Bitcoins: Regulatory Patterns

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Innovations bring forth potential revolutions in a variety of fields, including the legal one. The advent of the Internet posed a threat to the traditional legal framework, challenging the sustainability of the established legal institutions and regulations worldwide. Nonetheless, after an initial phase of “legal inertia,” legal systems resorted to regulate the innovations of the digital era through the existing legal instruments.

Over the past years, the virtual world has given rise to a new conceptualization of money and currency exchanges, fostered by the ongoing progress in the field of Information Communication and Technology (ICT). Cash payments seem to be obsolete, supplanted by mobile payment systems, electronic money, and the flourishing category of virtual currencies and cryptocurrencies, whose most debated example is represented by bitcoin.

Presently, another regulatory challenge lies ahead: identifying the proper legal framework—if any—applicable to cryptocurrencies.

So, the essay aims at analyzing the main features characterizing these innovative “currencies,” the risks inherent in their architecture, as well as the benefits they offer, with a specific focus on bitcoins and on the subjects best suited to regulate them.

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L’auteur de cet article analyse les principales caractéristiques de ces « monnaies » novatrices, les risques inhérents à leur architecture ainsi que leurs avantages; il s’attarde plus particulièrement au cas des Bitcoins et aux instances les mieux placées pour les réglementer.

1. INTRODUCTION: THE LATEST FRONTIER OF MONEY

Typically, the advent of a new technology brings forth a potential revolution along with it. In contrast to the scientific and technological breakthroughs that changed social and economic patterns throughout history, today’s greatest innovations involve information, communication, and technology (ITC). In particular, the technological improvement which has had the broadest impact on our daily life is, without any doubt, the Internet: by means of a computer connected to the Internet every individual can immediately become part of a universe of information, products, and services.

Obviously, the influence of such innovation does not spare the law. The introduction of new technologies into our society is inevitably associated with the rise of new legal issues and the need to make adequate regulatory choices. As a matter of fact, the advent of the Internet actually reshaped the domain of economics and finance, allowing for less expensive and more efficient commercial transactions and, at the same time, prompting a new conceptualization of money. Money could now easily be transferred via mainstream IT devices (such as, ATM, credit or debit cards) and the Internet. But the innovations did not stop there, and new forms of “money” were invented, namely, the so-called cryptocurrencies, such as bitcoins.

Hence, the gradual adjustment of the concept of money to the new social and economic circumstances which occurred over time has been tremendously expedited in the past decades by the technological achievements of the ITC domain.4

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1 See also Giovanni Pascuzzi, Il diritto dell’era digitale (Bologna, Il Mulino, 2002).
4 The complexity of this concept is apparent also in the very definitions of money provided for by encyclopedias, such as for instance, that of the Encyclopædia Britannica, according to which money is “a commodity accepted by general consent as a medium of economic exchange. It is the medium in which prices and values are expressed; as currency, it circulates anonymously from person to person and country to country, thus facilitating trade, and it is the principal measure of wealth.” Moreover, the “basic function of money is to enable buying to be separated from selling, thus permitting trade to take place without the so-called double coincidence of barter.” This represents the “medium of exchange” function of money.” However, the “[s]eparation of the act of sale from the act of purchase requires the existence of something that will be generally accepted in payment. But there must also be something that can serve as a temporary
Since the repeal of the gold standard in most (if not all) countries, money is considered a numeraire, that is, a "nominal signifier of value that does not contain any value itself," but which represents the final outcome of a social convention. Such a concurrent ordinary and obscure nature of money was already described by Savigny, who, in 1851, wrote about the rather mysterious legal quality of money as opposed to other goods.\(^6\)

On top of that, in recent times, the notion of money has become more and more linked to economy, and in particular, to the monetary policies adopted by governments, rather than to the law, which consequently further complicates the task of providing a clear-cut definition or outline of it.

This essay, therefore, hopes to offer some suggestions as to how the germ of the new means of payment may be incorporated into the current legal systems, by investigating the latest developments in the domain of digital payment systems, addressing specifically bitcoins and their architecture. In particular, this article will focus on the challenges currently faced by the legal domain in dealing with such innovations, taking into account the contingent developments and the challenges cryptocurrencies pose to regulators.

2. BITCOINS

Bitcoins represent the ultimate and successful outcome of a number of (failed) attempts, starting from the 1990s, to create an online decentralized currency. They have been described as a "masterpiece of technology" whose peculiarity consists in being a purely market-based cryptocurrency.\(^8\)

store of purchasing power, in which the seller holds the proceeds in the interim between the sale and the subsequent purchase or from which the buyer can extract the general purchasing power with which to pay for what is bought. This is called the "asset" function of money." Finally, it is noteworthy that "[a]nything can serve as money that habit or social convention and successful experience endow with the quality of general acceptability". Encyclopaedia Britannica s.v. "money" online: Encyclopaedia Britannica <http://www.britannica.com/EBchecked/topic/389170/money>.


6 Friedrich Carl von Savigny, Das Obligationenrecht als Teil des heutigen römischen Rechts (Berlin, Bei Veit und Comp., 1851) at 406. For an overview on the concept of money and monetary obligations from a (Italian) private law perspective, see T. Ascarelli, La moneta. Considerazioni di diritto privato, (Padua, Cedam, 1928, Padua).


In 2009, Satoshi Nakamoto (a pseudonymous hacker) published a paper on the Internet, where he delineated a system consisting of a network of computers running a special software that enabled each machine (called a miner) to solve specific algorithms and be consequently awarded bitcoins; he was successful in concretely implementing such a project and, thus, bitcoins were born. Bitcoins are thus distinct from conventional commodity-backed currencies. Furthermore, bitcoins are not denominated in an existing currency; therefore, the price of each bitcoin is uniformly determined by the market price, and there is no fixed exchange rate between them and conventional currencies.

In practice, bitcoins are private digital resources that can be traded online via an established peer-to-peer network.

It is noteworthy that, even though bitcoins are digital, “every individual bitcoin is unique and can only be held by one entity at any given time.” Besides, the amount of available bitcoins is finite, meaning that only 21 million are planned to ever be produced.

Bank Authority (EBA) opinion, virtual currencies are digital representation of value that is neither issued by a central bank or public authority nor necessarily attached to a conventional fiat currency, but is used by natural or legal persons as a means of exchange and can be transferred, stored or traded electronically. European Bank Authority, EBA Opinion on ‘virtual currencies’ (London: EBA, 2014) online: <https://www.eba.europa.eu/documents/10180/657547/EBA-Op-2014-08+Opinion+on+%27Virtual+Currencies%27.pdf>.

9 Paul Farmer Jr., “Speculative Tech: The Bitcoin Legal Quagmire & the Need for Legal Innovation” (2014) 9 J. Bus. & Tech. L. 85 online: <http://digitalcommons.law.umaryland.edu/jbtl/vol9/iss1/6>. Specifically, each computer runs the program named bitcoin miner, and once it is connected to the Bitcoin network, “the computer uses its processing power to compute the Bitcoin encryption function and Bitcoins are awarded to the computer that deciphers the puzzle and constructs the proper block. Miners are then incentivized to contribute CPU power in exchange for their own Bitcoins.” Benjamin Wallace, “The Rise and Fall of Bitcoin” (Nov. 23, 2011) online: Wired Magazine <www.wired.com/magazine/2011/11/mf_bitcoin/>.  


14 Ibid. The automatically limited number of bitcoins is directly generated by the system itself: At the beginning, miners received fifty Bitcoins for every proper block, but “as the computational problems become more difficult and the number of transactions
Once a bitcoin has been mined or purchased, it becomes “similar to a computer file that can be visualized as a coin on a desktop”\(^{15}\) stored within a virtual wallet and transferred as easily as e-mails via the Internet. Security protocols embedded in the online bitcoin network provide users with the necessary protection against (many types of) fraud, while ensuring the system’s proper functioning.

In particular, the Bitcoin network relies on the principles of cryptography to process and validate transfers of bitcoins. Each transaction on this network is recorded on a decentralized public ledger, called a *blockchain*, that is visible to all computers on the Bitcoin network and does not reveal the identity of the parties involved in the transaction, because each user’s identity is encrypted.\(^{16}\) This public ledger verifies that a user transferring a specific number of bitcoins has in fact transferred the specific amount to the user and that the user is in fact receiving that very number of bitcoins.

In short, this peer-to-peer network serves a twofold purpose: mining bitcoins and recording bitcoin transactions. Hence, the entire network keeps tracks of all transactions\(^{17}\) as if it were a huge public ledger.\(^{18}\)

So far so good.

Yet, the fuss about bitcoins is justified by a noteworthy peculiarity of the system: It was expressly designed to function without any interference or control by a third party (be it either a bank or a credit card company) or a central issuing authority, which could manipulate the system;\(^{19}\) in light of this, some have gone

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16 In that regard, bitcoins afford more privacy than all other forms of payment to date, in that all transactions recorded as transactions between public keys, rather than between named users. Farmer Jr., *supra* note 9 at 89-90.
17 Bitcoins can be mined or acquired from another user by “using exchanges to purchase them with traditional currencies, or to be connected directly with an individual for trading.” Wallace, *supra* note 9. On the basis of such exchanges speculation enters the bitcoin market, since they provide “a trading platform for futures and options contracts specifically on Bitcoins, or based in Bitcoins.” Farmer Jr., *supra* note 9 at 90.
18 Each bitcoin is essentially “a chain of digital signatures which, when decoded, provide the entire transactional history of the bitcoin.” The members of the network who verify new transactions (called miners) are rewarded for their service with additional Bitcoins. Sarah Hughes & Stephen Middlebrook, “Regulating Cryptocurrencies in the United States: Current Issues and Future Directions” (2014) 40 Wm. Mitchell L. Rev. 813.
19 Even though no authority has control over the network, “the sheer size of the network of miners helps to prevent unauthorized manipulation or implantation of data in the system.” Along with this security and the “ability of exchanges to pinpoint and correct abnormalities in Bitcoin trading,” the bitcoin network appears to be safer than other...
as far as suggesting that: “currency [. . .] is exactly like religion. It’s based entirely on faith.”

cy.idg/index.html >. This statement is especially true in relation to bitcoin, for this
digital currency is not asset-backed, neither is it issued by any government or financial
institutions. Doguet, supra note 7.

21 Bitcoin is defined as an anonymous method of payment, because parties are identified
only by a ‘bitcoin address’. J. J. Doguet, supra note 7.

22 Ibid., and Plassaras, supra note 2.

23 Hughes & Middlebrook, supra note 18.

24 Specifically, the anonymity connected to virtual currencies facilitate a number of various
crimes, making the systems of such currencies, profitable marketplaces for: assassins,
attacks on businesses, child exploitation (including pornography), corporate espionage,
counterfeit currencies, drugs, fake IDs and passports, investment and financial frauds,
sexual exploitation, stolen credit cards and credit card numbers, and weapons. (Cf.
Lawrence Trautman, “Virtual Currencies Bitcoin & What Now After Liberty Reserve,
jolt.richmond.edu/v20i4/article13.pdf >.

25 Matthew Kien-Meng Ly, “Coming Bitcoin’s ‘Legal-Bits’: Examining The Regulatory
Framework For Bitcoin And Virtual Currencies” (2014) 27 Harv. J. Law & Tec 587. A
second example of alleged misconduct involving bitcoins was the asset seizure of Mt. Gox.
The latter was one of the largest Bitcoin exchange worldwide, and the U.S. authorities
seized its assets in May 2013 on suspicion that Mt. Gox did not have an appropriate
license to engage in money transfer services according to the provisions of the FinCEN
guidance document on virtual currencies. Following the asset seizure, in February 2014,
Mt. Gox shut down its website and filed for bankruptcy “after losing approximately
Besides, some argue that cryptocurrencies do not grant the necessary protection to consumers, especially in relation to consumers’ rights to prompt and full redemption of funds.\textsuperscript{26}

On top of that, another problem is that national governments would never allow a massive storage of value in a currency beyond their control, because this would undermine their exclusive \textit{seignorage} rights arising from the issuance of legal tender.

It follows that states are having a hard time deciding how to handle this issue, and, specifically, whether or not and how stringently they should regulate it.

And it is not uncontroversial that bitcoins should be considered money. Those in favour of such reconstruction (i.e., most proponents of bitcoins) draw a parallel between the aforementioned evolution of money and the creation of bitcoins. In particular, they argue that bitcoins have been launched into the market as if they were one among several commodities available to users, and, owing to their scarcity and ease of circulation, they have gained in value and, consequently, they may evolve into a form of money if the majority of market participants eventually acknowledge their benefits.\textsuperscript{27}

The main shortcoming of this argument, however, lies in the fact that people already have a medium of payment and exchange in traditional currencies; hence, bitcoins could at best constitute an alternative or a competing monetary system.

Nonetheless, the conventional understanding of money, as described above, is challenged by an alternative constitutional theory, according to which money is a “constitutional project [. . .] with transfer-enabling properties that have a ‘real value.’”\textsuperscript{28}

In fact, owing to historical and practical circumstances, people could not have spontaneously turned to coins, but rather started to mint them as a form of governance, i.e., as a way through which the sovereign authorities could carry out their activities.

However, either way, today, bitcoins can hardly be considered money, for they constitute “a difficult medium of exchange and a poor unit of account and a store of value.”\textsuperscript{29}

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\textsuperscript{26} Hughes & Middlebrook, \textit{ibid}.\textsuperscript{ supra note 18.}

\textsuperscript{27} Ed Howden, “The Crypto-currency Conundrum: Regulating an Uncertain Future” (2015) 29 Emory Int'l L. Rev. 741 at 742-743. Before 1970, western countries relied on currencies which were backed by their reserves of gold or silver. This system was aimed at preventing states from indiscriminately increasing the amount of money circulating. During the twentieth century, all countries abandoned the so-called \textit{gold standard} (the U.S. being the last one during the 1970s) and, as a result, “most currencies today are known as fiat money—in other words, currency that a government has declared legal tender despite the fact that it has no intrinsic value or backing by any reserves.”

\textsuperscript{28} \textit{Ibid}.\textsuperscript{ Ibid}.
Regardless bitcoins have been relatively successful for “micropayments and crowdfunding, but also payments related to the online sale of illicit goods [...] or subversive actions against oppressive regimes like Iran and Russia”\(^{30}\) owing to the fact that transaction costs are much lower, as opposed to the traditional methods of payment,\(^{31}\) in addition to the fact that such transactions can be completed more quickly than traditional wire transfers,\(^{32}\) and that bitcoin transactions may help circumvent attempts at censorship.\(^{33}\)

Concerns, however, have been expressed as to the vulnerability of the system, and the need to improve cyber-security so as to avoid any breach or violation of users’ accounts. Moreover, the degree of vulnerability of the system is further enhanced by the fact that bitcoin transactions do not occur at the same time, namely with “an instantaneous debit and credit of the payer and the payee,

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\(^{29}\) Ibid. Nicole Swartz, (“Bursting the Bitcoin Bubble: The Case To Regulate Digital Currency as a Security or Commodity (2014) 17 Tul. J. Tech. & Intell. Prop. 319 at 329-330) offers the following definition of currency: “a coin, government note, or bank note that circulates as a medium of exchange, unit of account, and store of value.” Swartz, however, harbors doubts that bitcoins can successfully function as such. In particular, Swartz maintains bitcoins are a poor medium of exchange because the amount of transactions involving them occurring every day is minimal, the process of acquiring and spending bitcoins is complicated and cumbersome, and the mining process requires significant computing effort. In addition, according to Swartz, bitcoins’ high volatility and the decreasing supply may end up encouraging hoarding. Furthermore, bitcoins are also a poor unit of account: Owing to their constituting features, they offer unreliable price information and make it difficult for users to compare the respective value of goods, not to mention that the large size of one bitcoin is too large for practical use. Finally, bitcoins are also a poor store of value, because of their very high volatility, and the fact they are frequently targeted by thieves. On the other hand, there are those who believe that bitcoin can be described as money. As a medium of exchange, the bitcoin’s essential advantage is that it avoids the costs of transaction imposed on the exchange of currencies thanks to the fact that the bitcoin is a universal currency inherently “designed to be used transnationally via the Internet.” Plassaras, supra note 2. As unit of account and measure of relative worth, given the complexity of bitcoin’s production process and coupled with its scarcity, bitcoins should be regarded as “intrinsically and intuitively valuable.” As a store of value, since the bitcoin is not influenced by the policies adopted by governments, its worth depends exclusively on the market; for this reason, the issuers of digital currencies, like bitcoin, commit to making their currencies the most stable and reliable as possible, for only in that way can they succeed in becoming a store of value and concurrently attracting investments. Iwamura, Kitamura & Matsumoto, supra note 8.


\(^{31}\) “While credit card networks charge merchants fees in the range of 3 to 4 percent of the total amount of a transaction, and the average cost of international remittances is 8.5 percent, a Bitcoin transaction can cost less than 1 percent.” Ibid. at 151.

\(^{32}\) Ibid.

\(^{33}\) Ibid. The author mentions Wikileaks’ case, where PayPal was able to freeze Wikileaks’ account, thereby stopping donations. When it comes to bitcoins, on the other hand, nobody has the power to freeze anybody else’s account.
The period of time between the payment and the receipt of such payment depends, in fact, on the mining activity. The nonsimultaneous occurrence of bitcoin payments may lead to the so-called ‘double spending': since such transactions are not completed in real time, fraudulent bitcoin users may employ the same bitcoin to purchase two different goods or pay two different people, splitting, in so doing, one bitcoin transaction into two (which is named fork transaction).

3. BITCOINS FROM A LEGAL PERSPECTIVE

(a) De iure condito

Legal systems, faced with the new challenges posed by bitcoins, have, to date, adopted four different approaches. There are countries where no action has been taken to regulate cryptocurrencies as an independent entity. There are countries where bitcoins have only been regulated for tax purposes, others where the use of bitcoins has been prohibited or otherwise curtailed, and, finally, a few countries where cryptocurrencies have been recognized as a form of currency.

At this time, the majority of countries do not regulate cryptocurrencies. Among these, are Alderney, Argentina, Australia, Belgium, Canada, Chile,
Croatia, Cyprus, Denmark, Estonia, the European Union, France, Greece, Hong Kong, India, Indonesia, Ireland, Italy, Japan, Malaysia, Malta, the Netherlands, New Zealand, Nicaragua, Poland, Portugal, Russia, Singapore, South Korea, Taiwan, and Turkey.40

This should not surprise, since cryptocurrencies are a comparatively novel phenomenon that have not yet gained much traction in mainstream society; by nature, legislation generally only occurs when a phenomenon has become relatively common.

Among the countries which have only regulated cryptocurrencies for tax purposes, it is possible to include the United Kingdom, where bitcoins have been classified as “single purpose vouchers ... [subject] to a value added tax of 10-20%,”41 but also Norway, Spain, and Finland, which “assess bitcoins as capital property subject to a value-added tax of up to twenty-five percent,”42 whereas Slovenia and Israel tax bitcoin-derived profits as income.43

While these countries have begun to regulate cryptocurrencies, they only do in a limited fashion, which does not resolve most of the doubts concerning the nature and regulation of virtual currencies.

The countries which have banned or curtailed the use of bitcoins include Thailand, China,44 and Iceland. In particular, in Thailand, the national bank declared the use of cryptocurrencies illegal;45 on the other hand, China did not outlaw the use of bitcoins, but “the People’s Bank of China and four other ministries and agencies announced that banks and payment companies were prohibited from dealing with the coin.”46 Finally, in Iceland, the use of bitcoins

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40 Tu & Meredith, supra note 38 at 301-302. Bollen, supra note 12. Anita Ramasastry, “Bitcoin: If You Can’t Ban It, Should You Regulate It? The Merits of Legalization” Justia.com (Feb. 25, 2014), online: <http://verdict.justia.com/2014/02/25/bitcoin-cant-ban-regulate#sthash.4oUpDzhi.dpuf>. According to the website bitlegal.io, most of the countries in Europe, along with the U.S., Canada, Australia, Argentina, and Brazil, and some Asian countries, display a permissive approach to bitcoins; this, however, in most cases means that no official guidelines or regulations have been passed yet. On the other hand, Russia, China, India, Thailand, Jordan, and Mexico are defined as contentious. Cf. <http://bitlegal.io/>. See also Maria Perugini & Cesare Maioli, Bitcoin: Tra Moneta Virtuale E Commodity Finanziaria (Bitcoin: Between Digital Currency and Financial Commodity) (November 17, 2014) online: <http://ssrn.com/abstract=2526207>.

41 Tu & Meredith, supra note 38 at 301.

42 Ibid.

43 Ibid.

44 Farmer Jr., supra note 9.


46 Tu & Meredith, supra note 38 at 303.
has not been forbidden per se, but it has been clarified that “engaging in foreign exchange trading with bitcoins is prohibited, based on the country’s Foreign Exchange Act.”

The most interesting countries, however, are the ones where cryptocurrencies have been recognized as a valid form of currency, for “in doing so, these jurisdictions appear to be leveraging concepts from traditional financial regulation and adapting them for use with virtual currencies.”

One such country is Brazil, where Law No. 12,865 of 9 October de 2013, Article 6-VI allowed for the creation of “electronic currencies.”

But bitcoins are regulated also in Germany and Sweden.

In particular, Germany considers “Bitcoin exchanges as financial service companies that “must fulfill strict standards of operation” including meeting initial capital requirements, maintaining certain professional qualifications, and reporting transactions to Germany’s financial regulator, BaFin,” whereas Sweden has found that Bitcoin constitutes “a financial service, subject to a mandatory reporting requirement.”

This short overview makes it clear that, to date, there has been no uniform regulation of cryptocurrencies. Most countries have not yet tried to regulate this phenomenon, and the ones which have tried have adopted widely differing approaches.

In particular, “various regulatory bodies have acted independently to provide guidance as to the treatment of virtual currency under the laws within their purview,” which has led to increased clarity, but has also resulted in “(1) a lack of inter-agency communication such that the resulting regulatory framework may be fragmented and lack cohesion; (2) difficulty in developing regulation tailored to the unique characteristics and risks of virtual currency; and (3) a failure to give sufficient consideration to the full breadth of regulatory issues raised by decentralized virtual currency such that the resulting regulatory framework may suffer from an unintended oversight in scope.”

This is particularly problematic, for it makes the international circulation of bitcoins difficult, if not impossible.

47 Ibid.
48 See De Filippi, supra note 11.
51 Tu & Meredith, supra note 38 at 303.
53 Tu & Meredith, supra note 38 at 301.
54 Ibid.
(b) De iure condendo

Bitcoins present a number of challenges in comparison to the other digital means of exchange which have preceded them. Because of its decentralized nature, the bitcoin system evades the traditional patterns of state regulation, the lack of a provider or issuer that may be held accountable, or a central database; instead, there is a community of users which exists merely in cyberspace.

In light of this, it is worth examining which regulatory alternative would actually be the most efficient in terms of interests of both bitcoins’ users and national governments.\(^55\)

Three potential regimes are therefore investigated: (i) prohibition, (ii) self-regulation, and (iii) intermediary regulation.\(^56\)

Typically, prohibitive measures are adopted only when the harm that may derive from the use of a technology outweighs the social benefits resulting from it.

Hence, regulators are likely to take prohibitive measures against bitcoins if this cryptocurrency were primarily used for unlawful purposes, and only few advantages were acknowledged. Besides, bitcoins might be outlawed if they actually posed a threat to an existing fiat currency, and, in particular, to the seignorage income of governments.

However, according to the proponents of this alternative system, so far, none of the aforementioned reasons actually exists: Bitcoins are used mainly for legitimate purposes, and the economy created by the system is still too small to compete with national currencies or undermine international economic stability. Furthermore, the recourse to prohibition commonly leads to inefficiencies from an economic viewpoint. First, banning bitcoins would result in ruling out also its inherent benefits; second, the prohibition of its use may inhibit the evolution of technology in the domain of e-commerce. Finally, enforcing such a prohibition would entail very high costs and turn out to be a legal fiasco because it would restrain the use of the system solely on the part of law-abiding citizens, but not on the part of criminals. It follows that, presently, the prohibition of bitcoins seems unlikely.

Some, however, oppose regulating bitcoins, arguing that doing so would stunt the natural development and growth of this system, would “drive

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\(^{55}\) According to the document “Bitcoins: a first assessment” that was published by Merrill Lynch Bank of America in 2013, the issue of bitcoins requires a uniform international regulation that should not impose too stringent restrictions, because it would increase the cost of the transactions and consequently decrease one of the major benefits of the system. Furthermore, the analysis warns against the system’s lack of forms of protections on deposits and investors which are typical of the banking system, highlighting, though, that the implementation of such mechanisms would, in all likelihood, raise the transaction costs as well. Cf. Merrill Lynch Bank of America, “Bitcoin: a first assessment” (2013) online <https://ciphrex.com/archive/bofa-bitcoin.pdf>. Cf. Perugini & Maioli, supra note 40.

\(^{56}\) Cf. Doguet, supra note 7.
exchanges to countries with lower compliance standards,”57 and would cause a surge in transaction costs.

These arguments fail to convince.

In particular, it stands to reason to expect that regulation would boost investors’ confidence, leading to an increase in the number of bitcoin transactions. And while it is true that this may lead to an increase in transaction costs, these would “would be minimal compared to the costs of losing bitcoins due to lack of consumer protection,”58 especially in light of the fact that, currently, such transaction costs are the lowest, compared to all alternative online payment methods, and, therefore, would continue to be competitive even if increased.

Furthermore, if a market is faced with the threat of prohibition, it commonly reacts through self-regulation, and this is precisely the regulatory pattern presently characterizing the bitcoin system. Many maintain, in fact, that the relationships among users within cyberspace should be governed by “social norms and market mechanisms [. . .] without the need for state intervention.”59 Nonetheless, since the Internet has evolved over the decades and has become an important medium for commercial exchanges, self-regulation may no longer be the best solution, for inequities are bound to arise.

Moreover, as regards bitcoins, a specific problem lies in the fact that the system’s transactions are virtually irreversible owing to the computer power which secures them, which ends up benefiting merchants and retailers, who are safeguarded against fraudulent practices carried out by dishonest buyers, but, at the same time, fails to protect buyers from dishonest merchants or retailers.

The only means developed by the network to ensure part of said protection to consumers are reputation systems and escrow services. The former enable the defrauded buyer to publicly complain about the merchant on a forum, so that the other community members would no longer trust the merchant. However, this mechanism cannot prevent fraud from occurring, and the potential for anonymity60 provided for by the bitcoin system is likely to exacerbate this problem. As to large-scale criminal activities, the self-regulation attitude of the system has resulted in the development of specific software programs, called autonomous agents, that prevent such activities by scanning large amounts of financial transactions involving the exchange of bitcoins in search for irregularities. However, such programs are not largely applied by bitcoin exchanges. Furthermore, the major shortcoming of the system lies in the fact that it cannot tackle small-scale criminal activities. So, since “Bitcoin software

57 Swartz, supra note 29 at 328.
58 Ibid. at 328-329.
59 Doguet, supra note 7.
60 For an analysis of Bitcoin’s potential users in relation to the anonymity offered by the system, and its potential for abuses, like the case of Silk Road website, see Matthew Wilson & Aaron Yelowitz, “Characteristics of Bitcoin Users: An Analysis of Google Search Data” (November 3, 2014) online: <http://ssrn.com/abstract=2518603>.
provides no way to punish its users or to stop them from using it criminally, state action will be necessary to prevent such uses."\textsuperscript{61} Hence, self-regulation has a limited impact which is sustainable only within small groups; therefore, this solution appears to be rather ineffective.

Luckily, lately law enforcement has demonstrated an ability to successfully thwart fraud attempts, as was the case when FBI shut down Silk Road; as Jeans pointed out, "the growing number of positive examples where existent laws are used to prevent bitcoin-based crime demonstrate why the creation of a wholesale specialized regime is unnecessary."\textsuperscript{62}

The two abovementioned proposals, however, seem unviable when cryptocurrency becomes widespread. So, a third solution arises, the intermediary regulation, which in this case involves all activities surrounding the bitcoin world, and, above all, bitcoin exchanges.

As a matter of fact, for the most part, the operations involving bitcoins are accomplished through bitcoin exchanges, namely, entities that facilitate the conversion of the cryptocurrency to and from traditional currencies. It follows that also criminals who want to exploit the bitcoin system for money-laundering purposes or similar illicit aims should have to rely on these exchanges. As a result, bitcoin exchanges may constitute the starting point for the implementation of anticriminal mechanisms, which, in turn, represent the major concern expressed by legal systems as regards the otherwise almost neutral bitcoin phenomenon. Hence, to reach said objective, states may apply existing regulatory frameworks to the bitcoin system; for instance, in the case of the U.S., the system may be governed by the regulations of money service businesses, since bitcoin exchangers may be classified as money transmitters. If such regulation were applied, bitcoin exchanges would have to comply with a number of requirements, such as registration with the Financial Crimes Enforcement Network (FinCEN),\textsuperscript{63} the compilation of reports or records pertaining to criminal, tax, or regulatory investigations, and the implementation of anti-

\textsuperscript{61} Doguet, supra note 7.
\textsuperscript{62} Jeans, supra note 49 at 122.
\textsuperscript{63} FinCEN is an Agency of the U.S. Department of Treasury, which, in 2013, issued guidance concerning the applicability of its regulations to persons administering, exchanging, or using virtual currencies so as to clarify which individuals or entities could be regarded as money services businesses (MSBs) for the purposes of the Bank Secrecy Act and would therefore have to comply with FinCEN's requirements, such as registration, reporting and keeping records of transactions and clients. U.S. DEPT OF THE TREASURY, FINANCIAL CRIMES AND ENFORCEMENT NETWORK, FIN-2013-G001, Application of FinCEN's Regulations to Persons Administering, Exchanging, or Using Virtual Currencies (Mar. 18, 2013), available at <http://fincen.gov/statutes_regs/guidance/html/FIN-2013-G001.html>. For an overview of FinCEN regulations, see Stephen Middlebrook & Sarah Hughes, "Virtual Uncertainty: Developments in the Law of Electronic Payments and Financial Services" (2013) 69 Bus. Law 263.
money-laundering programs, along with the need to keep records of customers’ identities.64

The most evident advantage of the application of preexisting legal frameworks like the one just described is the fact that no additional undertaking is necessary to draw a new and ad hoc regulation of bitcoins, because the existing provisions would achieve the desired purpose without any need for amendments. Nonetheless, since bitcoins constitute a transnational phenomenon, domestic regulation is not suitable to handle all issues of private international law that may arise in relation to bitcoin transactions.65

Indeed, this shortcoming may be partially tackled by the so-called legal interoperability approach, which is a regulatory mechanism that does not entail regulation through direct state action. The concept of legal interoperability has been defined as “the working-together among legal norms, either within a given legal system of a nation state (e.g. Federal and State legislation) or across jurisdictions or Nations.”66 Within an increasingly intertwined digital society and economy, policymakers should make attempts to increase the interoperability of policies and rules, in view of the fact that we are heading toward a multilevel governance system, within which cooperation and interconnection of the various layers are unavoidable elements.

This approach would bring forth the following advantages: (i) the reduction of costs associated with cross-jurisdictional business transactions; (ii) the further promotion of innovation, competition, trade and economic growth (at least in the ICT domain); and, (iii) incentives for the worldwide recognition of fundamental values and rights, such as information privacy and freedom of expression.67

In short, this is predicated on the idea that more and more legal institutes fall outside the scope of states’ regulation, and therefore have to be regulated at the supranational level.

Regardless, while regulation of the bitcoin phenomenon is necessary to prevent fraud and harm to the international economy and to national currencies, regulators should be careful and adopt a “delicate approach,”68 for excessively restrictive legislation might “spark innovation to circumvent these controls and

64 On this, see Brito, Shadab, & Castillo, supra note 30 at 144.
65 Ibid. Anyway, the aforementioned U.S. regulatory approach may be exported also abroad as a viable blueprint.
67 Ibid. This standpoint is shared also by Trautman, who affirms that “by optimizing the international governance of virtual currency, this legal interoperability should ‘enable the flow of goods, services, and information across legal systems.’” Trautman, supra note 24.
68 Howden, supra note 27 at 742.
foster the development of new cryptos, reduce demand for the established cryptos, and harm the international economy.”

Then again, some scholars argue in favour of an even softer approach, whereby regulators should not create new rules, but rather adapt the existing framework to make transactions safer and more transparent, by “promot[ing] enhanced public-private cooperation [...] pursue[ing] tougher enforcement on non-compliant Bitcoin exchanges [...] and advocate[ing] for more active filings of Suspicious Activity Reports.”

For others, instead, the way to go is not for countries to regulate this phenomenon directly, but rather to facilitate the creation of self-regulatory organizations, non-governmental organizations that formulate and enforce best practices to protect consumers, or other forms of self-regulation, because, they argue, “there is something special about Bitcoin that makes it inherently resistant to government control.” Specifically, the bitcoin is predicated on an open-source protocol, which can be modified and regulated by those who use it. In particular, the fact that system changes have to be accepted by the system users is evidence of the network’s self-regulating capability.

More problematic than this lack of consensus, though, is that, at present, national parliaments as well have chosen widely differing approaches, as discussed in the previous section, and the most influential supranational entities have so far been silent on the issue. This is evidently not sustainable in the long run. Recent developments have made the situation even more complex.

First, a collective of bitcoin miners has come to light, “controll[ing] over forty-two percent of the computer processing power of the bitcoin network,” a percentage dangerously close to fifty percent, which would give a group of people the power to assert control over the bitcoin system. Contemporarily, though, hundreds of new and competing cryptocurrencies have seen the light (some of which, such as NXT, rely on a system which would make it impossible for anyone to assert control over most of the mining processing power within said system), although they are unlikely to replace bitcoins any time soon, owing to

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72 Ibid.

73 Sonderegger, supra note 69 at 205.

74 Howden, supra note 27 at 756. This was the so-called Goldfinger attack; for a discussion of this, see Trautman, supra note 24 at 35.

75 Juliya Ziskina mentions, for instance, “(1) Litecoin, considered the ‘most valuable cryptocurrency after Bitcoin;’ (2) PPCoin; (3) Dogecoin; (4) Freicoin; (5) Namecoin; (6)
the network effect, namely “the capital investment already made by the system’s participants—miners, merchants, and simple users.”

However, in spite of these difficulties, it cannot be denied that someone needs to regulate cryptocurrencies to protect both individuals and the global economy.

4. WHO SHOULD REGULATE BITCOINS?

In light of Internet’s ability to cross borders and allow people from different countries to communicate with, and, more than that, have commercial transactions with, each other, a uniform legislation of the cryptocurrency phenomenon is necessary, otherwise, as Jeans shrewdly pointed out, bitcoins will face the same problems faced by automated cars, “where the necessity of adherence with disparate local legislation impedes the implementation of advantageous technology.”

Among the possible entities that could regulate cryptocurrencies it is possible to include the European Union (E.U.), the World Trade Organization (WTO), and the International Monetary Fund (IMF). Of these, the E.U. is probably the least appropriate, because its scope is too narrow, it being only a regional entity, and so it would only be able to provide a partial solution. And, on top of that, since bitcoins also involve tax matters, regulating them would require unanimity, which is difficult to achieve.

Some maintain that the WTO would be better suited than the IMF to regulate cryptocurrencies, because of its novelty and the fact that the technology behind cryptocurrencies is rapidly changing; accordingly, “suggested IMF regulation will only prove feasible if both the industry stagnates and the regulation does not spur innovation,” which the author does not consider likely. The regulation of financial instruments or similar legal institutions falls squarely outside the WTO’s scope.

The IMF is, in this author’s opinion, better equipped to deal with cryptocurrencies, since “the IMF’s primary purpose is to ensure the stability of the international monetary system—the system of exchange rates and international payments that enables countries (and their citizens) to transact

Terracoin; (7) Ripple; and (8) Feathercoin; among others.” Juliya Ziskina, “The Other Side of the Coin: The FEC’S Move to Approve Cryptocurrency Use and Deny its Viability” (2015) 10 Wash. J.L. Tech. & Arts 305 at 311. And this does not take into account all the other cryptocurrencies which have already failed, “including Solidcoin, BBQcoin, Fairbrix, and Geist Geld.” Ibid.

76 Ibid. at 756-757.
77 Jeans, supra note 49 at 121.
78 Howden, supra note 27 at 794.
79 For a detailed overview of the areas on which the WTO focuses, see the official website <www.wto.org >. See, for instance, “negotiating the reduction or elimination of obstacles to trade (import tariffs, other barriers to trade) and agreeing on rules governing the conduct of international trade (e.g. antidumping, subsidies, product standards, etc.),” <https://www.wto.org/english/thewto_e/whatis_e/wto_dg_stat_e.htm >.
with each other. The IMF’s mandate was updated in 2012 to include all macroeconomic and financial sector issues that bear on global stability.80 And among its original aims there was the promotion of exchange stability and, above all, “the establishment of a multilateral system of payments.”81

The problem however is that to bring bitcoins under the IMF’s purview, it would be necessary to amend the “separate currency” provisions, which would result in a modification of the quota requirement.82

An alternative approach would be to hold an international conference for the purpose of drafting a multilateral agreement under the aegis of the IMF, a process which has been successfully followed on various occasions, to come up with uniform, supranational regulation.

It follows that the process of legitimization of bitcoins would involve a “clean up of the current image associated with criminal activities;”83 this, however, shall be complemented by the endorsement of bitcoins by large companies (which decide to accept the cryptocurrency as a means of payment) as well as by transnational financial institutions, such as, for instance, the IMF, which Plassaras maintains may “mitigate the impact of bitcoins on foreign currency markets”84 by bringing [bitcoins] within its reach under the category of ‘separate currencies.”85

80 International Monetary Fund online: <www.imf.org>.
81 Ibid.
82 Then again, bringing bitcoins under the IMF’s purview like this is misguided, for the separate currency provisions apply to “separate currencies of all territories” and cryptocurrencies, at present, are not recognized as currency by any government or in any territory. This means that for the IMF to have competence over the regulation of bitcoins, it would be necessary to amend its charter. Howden, supra note 27 at 779.
83 Sirila, supra note 34.
84 Plassaras, supra note 2.
85 The global spread of virtual and cryptocurrencies is likely to hit, above all, the IMF. The IMF is a specialized agency of the United Nations that was founded in 1944 and whose primary objective is to coordinate international monetary policy, especially the foreign currency exchange market, so as to promote international economic cooperation among its member countries and to foster global economic stability <http://www.imf.org/external/about/overview.htm>. In practice, the IMF sets standards, provides economic policy advice and, in some cases, also financing to its member states in economic difficulties. Its rules apply only to its members, and, since bitcoins are not backed by any state government, such cryptocurrency does not have to comply with IMF’s regulations. Plassaras, supra note 2 at 20-21). It follows that bitcoin and similar digital means of payment may pose a threat to the stability policies of the IMF, for they fall outside the organization’s regulatory framework and, as a consequence, the IMF cannot acquire them directly. So, IMF has a very limited power in relation to bitcoins or any other cryptocurrency, especially in case of speculative attacks against conventional weak (depreciated in value) currencies. Such an attack may further deprecate the value of the currency affected, and in so doing, it would destabilize the whole international foreign currency exchange market. (Plassaras, supra note 2 at 20). Thus, if the value of bitcoins continued to increase, turning it into a hard currency on international markets, then the possibility of carrying out speculative attacks by means of it would increase as well,
5. CONCLUSIONS

In such a morass, legal systems worldwide are currently faced with hard decisions: whether to prohibit bitcoins outright or to regulate bitcoins and bitcoin-like products, and, if so, who is best suited to do so.

Typically, in case of particularly groundbreaking innovations, we experience a sort of legal inertia, which may be caused by two things: 1) the initial disorientation pervading the legal domain in dealing with revolutionary legal categories and institutions, and 2) that any regulation, once adopted, would turn out to be—in all likelihood—obsolete due to the extremely fast technological evolution.

This is particularly true in light of the fact that, when it comes to cryptocurrencies, it is no longer possible to follow the same pattern followed in the past, whereby only few intermediaries had to be regulated to pursue public policy goals. In this case, in fact, since the system entails a great number of users all interacting with each other on a peer-to-peer basis, the costs of regulating this network may well end up outweighing the potential benefit inherent in such regulation.86

And it is exactly for that reason that experts urge regulators to be prudent and adopt careful policies, aimed at “encourag[ing] resilience and adaptation by existing institutions.”87

Furthermore, the difficulty in regulating ICT innovations is enhanced by the very nature of digital technologies which, notwithstanding their impact on domestic legislations, are essentially located outside the conventional boundaries of national jurisdictions.

Cyberspace, and the various activities occurring inside it, amount to a world which is not identified by geographic features, and which, as such, may also be classified under different legal institutions and be governed by specific provisions. Not to mention that, even removing traditional bitcoin

86 Brito, Shadab, & Castillo, supra note 30 at 144.
87 Ibid. at 147.
transactions from the equation, the next frontier of bitcoin regulations will have
to focus on far more complicated issues, such as derivatives and other financial
instruments and prediction markets.  

By virtue of their understanding, in the past, it has been suggested that online
activities ought to be regulated by laws which should not be linked to specific
legal or geographical areas, such as for instance the *lex electronica*, which
would strengthen the case for regulation by a supranational organization or
alternatively through international instruments. At the same time, though,
careful thought shall be given to the consequences of bitcoin regulation, as well,
because if governments and international organizations exceeded in
overregulating this domain, the benefits attached to it would definitely
disappear.

Perhaps, it might be argued that the adoption of a wait and see attitude may
be a valid alternative, at least for the moment, notwithstanding the potential
economic benefits arising from the regulation of bitcoins. This option would in
fact enable states to observe the evolution of bitcoins over time before taking the
appropriate measures. Actually, it is still too early to predict bitcoin’s future and
we may even witness an unexpected—though not so unusual—development: The
bitcoin system may eventually implode (due to market forces) or be replaced by
either more advanced cryptocurrencies or new and still unknown means of
payments, and this would make any attempt to regulate the system basically
useless. Then again, it seems that the bitcoin phenomenon is not merely a fad and,
“just as BitTorrent was not the first file-sharing service and Skype was not
the first voice-over-Internet service, it may be that bitcoin will be a pioneer in the
field of virtual currencies, but will be overshadowed by an easier-to-use rival.”

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88 Ibid. at 144. In that essay, the authors mention Mastercoin, Counterparty, and
Etherum, projects aspiring to “extend the Bitcoin protocol or their own block chain’s
capabilities to asset exchange, complex financial instruments, and even real world
assets.” Ibid. at 211.

89 See in this regard, John Barlow, “A Declaration of the Independence of Cyberspace.”
Electronic Frontier Foundation: Defending Your Rights in the Digital Age (February 8,

90 It is clear that the nature of cyberspace creates the need for countries to negotiate in order
to meet their respective aims by finding common grounds and avoiding conflict. This
understanding may serve as a precursor for the establishment of an international
regulatory framework encompassing permissive, restrictive, and hostile states rather
than a case-by-case legislation or sector-specific solutions.

91 Perugini & Maioli, supra note 40.

92 Michael Sivy, “The Real Significance of the Bitcoin Boom (and Bust)” *Time* (Apr. 12,
2013) online: Time <http://business.time.com/2013/04/12/the-real-significance-of-the-
bitcoin-boom-and-bust/>.

online: The Economist <http://www.economist.com/blogs/economist-explains/2013/
04/economist-explains-how-does-bitcoin-work/>.
And this opinion seems correct, since bitcoins are more and more widely accepted. For instance, Wikipedia, the self-described “free-access, free-content Internet encyclopedia,”94 started accepting donations in bitcoin form in 2014,95 and, in the same year, the U.S. Federal Election Commission determined that political contributions could legally be made using bitcoins.96 Then there is the quaint case of the two schoolgirls who opened a lemonade stand and accepted bitcoins.97

In this context, Hayek’s words may ring almost prophetic. In fact, in 1976, the economist proposed that, in order to have “stabler” currencies and less unemployment, states should no longer have the monopoly on money, substituting it with the competition among private banks supplying the market with money just like all other enterprise supplies goods and services, completely dissolving the concept of a central bank capable of generating money.98 Such a proposal is still topical today, especially now that the E.U. has introduced a common currency. On the other hand, it could be said that it seems an impractical and risky project, so far.

In the end, leaving aside the unproductive effort to categorize and regulate bitcoins themselves, the law, and in particular legislators, will have to, in the first place, acknowledge the existence of cryptocurrencies and focus on what surrounds them and how they can make provisions concerning them, since all the available evidence points to fact that they are here to stay.99

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And, for that, it is time for regulators to sit down at the table, to start discussing the issue with an eye toward making lasting decisions.\textsuperscript{100}

\textsuperscript{100} The same approach is shared by the EBA according to whom “the global, internet-based nature of virtual currencies would require a regulatory approach to strive for an international, and ideally global, coordination, otherwise it will be difficult achieve a successful regulatory regime. In the absence of a global approach, national regulators will be required to issue continued warnings to potential users to make them aware of the risks of virtual currencies schemes that do not comply with the regulatory regime.” <https://www.eba.europa.eu/documents/10180/657547/EBA-Op-2014-08+Opinion+on+Virtual+Currencies.pdf>. Then, also added the possibility to make recourse to a governance authority.” A governance authority may, at first, appear incompatible with the conceptual origins of Virtual currencies as a decentralised scheme that does not require the involvement of a central bank or government. However, the mandatory creation of a scheme governance body does not imply that VC units have to be centrally issued. This function can remain decentralised and be run through, for example, a protocol and a transaction ledger. If it is true that the decentralised VC schemes are secure, it should be possible for market participants to establish themselves as scheme governance authorities.” See <https://www.eba.europa.eu/documents/10180/657547/EBA-Op-2014-08+Opinion+on+Virtual+Currencies.pdf>.