, this is rendered more difficult by the degree of indeterminacy in the concepts of money and currency, on the basis of which regulatory competence within the Eurosystem—and within Member States—is distributed.

As we have noted, strict legal definitions of money often take legal tender status as their point of departure and stress the physical nature of bank notes and coins as physical moveable objects.²⁸³ Thus, for the purposes of the law of property, money is often treated as a tangible, moveable property.²⁸⁴ This excludes commercial bank book money from the core of the legal definition of money, which is difficult from an economic perspective, because bank deposits are the major part of the money supply (M1), and the fact that banks are engaged in the process of private money creation provides a monetary rationale for banking regulation.²⁸⁵ This does not place us particularly well for assessing when any alternative payment instrument crosses the threshold, as it were, and falls within the sphere of competence of the ECB or an NCB.²⁸⁶ Equally, central bank reserves need definition within the legal framework, but this is rendered difficult given the composition of such reserves and, in recent years, the growth of sovereign wealth funds in some jurisdictions.

The problem would appear to be one of how to keep tabs on the changing landscape without dedicating a disproportionate amount of resources to the task. In our view, it is essential that the different NCBs and regulatory agencies work together with the ECB to share knowledge and analyses of VCs as the market evolves. The reports and whitepapers currently published by some NCBs and national regulatory agencies as well as by the IMF and BIS are, in our view, a helpful development.²⁸⁷

2. *Financial Crime and Tax Evasion*

Another important, specific challenge is to ensure that financial innovations do not provide new means for financial crime and tax evasion. VCs could provide payment rails that circumvent Know Your Customer

283. Monetary and Capital Markets, Legal, and Strategy and Policy Review Departments, *Virtual Currencies and Beyond: Initial Considerations* 16, SDN/16/03 (Jan. 2016).

284. *Id.*

285. *Id.*

286. See Goodhart & Lastra, *supra* note 262, at 58, 62.

287. See, e.g., Bank for International Settlements (BIS): Committee on Payments and Market Infrastructures, *Central Bank Digital Currencies* (Mar. 2018), <https://www.bis.org/cpmi/publ/d174.pdf>; Monetary and Capital Markets, Legal, and Strategy and Policy Review Departments, *supra* note 283; IMF, *Monetary Policy in the Digital Age*, Finance & Development (June 2018); Bank of England [BoE], *The Economics of Digital Currencies*, Quarterly Bulletin (2014); Bank of England [BoE], *Innovations in Payment Technologies and the Emergence of Digital Currencies*, Quarterly Bulletin (2014); Paolo Siciliani, *Competition for Retail Deposits Between Commercial Banks and Non-Bank Operators: A Two-Sided Platform Analysis* (Bank of England [BoE], Working Paper No. 728, May 2018).

(KYC) and Anti-Money Laundering (AML) measures.²⁸⁸ Traditional KYC and AML measures are aimed not at criminals directly, but at financial intermediaries; by disintermediating financial services, VCs deprive these measures of a subject on which to bite.

More generally, VC payments are (to a greater or lesser extent) anonymous, which makes detection, investigation, and prosecution of ordinary crimes more difficult. This is evident in the use of VCs for illicit activities including fraud, narcotics, child pornography, arms dealing, and terrorism in recent years.²⁸⁹ Examples such as the Silk Road marketplace show that anonymity is not complete, and law enforcement measures can still be effective to identify individuals and discourage illicit online activity.²⁹⁰ But these measures are generally ex post investigative measures taken under some police power rather than ex ante measures taken by financial regulators.²⁹¹ They are not, in our view, a suitable replacement for KYC and AML procedures.

VCs may also help to facilitate tax evasion by providing virtual tax havens.²⁹² This underscores the direct challenge VCs pose to national sovereignty, as they may undermine the tax base even while their users enjoy the benefits provided with tax revenues.²⁹³ In light of recent public scandals and the public dissatisfaction with corporate tax evasion, and to the extent the money supply relies on the sale of government debt underwritten by governments' power to tax, the tax implications of VCs should be recognized as having potentially systemic importance.

3. *The Role of Regulatory Technology*

Regulatory Technology (Regtech) is the use of novel Information and Communications Technology (ICT) in monitoring, reporting, and compliance.²⁹⁴ To date, most innovations in Regtech have been the result of players in the financial industry creating digital tools to enhance their compliance and reduce the costs of compliance.²⁹⁵ But technology also allows regulators to take a more proportionate risk-based approach where access to and management of data enables more granular and effective supervision of markets and market participants, promising better outcomes and lower costs.²⁹⁶

Andy Haldane, Chief Economist of the Bank of England, presented in 2014 the vision of a real-time flow of financial data in an information system

288. Monetary and Capital Markets, Legal, and Strategy and Policy Review Departments, *supra* note 283, at 27.

289. *Id.*

290. *Id.*

291. *Id.* at 28.

292. See Marian, *supra* note 264.

293. *Id.* at 43-45.

294. Arner et al., *supra* note 278, at 373.

295. *Id.* at 374.

296. *Id.* at 375.

as we measure weather systems and Internet traffic.²⁹⁷ While progress to date has been incremental, some commentators argue that we are approaching a paradigm shift in financial regulation as the volume of financial transactions and data increase (for example, as algorithmic trading by data driven agents increases), and as the financial markets become still more globalized.²⁹⁸ In our opinion, Regtech tools will be an essential component in the regulatory response to VC and associated developments, such as smart contracts (i.e., self-executing code that embodies and in some cases purports to displace the traditional agreement between counterparties).²⁹⁹

In our view, the Eurosystem should play an active role in encouraging Regtech solutions that help to coordinate the monitoring of VC-based financial activity across the European Union and the Eurozone. For example, as the IMF's Christine Lagarde recently argued, it may be necessary to fight fire with fire by exploring regulatory applications of DLT to maintain oversight of VC-based activity.³⁰⁰

IV. Central Bank Issued Virtual Currencies

In recent months, a number of central banks in Europe and elsewhere have published analyses of the reasons for and against issuing VCs themselves, and explored the shape that CBVCs might take.³⁰¹ The prospect of central bank issued VCs raises particular questions in the ESCB and in the Eurosystem. In this section, we briefly discuss (i) the reasons for which central banks might wish to issue a DLT-based VC, (ii) the design features that central banks would consider when deciding what kind of CBVC to issue, and (iii) the distinct issues raised by CBVC in the Eurosystem context.

Yermack and Raskin rightly stress that competition between official currency and private money is not new, whether in the form of commodities performing monetary functions or, more commonly, foreign currency.³⁰² As outlined above, there is a school of thought within macro-economics that evaluates monetary competition of this sort as a salutary influence on the monetary system, for example, by imposing a market-based form of

297. Andrew G. Haldane, 'Managing Global Finance as a System' (Exec. Dir. and Chief Economist of the Bank of England [BoE], Speech Given at Maxwell Fry Annual Global Finance Lecture, Birmingham University, Managing Global Finance as a System (Oct. 29 October, 2014).

298. Arner et al., *supra* note 278, at 376.

299. Monetary and Capital Markets, Legal, and Strategy and Policy Review Departments, *supra* note 283, at 23.

300. Christine Lagarde, *Addressing the Dark Side of the Crypto World*, IMF BLOG: INSIGHTS AND ANALYSIS ON ECONOMICS & FINANCE (Mar. 13, 2018), <https://blogs.imf.org/2018/03/13/addressing-the-dark-side-of-the-crypto-world/>.

301. Max Raskin & David Yermack, *Digital Currencies, Decentralized Ledgers, and the Future of Central Banking* 10 (Nat'l Bureau of Econ. Research, Working Paper No. 22238, 2016).

302. *Id.* at 5.

discipline on central banks.³⁰³ Part of the relevance of CBVC is the impact on a long-running macro-economic debate between advocates of free banking and advocates of a narrowing of the money supply through a reduction of the systemic role of commercial bank money creators through deposit taking and lending.³⁰⁴ Although the impact of a CBVC on the monetary system as it stands would differ according to the design features of the CBVC, in general it is fair to see proposals for CBVC as a tool for central banks to fight fire with fire as discussed above, to increase the functionality of central bank money and bolster public confidence in it.³⁰⁵

A. REASONS FOR CBVC

We perceive four main reasons why central banks might choose to launch a VC scheme, each with different motivations and each with different implications.

The first, and most obvious reason, is that the use of cash is declining in many jurisdictions as electronic payment methods have become more safe and convenient.³⁰⁶ This is evident, for example, in the Swedish Riksbank e-krona project.³⁰⁷ Sweden leads the world's economies in the replacement of cash with digital payment systems, including the 'Swish' platform.³⁰⁸ As individuals and firms cannot generally hold accounts with the central bank, cash is the only way that they can hold central bank liabilities.³⁰⁹ To the extent that it is considered desirable for individuals and firms to have direct access to central bank liabilities, there are good reasons for central banks in economies leading the way to cashless payment systems to issue VC tokens directly accessible to the public. But as the BIS Markets Committee notes, this need should be considered well in light of the available retail payment

303. *Id.* at 5-6.

304. *Id.* at 13.

305. *Id.* at 5.

306. See Sveriges Riksbank, *The Riksbank's E-Krona Project: Action Plan for 2018* (Dec. 2017) (Swed.).

307. See *id.* at 2 (stating that one reason why the Riksbank wants to investigate the possibility of introducing an e-krona is that the use of cash in Sweden has been declining steadily over a long period of time. At the same time, the Riksbank has the statutory task of providing Sweden with banknotes and coins, households are using cash less and less and the private sector is reducing the general public's access to, and the usability of, notes and coins. This means that ultimately, private agents may determine the access to central bank money and payment methods. In addition to the Riksbank's obligation to supply cash, the starting point for this project is the Riksbank's task of maintaining price stability and promoting a safe and efficient payment system in a new digital environment.); Sveriges Riksbank, *The Riksbank's E-Krona Project: Report 1* (Sept. 2017) (Swed.), https://www.riksbank.se/globalassets/media/rapporter/e-krona/2017/rapport_ekrona_uppdaterad_170920_eng.pdf.

308. Morten Bech & Rodney Garratt, *Central Bank Cryptocurrencies*, BIS QUARTERLY REVIEW 64 (Sept. 17, 2017), https://www.bis.org/publ/qtrpdf/r_qt1709f.pdf.

309. *Id.* at 57.

products offered by the private sector,³¹⁰ and, depending on how it was introduced, a CBVC could potentially cause systemic problems for the monetary system by negatively affecting the desirability of commercial bank book-money.

The second reason is that central banks currently provide extensive settlement and clearing services for commercial banks, and a CBVC could be used to increase the efficiency of this service with significant costs savings.³¹¹ In a similar vein, this type of CBVC could be used to increase central banks seigniorage, which in a modern context, is the difference between interest earned on securities acquired in exchange for bank notes and the costs of producing and distributing those notes.³¹²

The third reason relates to extending central banks' monetary policy toolkit. In particular, CBVC could potentially solve the Zero Lower Bound (ZLB) problem to encourage spending in the economy during periods of downturn.³¹³ "A central bank's liabilities define the quantity of so-called base money in circulation," and the interest rate on central bank money defines monetary policy because the primary tool used by central banks is the interest rate on central bank reserves.³¹⁴ This tool is exhausted when the interest rate nears zero, leading central banks to unconventional policy tools such as QE, where the central bank purchases assets (with newly created central bank money) to stimulate spending and investment.³¹⁵ A CBVC could remove the ZLB problem because negative interest rates could be payable on CBVC tokens.³¹⁶ A CBVC could also provide an alternative to traditional QE by making it possible for central banks to inject liquidity into the monetary system not by purchasing securities but by directly increasing the balance of retail CBVC accounts.³¹⁷

These reasons are all subject to the usual disagreement on political and macro-economic grounds. Some people will favor the idea of directly accessible central bank liabilities in times of crisis, for example, while others will stress the risk that demand for CBVC would drive a flight away from traditional forms of money. It is difficult to discuss these issues in the abstract, so we will now move on to the design considerations that will shape any CBVC proposal.

310. Bank for International Settlements (BIS): Committee on Payments and Market Infrastructures, *supra* note 287.

311. Raskin & Yermack, *supra* note 301, at 14.

312. *Id.* at 4.

313. See Andrew Haldane, Chief Economist of Bank of England, Speech at Portadown Chamber of Commerce, Northern Ireland: How Low Can You Go? 13 (Sept. 18, 2015).

314. *Id.* at 2.

315. *Id.*

316. *Id.* at 11.

317. *Central Banks Should Consider Offering Accounts to Everyone*, THE ECONOMIST, May 26, 2018, available at <https://www.economist.com/finance-and-economics/2018/05/26/central-banks-should-consider-offering-accounts-to-everyone?fsrc=scn/li/te/bl/ed/centralbanksshouldconsiderofferingaccountstoeveryonefreexchange>.

B. DESIGNING A CBVC

As we have seen, those tasked with designing a VC scheme have a number of choices to make about the structure and operation of the scheme. In this section, we present the most important design choices specific to CBVCs. As in private VC schemes, these choices are not value neutral; they are informed by the central bank's motivations for considering the launch. In our view, the most important design choices relate to (i) access, (ii) anonymity, (iii) availability, and (iv) interest bearing characteristics. Other design features include the mechanism by which CBVC is transferred, and whether quantitative limits are imposed on the acquisition and use of CBVC tokens.³¹⁸

1. *Accessibility*

The primary question concerning accessibility is whether the CBVC is accessible by retail customers (individuals and firms) or only by financial intermediaries (commercial banks, in particular). In the latter case, CBVC would be an extension of already ubiquitous central bank electronic money, i.e., reserves, and its chief purpose would be to operate a RTGS system.³¹⁹ A retail CBVC, on the other hand, would complement or supplant cash as a retail medium of exchange.³²⁰ This design feature therefore informs the central question of what the CBVC is designed to be: an extension of one of the existing forms of central bank money (i.e. cash and reserves), or a new, third form of central bank money.³²¹

Accessibility also refers to whether the CBVC can be acquired and transferred by users at all times or only during business hours, for example. Currently, central bank reserves are only accessible during business hours, although this may change in light of the introduction of faster payment systems generally.³²² Choices regarding this feature will be informed by the other design choices, particularly whether the CBVC is intended to provide a retail payment system or something more akin to an inter-bank RTGS system.³²³ To the extent that a CBVC scheme is designed to augment the central bank's monetary policy toolkit, this is another important point of comparison with central bank's settlement and clearance function, and the ability of central banks to set interest rates.

318. Bank for International Settlements (BIS): Committee on Payments and Market Infrastructures, *supra* note 287.

319. See Jack Meaning et. al, *Broadening Narrow Money: Monetary Policy with a Central Bank Digital Currency* 2 (Bank of England, Staff Working Paper No. 724, 2018).

320. *Id.* at 4.

321. See Michael Kumhof & Clare Noone, *Central Bank Digital Currencies – Design Principles and Balance Sheet Implications* 4 (Bank of England, Staff Working Paper No. 725, 2018).

322. See Bank for International Settlements (BIS): Committee on Payments and Market Infrastructures, *supra* note 287, at 5.

323. *Id.* at 1, 8.

Another question is how users purchase CBVC tokens and convert them into traditional forms of money. If CBVC tokens can be purchased by individuals using demand deposits, this could precipitate a flight of capital from broad to narrow money, as retail customers liquidate their deposits with commercial banks for central bank money.³²⁴ A recent BIS discussion paper, for example, has warned that such an arrangement could precipitate runs on traditional lenders, and the disruptive potential of interest-bearing CBVC would be greater if it competed with short term government debt and commercial bank liabilities.³²⁵ In the Eurozone context, this could exacerbate liquidity problems, especially in the weaker Eurozone economies.³²⁶ Certain proposals, for example the models presented by Kumhof and Noone, envisage a CBVC unit that may not be purchased with commercial bank liabilities, but only with qualifying securities, particularly government debt securities.³²⁷ Such CBVC units would not be guaranteed to be convertible back into book-money.³²⁸ This is one of the core principles of their proposal for a CBVC.³²⁹

2. *Anonymity*

Currently, central bank money available to retail users (i.e. cash) is anonymous, while that available to financial intermediaries (i.e. reserves) is not.³³⁰ Central banks considering a CBVC scheme have to consider the AML, CTF, and tax evasion implications of the scheme, which speak against an anonymous CBVC.³³¹

3. *Interest Bearing*

Perhaps the most important choice in CBVC design is whether the CBVC bears interest.³³² For example, this informs the ability of the CBVC to address the ZLB problem. The notion of interest-bearing cash equivalents is novel, but in all use-cases, except for a straightforward digital substitute for cash, an adjustable interest rate seems necessary to avoid undesirable disruptions to the broader monetary system.³³³ Further questions follow with regards to how the interest rate is set.

324. *Id.* at 16.

325. Bank for International Settlements (BIS): Committee on Payments and Market Infrastructures, *supra* note 287.

326. See Goodhart & Lastra, *supra* note 262, at 52.

327. Kumhof & Noone, *supra* note 321, at 5.

328. *Id.*

329. *Id.*

330. Bank for International Settlements (BIS): Committee on Payments and Market Infrastructures, *supra* note 287, at 9-10.

331. *Id.*

332. *Id.* at 6, 10.

333. Kumhof & Noone, *supra* note 321, at 8.

4. *Transfer Mechanism*

One question raised in the Swedish e-krona project is whether a CBVC payment system should (i) store value in a central register and transfer value between accounts by amending this register, or (ii) store value locally (i.e., in an app or on a card).³³⁴ In other words, should CBVC be an account-based or an (electronic) note-based payment system?³³⁵ The e-krona project proposes a combination of these two models, as (ii) is more easily implemented in the short term (and may be more readily used by older citizens, for example), while (i) is more complex but offers greater possibilities over the long run, potentially including monetary policy tools.³³⁶

The choice of design features will ultimately be a function of (i) the legal constraints provided by the Eurosystem framework, and (ii) the macro-economic policy sought to be achieved by the adoption of an ECB issued VC. In the aggregate, they will have important implications for the future role of cash and central bank reserves in the monetary system, the policy tools available to central banks to pursue their legislative mandates, and the dynamics of interaction between components of the monetary system, particularly central banks, commercial banks, and fiscal authorities outside central banks.³³⁷

The traditional mode of money creation in our current monetary system is that commercial banks create money by lending and taking deposits but holding only a fractional reserve of central bank money.³³⁸ Critics do not trust commercial banks to play this role as money creators and point to their track-record of causing boom-bust cycles in the economy.³³⁹ Some people will favor the idea of directly accessible central bank liabilities in times of crisis, for example, while others will stress the risk that demand for CBVC would drive a flight away from currency etc. And CBVC could be liable to political (including populist political) abuse.³⁴⁰ It is worthwhile to point out that CBVCs are not the only development in the debate about money creation. The failed referendum in Switzerland on June 10, 2018, regarding the *Vollgeld* (sovereign money) proposals—that would have banned commercial banks from creating money through their lending operations—go to the root of the constitutional role of central banks as the monopoly providers of national currency.³⁴¹ Under *Vollgeld*, the amount of money injected in the economy would have been overseen by the central bank. As a proposal to abolish the fractional reserve banking, *Vollgeld* resembles the

334. Riksbank, *supra* note 307, at 19, 21.

335. See Rogers, *supra* note 176, at 1254.

336. Riksbank, *supra* note 307, at 5.

337. See Michael D. Bordo & Andrew T. Levin, *Central Bank Digital Currency and the Future of Monetary Policy 2* (Hoover Inst. Econ., Working Paper No. 17104, 2017).

338. See Ralph Atkins, *Radical Reform: Switzerland to Vote on Banking Overhaul*, FIN. TIMES (May 28, 2018).

339. *Id.*

340. See generally Goodhart & Lastra, *supra* note 262.

341. See Atkins, *supra* note 338.

one-hundred percent reserve banking system advocated by Irving Fisher in the 1930s.³⁴²

The place of any proposed CBVC, and its impacts on the existing monetary system, depend on the concrete design features of the CBVC scheme. Bech and Garrat combine conventional taxonomies of money to yield a model structured around four properties: (i) issuer (central bank or other), (ii) form (electronic or physical), (iii) accessibility (universal or limited), and (iv) transfer mechanism (centralized or decentralized/peer-to-peer).³⁴³ This provides a graphic framework within which CBVC schemes can be placed and compared.³⁴⁴

C. CBVCs IN THE EUROSISTEM

The prospect of CBVCs raise issues in the Eurosystem in relation both to the Eurosystem's money creation and oversight role.

1. *CBVCs Issued in the Eurosystem*

The main question that arises in the context of CBVCs in the Eurosystem is one of competence—of who is authorized to issue CBVC tokens. In 2017, certain officials within the Estonian government announced plans to launch an 'Estcoin' as a national VC pegged to the euro.³⁴⁵ These plans were, however, disclaimed by the governor of the Estonian central bank, Ardo Hansson.³⁴⁶ The proposal met with stiff opposition from ECB President Draghi, who in September 2017 said that: "no member state can introduce its own currency . . . The currency of the euro zone is the euro."³⁴⁷ In light of this pushback from the ECB, recent reports are that the Estonian government is amending—but not abandoning—its plans for an Estcoin.³⁴⁸ Instead of a VC issued to Estonians, the plan seems to be to issue VC units to members of the country's e-Residency program.³⁴⁹ Officials have been cited as saying that, while the planned Estcoin might still provide some payment services, it would not be a national cryptocurrency.³⁵⁰

342. *See id.*; *see also* Bank of England [BoE], *Money Creation in the Modern Economy* 15, Quarterly Bulletin (2014).

343. Bech & Garratt, *supra* note 308, at 55.

344. *Id.*

345. *See e.g.*, Kaspar Korjus, *We're Planning to Launch Estcoin—and That's Only the start*, MEDIUM (Dec. 18, 2017) (Est.), <https://medium.com/e-residency-blog/were-planning-to-launch-estcoin-and-that-s-only-the-start-310aba7f3790>.

346. Ott Ummelas, *Estonia Scales Down Plan to Create National Cryptocurrency*, BLOOMBERG (June 1, 2018), <https://www.bloomberg.com/news/articles/2018-06-01/estonia-curbs-cryptocurrency-plan-that-drew-rebuke-from-draghi?srnd=cryptocurrencies>.

347. Francesco Canepa, *ECB's Draghi Rejects Estonia's Virtual Currency Idea*, REUTERS (Sept. 7, 2017), <https://www.reuters.com/article/us-ecb-bitcoin-estonia/ecbs-draghi-rejects-estonia-virtual-currency-idea-idUSKCN1BI2BI>.

348. Ummelas, *supra* note 346.

349. *Id.*

350. *Id.*

President Draghi's position seems, in our view, rightly to assume that a central bank issued VC would qualify as a currency, properly so called.³⁵¹ The issue of currency in the Eurozone is regulated by Article 108 TFEU, which provides that the ECB has the exclusive right to issue euro banknotes.³⁵² In our view, this would include e-euro VC tokens. Under the aegis of the ECB, NCBs could have some delegated authority to issue CBVC, but not otherwise.³⁵³

As Goodhart notes, the design of the Eurosystem attenuates the link between political sovereignty and fiscal authority, on the one hand, and money creation, on the other, to an unprecedented degree.³⁵⁴ It is generally considered desirable to insulate central banks from direct political pressure, but in the Eurosystem the institutions tasked with money creation and monetary policy have been removed to a federal European level, while the main political and fiscal powers remain at the level of the nation state.³⁵⁵ Indeed, the fact that monetary unification has preceded political unification in Europe is a historically unprecedented.³⁵⁶ We can see the tensions inherent in this novel settlement in the Estcoin question, and we expect further such tensions play out in the future. We would again underscore the importance of European-level coordination in this area. For currencies widely used in cross-border transactions, some of the risks raised by CBVCs (including instability of commercial bank deposit funding from a flight towards central bank liabilities) are more acute.³⁵⁷ BIS suggests that introduction of CBVC in one jurisdiction could adversely affect others, and that central banks should consider cross-border issues.³⁵⁸

2. *CBVCs Issued in Third Countries*

CBVCs issued outside the Eurozone also raise issues of relevance for the EU at large. One such question could arise in the context of VCs issued by governments that are unrecognized or that are subject to international sanctions. For example, the Venezuelan central bank issued a VC called the 'Petro' in early 2018.³⁵⁹ Shortly after, United States President Donald Trump signed an executive order banning purchases of the Petro on the basis that it was an attempt to circumvent sanctions.³⁶⁰ For its part, the

351. Canepa, *supra* note 347.

352. Goodhart & Lastra, *supra* note 262, at 66.

353. *Id.* at 64.

354. Goodhart, *supra* note 258, at 409.

355. *Id.* at 410.

356. See Barry Eichengreen, *A More Perfect Union? The Logic of Economic Integration*, *ESSAYS IN INT'L FIN.*, no. 198, 1996 at 12.

357. Haldane, *supra* note 313, at 9.

358. *Id.*

359. *Petro*, SUPCAVEN (Jan. 30, 2018) (Venez.), https://www.petro.gob.ve/whitepaper_eng.html.

360. *Trump Bans US Purchases of Venezuela's Cryptocurrency Petro*, *AL JAZEERA NEWS* (Mar. 20, 2018), <https://www.aljazeera.com/news/2018/03/trump-bans-purchases-venezuela-cryptocurrency-petro-180320094506428.html>.

Venezuelan National Assembly declared the Petro illegal and declared all obligations entailed in the issue to be null and void.³⁶¹ In May 2018, Venezuela and the Palestinian Authority launched a bi-national bank with an initial injection of petros.³⁶² President Nicolas Maduro has reportedly offered oil imports at a discount for purchases in the currency.³⁶³

VCs issued by unrecognized governments or by non-state (e.g. separatist or terrorist) actors could raise similar questions in the Eurozone. The use of VCs for illicit activities is well known.³⁶⁴ The issue of VCs by known terrorist organizations or sanctioned states would present a clearer case for prohibition and raise questions of responsibility and competence within the Eurosystem.

V. Conclusion

This paper has examined the impact of VCs on central banks in the Eurosystem. Although they generally share the use of DLT as a common feature, VCs are differentiated both by their technical features and economic function(s) and will, accordingly, be characterized differently in legal terms. This requires granular assessment by central banks of the risks and opportunities presented by any given VC over time. We have drawn a basic distinction between privately issued VCs and VCs issued by central banks; while they may share some technical features, these two classes of VCs raise unique issues. While CBVCs raise questions about regulatory competence within the Eurosystem, the bulk of our examination has concentrated on privately issued VCs. As our approach has made clear, economic accounts of the nature and functions of money are essential to any description of VCs and monetary policy, but we have focused specifically on the legal aspects of VCs, money and monetary policy.

Many privately issued VCs pose a direct and intentional challenge to the monetary system and to central banks. But, in our view, no privately issued VCs currently pose any serious risks to central banks' money creation role in the Eurosystem. Further, we do not think that any VC currently in the market is likely to qualify for 'money status' in the near future. VCs could, however, create risks to the stability of the financial system if VC markets

361. Press Release, La Asamblea Nacional, AN Declaró Nula la Emisión del Petro y Todas sus Obligaciones (June 3, 2018) (Venez.), http://www.asambleanacional.gob.ve/noticias/_an-declaro-nula-la-emision-del-petro-y-todas-sus-obligaciones.

362. Jose Antonio Lanz, *Venezuela and Palestine Approve Binational Millionaire 'Petro Fund'*, ETHEREUM WORLD NEWS (May 8, 2018), <https://ethereumworldnews.com/venezuela-palestine-fund-petro/>.

363. Shine Jacob & Dilasha Seth, *Venezuela Offers India 30% Discount on Crude but with Cryptocurrency Rider*, BUS. STANDARD (Apr. 29, 2018), https://www.business-standard.com/article/markets/venezuela-offers-india-30-discount-on-crude-but-with-cryptocurrency-rider-118042900018_1.html.

364. See e.g., Ankit Panda, *Cryptocurrencies and National Security*, COUNCIL ON FOREIGN REL. [CFR] (Feb. 28, 2018), <https://www.cfr.org/background/cryptocurrencies-and-national-security>.

continue to grow at the current pace and continue to interact and entangle with the regulated financial system. The unregulated nature of VCs, and the dominance of quasi-anonymous VC schemes, also raises challenges in terms of AML, terrorism financing, and tax evasion. Other traditional regulatory concerns, such as consumer/investor protection, avoidance of market manipulation and transparency are also at stake.

Further, if the VC market continues to grow, central banks such as the ECB may face challenges in their monetary policy role as a large category of money-like instruments could be out of their oversight and control. The policy of 'wait and see' is properly risk-oriented, but the need for action must be evaluated constantly in light of changing circumstances. Changes can be very rapid, so a certain level of preparedness is necessary on the basis of the precautionary principle. Furthermore, the cross-border nature of VCs suggests the need for a harmonized European regulatory approach.

All of these questions, we have argued, are rendered more difficult by the raft of conceptual challenges raised by the existence of VCs, particularly relating to the definition of concepts including 'money' and 'securities,' the relation of these concepts as a matter of legal and economic theory, and the methodological problem of squaring legal and economic approaches to monetary theory itself.

In general, VCs require a pro-active regulatory response and that certain VCs could warrant prohibition now or in the future. Ideally, a harmonized European approach to the regulation of VCs is desirable to prevent regulatory arbitrage by market participants and a 'race to the bottom' by national regulators. Financial regulation generally follows crises. In our view, it would be preferable for regulators at the European level to act before any VC-based crisis in order to shape the VC market as it evolves and so avoid disruption in the (regulated) financial economy or the real economy. This might include (i) banning certain classes of VC outright, (ii) imposing regulations on the issue and governance of others, and (iii) launching applications of the same underlying technology in order to displace private VC schemes. While it is imperative to avoid stifling innovation in the financial services industry, we do think that VCs require a pro-active regulatory response and that certain VCs could warrant prohibition now or in the future. Regulatory tools such as the creation of 'sandboxes' provide a middle road and have been used successfully in a number of jurisdictions. Ideally, a harmonized European approach to the regulation of VCs is desirable to prevent regulatory arbitrage by market participants and a 'race to the bottom' by national regulators.