

The economic potential and risks of crypto assets: is a regulatory framework needed?¹

Maria Demertzis, Guntram B. Wolff

Executive Summary

We analyse and assess the economic potential and risk of crypto assets and discuss key regulatory questions that European Union policymakers need to confront. Crypto assets can be broadly classified as cryptocurrencies – a private means of payment – and initial coin offerings (ICOs), typically used to fund new activities against the promise of future utilities (utility tokens) or financial returns (securities tokens). Crypto exchanges and wallets provide services such as exchanging crypto assets into central bank currencies and brokerage services.

The underlying technologies – record keeping in distributed ledgers and blockchain – facilitate peer-to-peer interactions without intermediaries and are still experimental. They have been praised as offering benefits for many applications beyond finance, but there is also significant scepticism.

The crypto asset market has seen huge variation in its market valuation. After a peak of above \$800 billion (January 2018), it fell to around US\$200 billion (August 2018). Cryptocurrencies such as bitcoin have dropped markedly in value. The amount of funds raised through ICOs has also declined substantially since its March 2018 peak.

Regulators and supervisors have taken great interest in these new markets. Different regulators in Europe classify and treat cryptocurrencies differently. Some classify cryptocurrency as a unit of account while others reject it as a financial instrument. Several regulators take the view that case-by-case assessments of ICOs are necessary. There seems to be convergence on the view that crypto exchanges and wallet providers should require authorisation to operate.

Crypto assets raise six major public policy questions: how great is the potential of crypto assets in advanced financial systems? What is the best way to combat illegal activity such as money laundering and terrorism finance? How can consumer and investor protection be ensured? What about financial stability? How might crypto assets be taxed? And how can blockchain applications be embedded into the existing legal framework?

European policymakers must first decide whether crypto assets should be isolated, regulated or integrated. We argue that at this point regulation is the right approach. Second, global cooperation in the managing of the new technology's risks should be ensured while reaping

¹ Paper written at the request of the Austrian Presidency of the Council of the European Union for the informal ECOFIN meeting of EU finance ministers and central bank governors (September 2018). We thank Francesco Chiacchio for excellent research assistance in assembling data and providing a summary of MS regulatory initiatives. We would also like to thank numerous interlocutors in ministries, regulators, central banks and the private sector for sharing their insights with us. All errors and omissions remain ours.

the opportunities it may provide. The G20 and the Financial Stability Board should set regulatory norms that address the six policy questions. Standard-setting organisations such as the International Organisation for Standardization should also play a role. Third, EU policymakers need to agree on the right moment to move supervision of crypto assets from the national level to the EU level. In a single market for capital, diverging supervisory practices can come with significant downsides and this is particularly true for highly mobile crypto assets. However, different supervisory practices can allow experimentation with different approaches to a fast-changing technology.

1 Introduction

Crypto technologies and decentralised record keeping on distributed ledgers (eg blockchain) have facilitated secure peer-to-peer (P2P) interactions and allowed for the creation of so-called crypto assets. Such assets were initially created as private digital money (eg bitcoin). More recently, they have been employed as a way to raise funding, for example with initial coin offerings (ICOs). The technology has been used for applications other than finance, such as machine-to-machine exchanges in the internet of things, supply chains, digital identity management and healthcare record management (Casey *et al*, 2018).

The technology achieves two things: decentralisation and disintermediation. *Decentralisation* means that the technology removes the middle man from transactions. Just like cash, bitcoins (for example) can be used as a means of payment, used anonymously and without the need for a middle man. In the traditional financial system, for any other form of non-cash transaction, there is a need for at least one ‘trusted middle man’. In distributed ledger technology (DLT), this process of verification and record-keeping is done by everyone who engages in the system in a decentralised, open and transparent way. *Disintermediation* means that the technology provides a credible solution to the double-spending problem. In a cash transaction between two agents, there is a physical transfer from the wallet of one to that of the other. There is no possibility therefore of double-spending these funds. If this transfer is electronic, it is the role of the financial intermediary to ensure that the money is not spent twice. In a decentralised system, the intermediary is replaced by the decentralised verification process by all participants in the network. Often this is done in blocks of transactions, hence the term blockchain: a chain of peer-verified blocks of transactions saved in a decentralised way (see for example Lee, 2018).

The promise of the new technology is based on decentralised record-keeping, enabling the decentralisation of trust. Instead of a centralised ledger deposited at a trusted institution, information is recorded on a distributed ledger, in other words, the same information is saved simultaneously on a large number of computers. This enables the decentralisation of trust. However, the secure record-keeping needs to be governed by costly governance mechanisms, usually in the form of difficult computational tasks².

² In contrast, the accuracy of information in a centralised ledger depends on the central entity managing the ledger. Dynamic incentives and elaborate checks and balances aim to reduce the potential to abuse the power of centralisation of record keeping. The central entity does have an incentive to be accurate as inaccuracy will result in a loss of trust and thereby reduce the value of the central ledger. But as a central ledger, it is possible to extract rents and benefit from the record keeping – in other words, central record keeping comes with a concentration of power that could be abused. See for example Abadi and Brunnermeier (2018).

Two features constitute this technology's real added value. First, the log of transactions recorded cannot be tampered with. This implies that historical records are definitive, a feature that is invaluable to any business that relies on data tracking. Second, the principle of consensus-building (namely, the verification process) in a decentralised ledger has built-in incentives for participants to report truthfully. A DLT, therefore, has in-built structures to achieve a good equilibrium in which correct information is revealed by itself. These are all powerful innovations that can advance the way we track and update information.

The technology has the potential to provide innovative solutions to many areas including finance, but it is still at an experimental stage. The true scale of the technology's potential, in finance and in other areas, is heavily debated. Major banks, start-ups and venture capitalists invest significantly in these technologies³. Techno-enthusiasts claim that the technology will change everything. But increasingly, players in the market recognise that reaping the technology's benefits might be harder than initially thought. For example, it is now widely recognised that the transaction verification process in decentralised and *permission-less* ledgers such as bitcoins demands high levels of energy, with significant environmental costs⁴. There are also serious concerns about data-storage and eventually internet band-width as the files become larger. Moreover, it is too time-consuming to constitute an effective real-time payment system. This has led the latest generation of crypto technology to 'return' to more centralised systems, in which only a few nodes are given permission to verify transactions, known as *permissioned* ledgers. The original idea of full decentralisation has been shown to become less effective as the networks increased in popularity. It is also recognised that entries into ledgers still depend on the accuracy of the entered information. Whether distributed ledgers can really improve data keeping for cattle or mango supply chains is therefore debatable⁵.

Permissioned networks aim to combine the advantages of the centralised and decentralised approaches to record keeping. In particular, trust is based on the verification processes of new entries to the database carried out by a small group of trusted insiders but participation is wider than only the trusted insiders. Examples of permissioned networks are Alastria and Utility Settlement Coins⁶. Banks are exploring the usage of such permissioned networks in, for example, trade finance or for clearing and settlement of financial assets, which currently still takes several days, in contrast to payment systems that are almost instantaneous. However, the smaller the permissioned network, the larger the risk of abuse of market power (Abadi and Brunnermeier, 2018).

Crypto assets can, in principle, be divided into those that do not represent any real-world asset and those that are a representation of real-world assets or have the backing

³ For example, Santander announced that it plans to utilise blockchain and other new technologies within its capital markets business to change how securities are issued, traded and settled. See: https://www.santander.com/cs/cs/Satellite/CFWCSancomQP01/en_GB/Corporate/Press-room/Santander-News/2018/07/11/Santander-Corporate--Investment-Banking-appoints-John-Whelan-as-head-of-new-Digital-Investment-Banking-unit.html.

⁴ The global industry accounts for 0.17 percent of global electricity consumption, more than 161 individual countries, according to Digiconomist, a website that tracks the industry. See: <https://digiconomist.net/bitcoin-energy-consumption>

⁵ *Financial Times*, 'Wyoming's pioneering crypto cowboys beef up the supply chain', 1 July 2018. See: <https://www.ft.com/content/da69a410-6972-11e8-b6eb-4acfcfb08c11>. For a critical appraisal of 'smart mangoes' and the benefits of blockchain more generally, see: <https://hackernoon.com/ten-years-in-nobody-has-come-up-with-a-use-case-for-blockchain-ee98c180100>.

⁶ See: <https://alastria.io/> and <https://ftalphaville.ft.com/2017/09/18/2193542/what-is-utility-settlement-coin-really/>.

of an institution. In practice the world of crypto assets is fluid with hundreds of innovations every month, with new products combining different features of crypto technology and distributed ledgers. Nevertheless, we think that one can roughly classify the world of crypto assets into those assets that most resemble currencies (cryptocurrencies) and those that represent promises of institutions or networks on future services or pay outs (ICOs). Finally, there are service providers in the form of crypto exchanges, via which crypto assets can be exchanged against each other and against real currencies, and wallet providers that offer brokerage services and simple services such as the holding of crypto keys. **This distinction has significant implications for regulation and supervision.**

Cryptocurrencies, such as bitcoin, derive their value from scarcity and the network of users. They can therefore be thought of as a way to monetise network effects. **In contrast, many tokens and ICOs can be best thought of as representations of assets controlled by a cryptographic key.** Their attraction results from a possible reduction in transaction costs and their greater tradability. This could allow a wider spread and greater access to finance, as well as significant reductions in trading costs. But these crypto assets are otherwise not dissimilar to equities, securities or even gift cards.

Whether it is necessary to regulate crypto assets, and how one should go about it has been the subject of major recent debates. The Financial Stability Board has been tasked by the G20 to report on its overall work on crypto assets. In their findings (FSB, 2018) they reported that there is currently no financial stability risk but continuous monitoring is necessary. The European Commission discussed crypto assets in its fintech action plan,⁷ stressed their economic potential and pointed to the fact that the EU's anti-money laundering directive addresses concerns on money laundering and terrorist financing. Landau and Genais (2018) studied the crypto assets markets at the request of the French finance ministry and argued that it is probably too early to systematically regulate crypto assets. Instead, they suggested that exposure of standard financial intermediaries to crypto assets should be limited. The German government coalition intends to set out a strategy to limit abuse of blockchain and create a legal framework for cryptocurrencies and tokens at international and European levels⁸.

2 Crypto assets and infrastructure: size and economic assessment

2.1 Cryptocurrencies

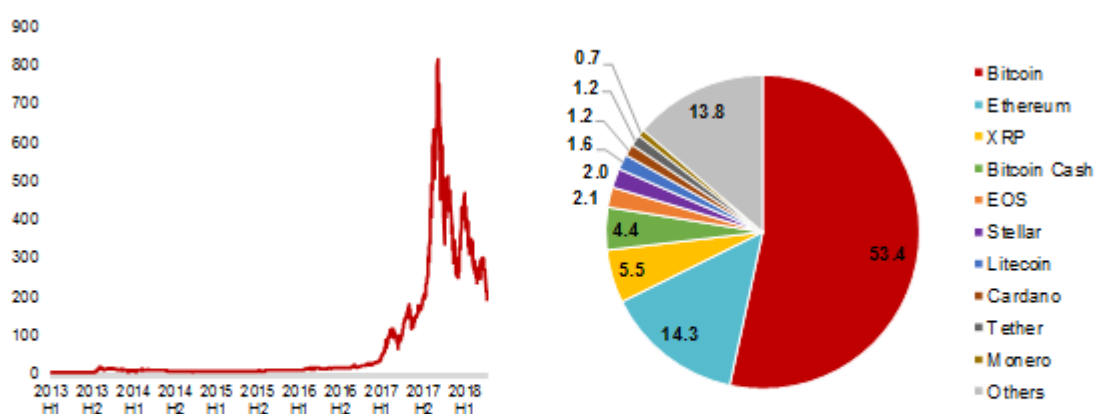
Market capitalisation of crypto assets after a peak of more than \$800 billion has fallen substantially during 2018 and to approximately \$200 billion. The market capitalisation of crypto assets increased strongly until 7 January 2018, reaching a peak of \$836 billion. Since then, it has fallen substantially to reach \$207 billion on 16 August 2018 (Figure 1). The greatest part of crypto assets are cryptocurrencies, with bitcoin playing the largest role. Most of the movement of market capitalisation of crypto assets is down to cryptocurrencies and bitcoin in particular. **Bitcoin has a high level of price volatility** with daily changes often in the hundreds of dollars (Figure A1 in the online annex).

⁷ https://ec.europa.eu/info/publications/180308-action-plan-fintech_en

⁸ The coalition agreement sets out the political programme of the governing parties in Germany. See: https://www.cdu.de/system/tdf/media/dokumente/koalitionsvertrag_2018.pdf?file=1.

Figure 1: Market capitalisation and shares

(\$ billions and percentage shares)



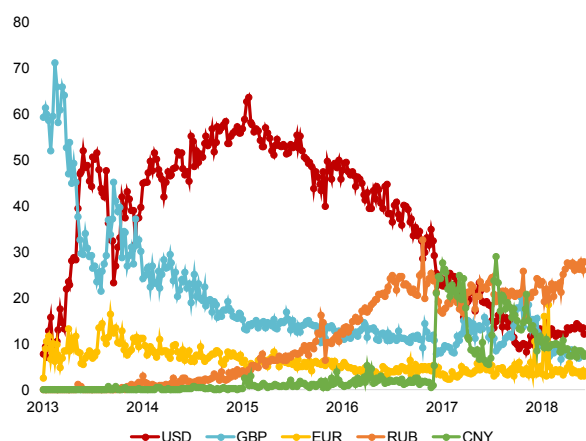
Source: coinmarketcap.com. Note: Last observation is for 15 August 2018. Source: coinmarketcap.com. Note: Data for 16 August 2018.

The share of cryptocurrencies in global payment transactions is tiny. According to the European Central Bank, on a daily basis, there are around 284,000 bitcoin transactions globally, compared with 330 million retail payments in the euro area⁹.

Exchanges between bitcoin and government-backed currencies were initially dominated by the British pound and are now more broadly spread across currencies. The geographic localisation of bitcoins is difficult to determine because bitcoins live in the internet. However, one can measure into which currencies bitcoin is traded on prominent P2P bitcoin exchanges. Figure 2 shows that as of 11 August 2018, on localbitcoins.com, the shares divided as follows: Russian rubble, 27.9 percent share; US dollar, 12.1 percent; British pound, 7.3 percent; Chinese yuan, 7.2 percent; and the euro, 3.1 percent.

⁹ See: <https://www.ecb.europa.eu/press/key/date/2018/html/ecb.sp180208.en.html>. A recent bitcoin conference (see <https://news.bitcoin.com/miami-bitcoin-conference-stops-accepting-bitcoin-due-to-fees-and-congestion/>) stopped receiving payment in bitcoin because of the cost and time involved in processing the payments.

Figure 2: Currency market shares in bitcoin exchange transactions (% shares)



Source: Bruegel based on localbitcoins.com and coin.dance. Note: Figures based on weekly bitcoin volumes on the Finnish exchange localbitcoins.com. Last observation is for 11 August 2018.

Revenues from mining new cryptocurrencies have increased substantially in the last five years. Cryptocurrencies create incentives for companies and groups of individuals to participate in the mining process. Since the end of April 2013, average daily revenues from mining went from \$0.7 million to \$33 million as of 18 July 2018 (Figure A2 in the online annex). Daily revenues in 2018 have averaged over \$44 million, and more than 1.6 million unique users participate in transactions each day (against 119,000 in 2013).

Regulators, supervisors and multilateral institutions have difficulties agreeing how to classify, treat and regulate crypto assets. A large number of views have been expressed and a number of institutions have adopted contradictory or at least differing views on the nature of crypto assets. The differences in views concern cryptocurrencies, ICOs/tokens and exchanges.

As regards cryptocurrencies, there are strong differences on their classification, including within the EU. The European Supervisory Authorities (ESAs) recently issued a joint warning on the risks of virtual currencies for consumers¹⁰. The European Banking Authority (EBA) argues that virtual currencies should remain outside the scope of the payment services directive as technology related risks make them distinct from conventional fiat currencies, and rejects the use of the term ‘currency’¹¹. The ECB makes it clear that it does not consider cryptocurrencies or virtual currencies to be money¹². But the ECB also

¹⁰ See: <https://www.eba.europa.eu/documents/10180/2139750/Joint+ESAs+Warning+on+Virtual+Currencies.pdf>.

¹¹ See: <https://www.eba.europa.eu/documents/10180/1547217/EBA+Opinion+on+the+Commission%E2%80%99s+proposal+to+bring+virtual+currency+entities+into+the+scope+of+4AMLD>.

¹² ECB executive Board member Yves Mersch argues that they are not in foreseeable future money as they lack official recognition and have a small market share. He also argues that they poorly function as medium of exchange, are not a valid unit of account and cannot well store value due to their high price volatility. <https://www.ecb.europa.eu/press/key/date/2018/html/ecb.sp180514.en.html>.

recognises that the nature of virtual currencies could change in the future and should therefore be monitored. The ECB also points to the fact that current payment systems are by far superior to what DLT can achieve (Coeuré, 2018). The Bank of England equally rejects the view that cryptocurrencies are money¹³. Central banks therefore do not consider them a unit of account. In contrast, the German Federal Financial Supervisory Authority (BaFin) classifies bitcoin as a unit of account comparable to foreign exchange with the difference that they do not refer to a legal tender (see Table A2 in the online annex, which details different EU countries' approaches). Bitcoin is thus a sort of private means of payment and falls under German law (Kreditwesengesetz) with implications for all those trading in bitcoin. The French supervisor AMF, in turn, argues that virtual currencies are not subject to the regulatory framework on means of payment and cannot be considered a financial instrument. Italian authorities consider it a means of exchange while the Spanish note that virtual currencies have not been registered, authorised or verified in Spain and a case-by-case approach should be taken. China restricts the bitcoin mining industry out of environmental and financial stability concerns¹⁴.

In our assessment, cryptocurrencies cannot currently be considered as money. We agree with the ECB that they are neither a useful unit of account, nor a well-usable medium of exchange, and least of all a store of value because of their extraordinary price volatility (see also Claeys *et al*, 2018). Currently, cryptocurrencies probably best resemble speculative assets.

2.2 Initial coin offerings

Financing via ICOs gained momentum, reaching more than \$7 billion in March 2018, before decreasing drastically in July to \$926 million (Figure 3). According to icowatchlist.com (retrieved on 16 August 2018), most of the fundraising is operated through the Ethereum blockchain and is located in five countries: Russia (\$1.0bn), the US (\$0.9bn), Switzerland (\$0.5bn), Singapore (\$0.3bn), and China (\$0.2bn).

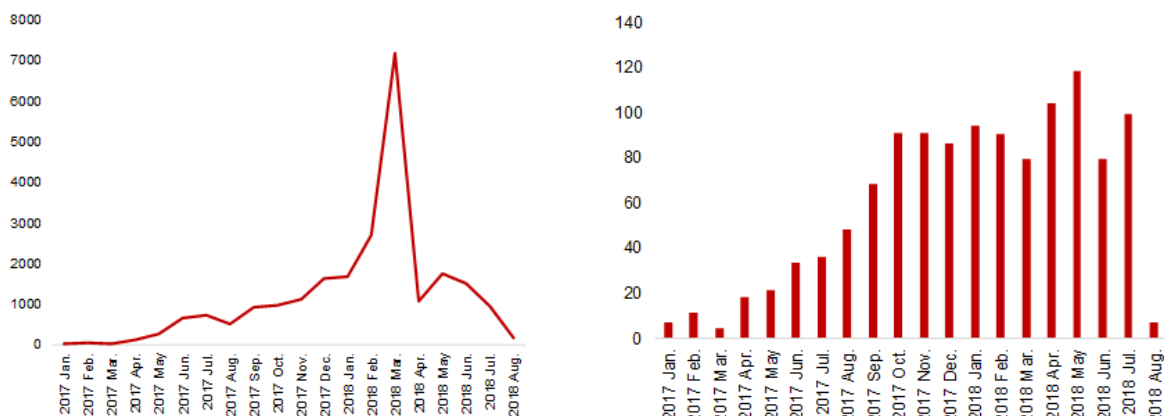
The EU market constitutes about 30 percent of the global market in terms of the number of projects¹⁵ and is concentrated in a few countries and industries. Within the EU, the UK and Estonia host more than 46 percent of ICO-funded projects, followed by Lithuania, Germany, France, and Spain. More than 71 percent of all projects are located in these six countries. In terms of industry, most ICO-based funds are raised in network/communications, followed by blockchain platform and finance (Figure 4).

¹³ Mark Carney argues that they fail to be a good store of value, an efficient medium of exchange and a proper unit of account. <https://www.bankofengland.co.uk/speech/2018/mark-carney-speech-to-the-inaugural-scottish-economics-conference>.

¹⁴ <https://www.ft.com/content/adfe7858-f4f9-11e7-88f7-5465a6ce1a00>.

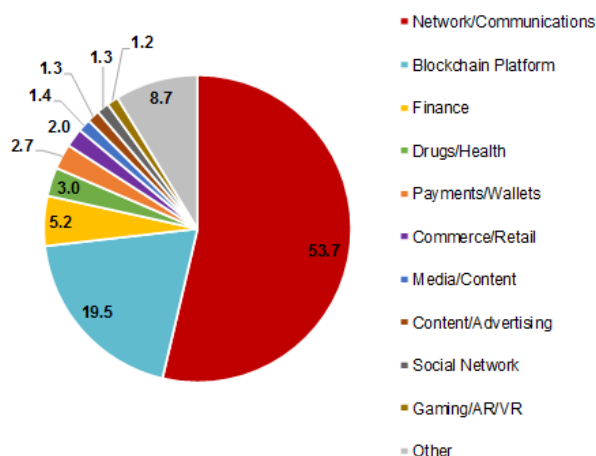
¹⁵ Source: icowatchlist.com.

Figure 3a: Monthly size of ICOs-based funding (\$ millions) **Figure 3b: Number of ICOs (units)**



Source: medium.com based on tokendata.io, icodrops.com, icodata.io, coinschedule.com, cryptocompare.com, smithandcrown.com. Note: August 2018 data up to 5 August. As medium.com notes, information on funds collected is not available for all ICOs (information for last week is tentative and may be adjusted). ICOs that collected less than \$100,000 were not considered. More than 1,000 ICOs were performed in 2017. However, the data for the 514 largest and most popular ICOs, the data of which can be processed, were considered when calculating the total amount of funds collected during 2017. Data include the TON Pre-ICO-1,2 (\$1.7 billion) and the Petro ICO (\$5 billion). According to the data from the official website of the Petro ICO, Petro sales equalled more than \$5 billion, which is equivalent to more than 4 billion euros or 31 billion yuan (<http://www.elpetro.gob.ve/#about>). However, the data on the amount collected by El Petro from some other sources differ. For example, according to criptomoedasfacil.com, the amount of funds collected cannot exceed \$2.3 billion taking into account discounts, the project White Paper indicates \$4.387 billion, and other sources mention the \$3 billion stated, among others, by the President of Venezuela Nicolas Maduro. Not including EOS, which collected \$4 billion or 7.12 million ETH over the year from 26 June 2017 to 1 June 2018.

Figure 4: Industry shares of ICO-funded projects (% shares)



Source: icowatchlist.com. Note: Shares out of raised funds. Data for 16 August 2018.

Several regulators take the view that a case-by-case consideration and assessment needs to be applied to ICOs. The European Commission is still in the process of assessing whether the current EU regulatory framework is adequate with regard to ICOs (see Table A2 in the online annex). The current practice at institutions such as BaFin and AMF is to look at every application for a new ICO separately. And while some take the view that some general guidelines are needed, it is also acknowledged that one has to primarily assess whether an ICO is a securities ICO or a utility ICO. For ICOs that are essentially securities living on a blockchain, relevant securities law applies. In Europe, for example Mifid II would be applied. But according to the information provided by our interview partners, the predominant form of ICOs is utility tokens, where future services are promised in exchange for a current payment. The US Securities and Exchange Commission (SEC), in turn, because of the wider definition of what a security is (Howey), calls most ICOs securities and applies the respective US law.

In our assessment, ICOs are indeed new forms of financing companies, usually young companies. In that respect they are similar to crowdfunding. Unlike crowdfunding however, they are globally available, they are transferable (marketable) and investors are expecting to earn a return. Crowdfunding by contrast is more localised and typically made as donations. It is for this reason that investors consider crowdfunding a more limited way of raising money¹⁶. As such, ICOs are akin to securities but since most of them only promise future services, they can best be thought of as tradable future services, for example access to computer games, or gift cards or tradeable frequent flyer miles.

ICOs raise questions for the functioning of the economy. If companies increasingly create company-specific money that is a promise of a future utility only delivered by the specific company, such funding can create significant new transaction costs¹⁷. ICOs also raise important regulatory questions and we concur with the view that every ICO in Europe should be assessed by the relevant regulator as to whether it is a security or a utility token and the relevant regulation should be applied correspondingly.

2.3 Crypto exchanges

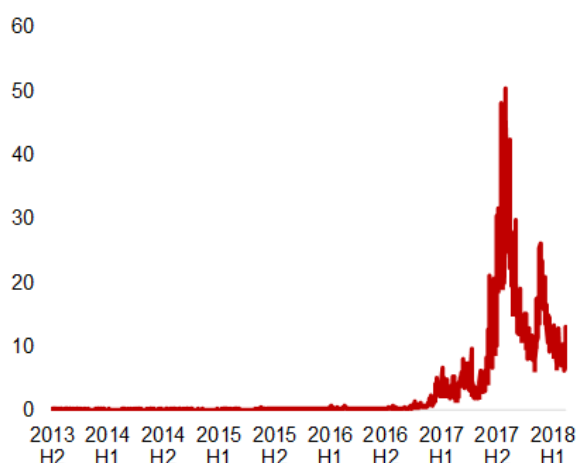
Crypto exchanges are digital platforms that allow users to exchange tokens for other tokens or possibly for central bank money. They have experienced a similar path to that of crypto assets: a meteoric rise in late 2017/early 2018, followed by a moderation. On 17 August, 215 exchanges were reported in the market, with a total trading volume of approximately \$19.1 billion, down from a high of more than \$50 billion in January 2018 (Figure 5). These figures exclude retail bitcoin dealers and focus on market-makers.

The market seems less concentrated than that for crypto assets, as the share of trading volumes of smaller participants is higher, even though the picture changes significantly depending on which type of volumes we are considering (Figure 6 reports market shares based on adjusted and reported 24-hours volumes). Moreover, data from crypto exchanges is usually released without scrutiny, which suggests that these figures should be examined with caution.

¹⁶ See: <https://medium.com/@EnergyPremier/ico-vs-crowdfunding-whats-different-bc54f13ede79>.

¹⁷ Suppose you hold a token promising that you will be able to play a certain online game by company x but then your preference changes and you want to play a game provided by company y. You would need to exchange the token from one company with a token of another company. This creates transaction costs and the tokens will probably trade at a discount.

Figure 5: Reported exchange volumes (billion USD)



Source: coinmetrics.io. Note: Figures based on daily volumes for 64 major crypto assets (accounting for more than 83 percent of the market). Data on OTC exchanges are not included. Last observation is 18 July 2018.

Figure 6a: Crypto exchanges market share based on prior 24 hours adjusted volumes (percentage shares)

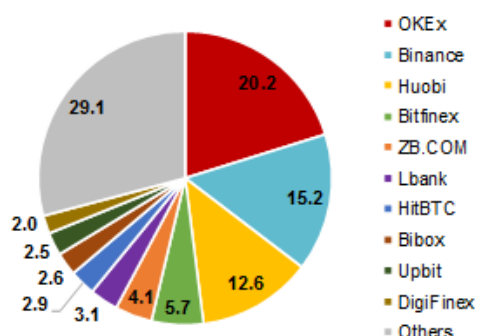
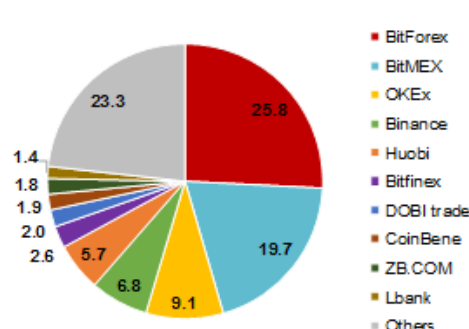


Figure 6b: Crypto exchanges market share based on prior 24 hours reported volumes (percentage shares)



Source: coimarketcap.com. Note: Data for 17 August 2018. Adjusted volume is volume from spot markets, without markets with no fees and transaction mining.

Nevertheless, crypto exchanges have gained millions of customers in a short period of time and are reportedly very profitable, perhaps because of the largely unregulated nature of the market (Casey *et al.*, 2018). In fact, while some Asian governments are introducing regulations, some crypto exchanges have decided to move their operations elsewhere; for example, Binance has reportedly decided to relocate to Malta¹⁸, while Huobi went to Singapore¹⁹. These are two of the biggest exchanges, whose moves might suggest that there is scope for regulatory arbitrage. The three largest crypto exchanges in terms of 24

¹⁸ See: https://medium.com/@Elysian_Ely/binance-relocates-to-malta-293fa03acb44.

¹⁹ See: <https://www.techinasia.com/singapores-huobi-putting-itself-blockchain>.

hours adjusted trading volumes (OKEx, Binance, and Huobi) are all located in Asia, and average almost 12 million users each (Table A1 in the online annex). Binance reported profits of \$300 million for the first half of 2018 and expects its 2018 profits to be between \$500 million and \$1 billion²⁰. In general, it is very difficult to retrieve or estimate profit or revenue figures for crypto exchanges. We provide a (rough) estimate of 30 days revenues based on reported fees and volumes, obtained by multiplying trading volumes by the percentage due in fees. While results might not be exact (because of insufficient data on actual applied pricing schedules), the order of magnitude for OKEx and Huobi is between \$20.5 million and \$40 million in revenues. Huobi Group also reports approximately \$150 billion cumulative turnover in 2018 up to April.

EU-based crypto exchanges trail market leaders in terms of scale. Based on the 24-hours reported volumes on 13 August 2018, the largest EU exchanges seem to be only a fraction of the biggest global ones. Table A1 in the online annex also reports information for a collection of major EU exchanges. They seem to operate on fewer markets, while the 30 days estimated revenues fall in a range from \$0.7 million to \$5.5 million.

Regulatory approaches seem to converge across EU countries. Crypto exchanges and custodial wallet providers fall under the EU's anti-money laundering directive. The ECB argues that virtual currency exchanges need to be held *"to the same rigorous standards as the rest of the financial system"*²¹. National regulators all require authorisation for a virtual currency exchange to be established (Table A2 in the online annex). However, it is more difficult to establish how strict the regulation of these exchanges is.

3 Policy concerns

The public policy debate on how to regulate crypto assets needs to consider six major concerns.

First, to what extent does the new technology allow for innovative sources of financing that would reduce the cost of financing? Currently, crypto assets such as ICOs play only a marginal role in financing the European economy. But permissioned blockchain solutions might eventually reduce the transaction costs of financial intermediation by broadening the access to finance for smaller companies and smaller projects. It is too early to say how significant the benefits will be as the technology and governance is still in its infancy. An important argument is certainly that public authorities should not stifle further innovation in this space.

Second, cryptocurrencies have been and are used for illegal activities²². As transactions in cryptocurrencies can be done anonymously, they can be misused. The strong market reaction to the value of bitcoin after the shutdown of Silk Road, a major digital market for illicit drugs, suggests that illegal activity is indeed an important feature of cryptocurrencies (see Figure 7 and BIS, 2018). As is the case for cash, where many measures are in place to

²⁰ See: <https://www.bloomberg.com/news/articles/2018-07-06/world-s-largest-crypto-exchange-eyes-1-billion-profit-amid-rout>.

²¹ See: <https://www.ecb.europa.eu/press/key/date/2018/html/ecb.sp180514.en.html>.

²² G20 Communiqué 19-20 March 2018. See: https://g20.org/sites/default/files/media/communique_-_fmcbg_march_2018.pdf.

limit its abuse, careful policy action is needed to limit and prevent illegal activity in cryptocurrencies. The EU’s anti-money laundering directive has been amended to deal with this²³.

Figure 7: Bitcoin price (\$) on the day of the Silk Road shutdown b8



Source: Bruegel based on coindesk.com. Note: Intraday data.

Third, consumer and investor protection issues need to be carefully considered. The digital nature of crypto assets makes them directly accessible to the general public, provided people are digitally savvy. Broad access is desirable but also exposes vulnerable groups. For example, the March 2018 US *Student Loan Report*²⁴ quotes the results of a survey, in which about a fifth of all participating students had used financial aid money to invest in cryptocurrencies, like bitcoin. The three ESAs have issued warnings about the riskiness of crypto assets. By their nature, many ICOs are investments in risky start-ups – which, in the regular financial system would typically be done by venture capitalists who know about and price the risks appropriately.

Beyond the regular possibility of default and losses when investing in ICOs and cryptocurrencies, there have also been incidents of fraud. These incidents have varied from the exploration of vulnerabilities in the code to actual instances of the system being beaten. Notably, a group of hackers known as ‘51 Crew’, took control of more than 51 percent of the computer network of two blockchain clones, Shift and Krypton. The group effectively took over the verification process and enabled an online theft of \$65 million in bitcoin²⁵. Hacks and frauds have also concerned services providers such as wallets, who hold cryptographic keys on behalf of consumers and investors. The MIT Technology Review reported in May 2018²⁶ that the Wall Street Journal investigated the documents of 1,450 ICOs and found that

²³ In February 2018, Europol, the European Union Agency for Law Enforcement Cooperation, estimated that about 3-4 percent of illicit proceeds in Europe are laundered through cryptocurrencies. See: <https://www.bbc.co.uk/news/technology-43025787>.

²⁴ Available at: <https://studentloans.net/financial-aid-funding-cryptocurrency-investments/>.

²⁵ See: https://www.huffingtonpost.in/raja-raman/blockchain-can-transform-the-world-but-is-it-fool-proof-a_21660586/.

²⁶ See: <https://www.technologyreview.com/the-download/611170/surprise-hundreds-of-icos-are-probably-scams/>.

271 raised serious doubts about their authenticity. As they increase in popularity, ensuring investor protection becomes even more important.

Fourth, there is the question of financial stability. The high price volatility in the market could cause financial stability problems. This is not a real threat at the moment as the market is still very small and largely separated from the traditional financial system. The FSB therefore agreed that crypto assets do not currently pose a material risk to global financial stability, but supported vigilant monitoring in light of the speed of developments and data gaps.

Fifth, there are important questions about how crypto assets should be taxed. One issue is how profits from speculation with crypto assets are taxed. A natural way would be to tax those profits in the same way as other profits resulting from speculation in, for example, stocks. A second question is how the proceeds from ICOs for companies should be treated. For companies issuing securities tokens, the normal taxation of companies can apply. More complicated is the taxation of utility tokens which, at the time of issuance, are exchanged for cash and oblige the company to spend resources in order to be eventually able to deliver the services. This requires some clarification on the necessary tax accountability. For the one buying the utility token, there is also a question of whether and how the valuation gain should be taxed (suppose you buy a token for €100 in the hope to have access to a computer game worth €200 in two years, should the €100 gain be taxed? What if the value of the token then increases to €250?).

Finally, blockchain solutions raise important legal questions in both financial and non-financial applications. For example, blockchain solutions could substantially simplify the process of clearing and settling. Yet the participants in such a solution would need legal safeguards that any settlement on a blockchain has the same legal status as in previous solutions. Similarly, experiments with blockchain solutions in trade finance suggest that a substantial reduction in transaction costs is possible. Yet, currently most experiments duplicate the blockchain solution with standard exchanges of the respective legal documents. For it to fully work, the transfer of the property of say a container on the blockchain would need to be legally recognised and binding. Otherwise, severe legal uncertainty prevails.

4 Three considerations that should frame the EU's debate on crypto assets

There is broad consensus among the crypto experts and policymakers (IMF, 2018; BIS, 2018) that the technology behind crypto assets is interesting and promising. However, it is also thought that the technology is still very much in flux and as different applications emerge we are only starting to understand how it can be adapted for different uses. Currently, the total value of crypto assets is small, as we have shown, and is therefore not perceived to pose a visible risk to financial stability (IMF, 2018) or, indeed, to other sectors.

The approach to regulation has to be adapted to the technical nature of crypto assets, especially when they are based on fully decentralised systems. A number of these crypto assets, for example bitcoin, are not issued by entities that are known (legal entities or otherwise). Nowhere in this process is the identity of the issuer revealed. It is therefore not possible to regulate bitcoin as such as it is just a software code that exists on the internet.

Instead, one can regulate all those entities that operate with cryptocurrencies: for example, as done in China, mining farms can be forbidden. Exchanges can also be regulated. Buying and selling can be prohibited on exchanges operating in Europe. So the approach to regulation needs to be adapted to the technology.

In our view, the European policy discussion on crypto assets should focus on three key questions.

First, should crypto assets be isolated, regulated or integrated? This question was first put forward by Mark Carney²⁷. Landau, J. and A. Genais (2018) argue that it might be premature to regulate crypto assets in general ways, as regulation could hamper or prevent innovation. Regulation would oblige definition and classification of crypto assets. As a result, innovation could be hampered or even be directed at regulatory evasion. Instead, Landau, J. and A. Genais (2018) propose to focus the regulatory effort on the interface between crypto assets and the regular financial system. A further important argument against a generalised regulation is that it could prematurely provide legitimacy to the regulated entity. The fact that something is regulated and supervised is a stamp of quality that can be used vis-à-vis retail and professional customers.

Yet, the proposal to basically isolate crypto assets by focusing their regulation on the interface and limiting the ability of banks or funds to invest in crypto assets has significant drawbacks. First, this intervention in itself might limit the development of crypto assets much more significantly than direct regulation of the assets. In particular, without gaining access to investment and savings funds, it might be impossible for the market to grow. Innovation would then be mostly directed at fringe uses. Moreover, consumer and investor protection questions are already significant and crypto asset exchanges could already be held to high standards given their strong growth and profitability. Mark Carney supports the view that crypto assets should be regulated now, but should not be isolated from the regular financial system. Others, for example the US SEC, are still considering whether to approve a bitcoin ETF, that would allow for a deeper integration of bitcoin in the financial system²⁸.

We concur with Landau and Genais that limiting the exposure of financial institutions to cryptocurrencies is sensible. Not only do cryptocurrencies provide little societal value (at least in advanced economies with well-functioning and accountable central banks) but they are also high-risk assets and as they grow can create financial stability risks. The question, however, is whether this would not be best achieved by treating and regulating them as highly risky assets. The argument can be made stronger with exchanges. Is it not time for citizens in the EU to be provided with comparable levels of disclosure when buying a crypto asset on an exchange than when buying a risky derivative on a regular exchange?

If one accepts the need to regulate, then the question is how. Our understanding is that much can be subsumed under existing regulation with case-by-case evaluations by the relevant supervisors. The central argument for this is that despite the great innovation and new

²⁷ See: <https://www.bankofengland.co.uk/speech/2018/mark-carney-speech-to-the-inaugural-scottish-economics-conference>.

²⁸ The US SEC announced that it would delay its decision on a bitcoin exchange traded fund (ETF). Disapproving the bitcoin ETF would be a step in the direction of isolating bitcoin from the traditional financial system. See: <https://www.ft.com/content/53311902-9ad1-11e8-ab77-f854c65a4465> and <https://www.sec.gov/rules/sro/cboebzx/2018/34-83792.pdf?ios-app-redirect=true>.

technology, at its core much of the crypto asset world is ‘old wine in new bottles’. In other words, the features of the technology do not transform the fundamental nature of the financial intermediation that requires regulation. Moreover, a case-by-case approach would allow the new technology to develop freely and for regulation to be technology-neutral.

Second, the public policy approach to crypto assets requires global coordination on key regulatory questions. Limiting money laundering and terrorism finance or preventing tax evasion requires international cooperation, and even more so in the world of crypto assets. But since access to crypto exchanges essentially only requires access to the internet, also consumer and investor protection for crypto exchanges would benefit from a global approach. We therefore consider the FSB and the G20 as the best-placed institutions to discuss these matters. Beyond finance, we have pointed to the need for international standards and compatibility with various legal systems. A global standard for blockchain trade finance solutions would for example be of great use. Standard-setting organisations such as ISO can play a role in this regard.

Third, there is the question of which supervisor/institution should apply regulation. As we have documented, currently a variety of national and EU-level supervisors apply the existing regulatory framework, sometimes in different ways. In a single market in which consumers, investors and firms can operate their digital business from any EU country, it is sensible to empower one supervisor to eventually be in charge of the entire crypto asset world. This is in our view the right approach for capital markets union in general (Sapir, Véron and Wolff, 2018) and holds even truer for crypto assets provided digitally. However, at which point that should happen can still be debated. Currently it might be useful to sustain different practices across EU countries for some time as a way to experiment and learn about the best approaches to this fast-developing technology. But it also implies that regulatory arbitrage within the EU would have to be tolerated for some time. This might currently be acceptable given the small size of the market but creates facts on the ground and makes eventual switching to European Securities and Markets Authority supervision more difficult from an economic and political economy point of view. So policymakers should not debate whether but when is the right moment to move to a single supervisory approach in the EU.

Finally, we would like to point to the issue of accountability. Crypto-asset systems should be resistant to error, fraud or ill intent. But even the most robust system can fail and therefore should have in-built processes for resolving conflict and disputes when things go wrong. Peer review of software code might not be sufficient for robustness. Purely decentralised systems such as bitcoin lack the individual/institution that could be held accountable in case of error. Ultimately, this might result in unstable systems. The promise of the technology as a stand-alone mechanism might therefore be limited. Instead, we predict that if it is integrated with systems that have strong ultimate accountability, the technology will provide tangible benefits.

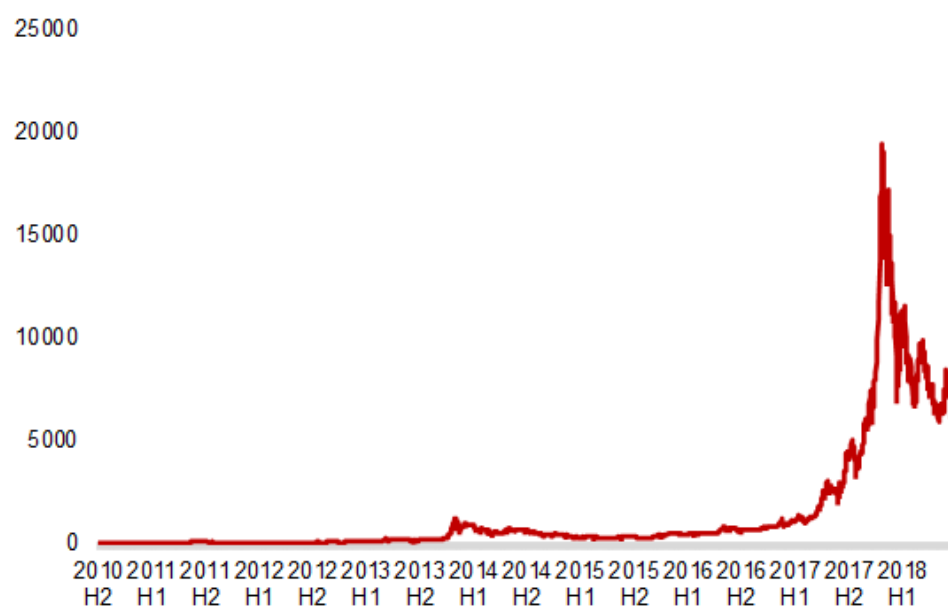
References

- Abadi, J. and M. Brunnermeier (2018) ‘Blockchain economics’, *mimeo*, Princeton University
- BIS (2018) ‘Cryptocurrencies: looking beyond the hype’, in *BIS Annual Economic Report*, Chapter V, Bank for International Settlements
- Carney, Mark (2018) ‘The future of money’, speech, available at <https://www.bankofengland.co.uk/speech/2018/mark-carney-speech-to-the-inaugural-scottish-economics-conference>
- Casey, M., J. Crane, G. Gensler, S. Johnson and N. Narula (2018) ‘The Impact of Blockchain Technology and Finance: A Catalyst for Change’, *Geneva Report on the World Economy* No. 21, ICMB and CEPR
- Claeys, G., M. Demertzis and K. Efstathiou (2018) ‘Cryptocurrencies and monetary policy’, *Policy Contribution* 10/2018, Bruegel, available at http://bruegel.org/wp-content/uploads/2018/06/PC-10_2018_2.pdf
- Coeuré, Benoit (2018) ‘The future of financial market infrastructures: spearheading progress without renouncing safety’, speech, available at <https://www.ecb.europa.eu/press/key/date/2018/html/ecb.sp180626.en.html>
- Landau, J. and A. Genais (2018) *Les Crypto-monnaies*, Rapport au Ministre de l’Economie et de finances, 4 July, La Documentation française
- Lee, J. (2018) ‘Distributed ledger technologies (blockchain) in capital markets: risk and governance’, *Journal of Business & Technology Law*, 14.1
- IMF (2018) ‘A bumpy road ahead’, in *Global Financial Stability Report April 2018*, Chapter 1, International Monetary Fund
- Mersch, Y. (2018) ‘Virtual or virtueless? The evolution of money in the digital age’, Official Monetary and Financial Institutions Forum, London, 8 February, available at <https://www.ecb.europa.eu/press/key/date/2018/html/ecb.sp180208.en.html>
- Sapir, A., N. Véron, G. B. Wolff (2018) ‘Making a reality of Europe’s capital markets union’, *Policy Contribution* 07/2018, Bruegel

Annex

Figure A1: The price of Bitcoin

(USD)

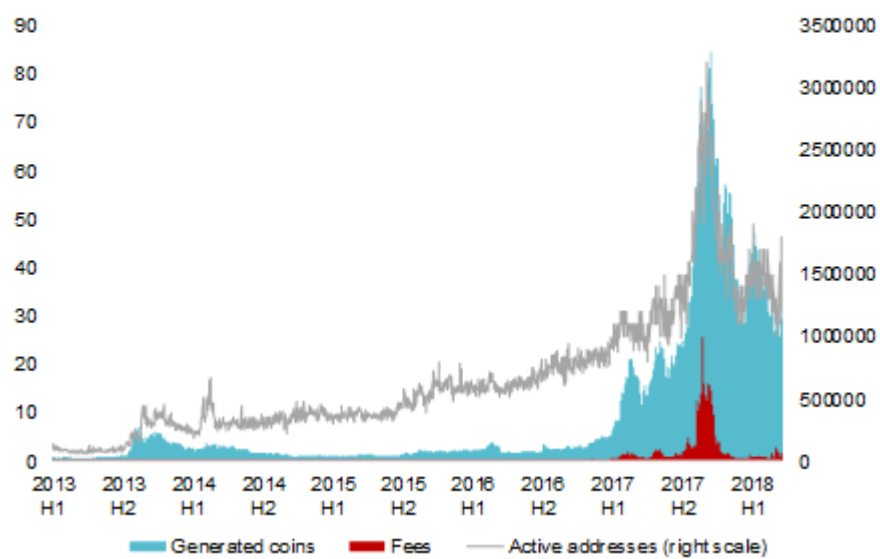


Source: coindesk.com.

Note: Close price. Latest observation is August 16, 2018

Figure A2: Mining revenues and users

(million-USD, -units)

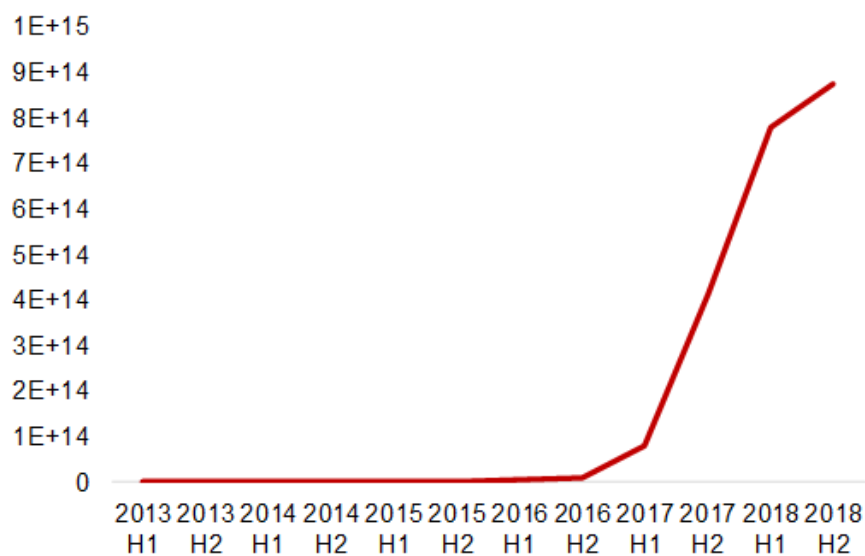


Source: coinmetrics.io.

Note: Coins and fees value in USD obtained using daily market prices. Included assets: Bitcoin, Ethereum, Bitcoin, Cash, Litecoin, Monero, Dash, Ethereum Classic, Zcash, Decred, Bitcoin Gold, DigiByte, Dogecoin, Verge, PIVX, Vertcoin. Last observation is July 18, 2018.

Figure A3: Mining difficulty index

(index)



Source: coinmetrics.io.

Note: Semestral weighted averages, with market cap weights. Included assets: Bitcoin, Ethereum, Bitcoin, Cash, Litecoin, Monero, Dash, Ethereum Classic, Zcash, Decred, Bitcoin Gold, DigiByte, Dogecoin, Verge, PIVX, Vertcoin. The bitcoin difficulty index measures the difficulty of finding a new block on the blockchain. The greater the difficulty, the longer the time it takes on average for a miner to find a valid block. Last observation is July 18, 2018.

Table A1: Largest global and EU-based crypto exchanges

Some major global exchanges									
	Volume (24h)	Volume (7d)	Volume (30d)	No. Markets	Change (24h)	Users	Profits/Revenue	Launched	Headquarters
OKEx	857984214	2437159552	28616275456	525	-15.93%	20 million	\$20.5 million (30d)*	Jan. 2014	Hong Kong
Binance	828702705	2538452480	30811083648	380	-10.71%	10 million	\$300 million in 2018 H1	Jul. 2017	Hong Kong
Huobi	771476053	1895250240	20159884960	266	7.56%	5 million	\$40.3 million (30d)*	Sep. 2013	Singapore

Some major EU-based exchanges									
	Volume (24h)	Volume (7d)	Volume (30d)	No. Markets	Change (24h)	Users	Profits	Launched	Headquarters
Bitstamp	69894767	266170582	2506343396	>=14	-3.56%	3 million	\$4.2 million (30d)*	Jul. 2011	United Kingdom
Cryptonex	48711767	89806444	695020364	50	4.88%	-	\$0.7 million (30d)*	Oct. 2017	United Kingdom
CoinsBank	42126225	88375652	1233063124	7	5.18%	-	\$5.5 million (30d)*	Apr. 2016	Estonia
Bitbay	18523378	58568250	459395003	44	6.81%	0.8 million	\$1.3 million (30d)*	May 2014	Malta

Source: bitbay.net, bitstamp.net, coinmarketcap.com, bloomberg.com, okex.com, huobigroup.com, medium.com, coinsbank.com, cryptonex.org, binance.com.

Note: CoinsBank's website operated by a UK-based company, financial services are reportedly operated by an Estonian one. Binance is reportedly planning to move headquarters in Malta. *30 days revenues estimated multiplying reported fees (in %) and volumes. Data for August 13, 2018.

Table A2: Major regulatory initiatives in the EU28

	Virtual currencies (VCs)	Initial Coin Offerings (ICOs)	Crypto exchanges
EC/EU	<p>The European legislators recently adopted the Fifth Anti-Money Laundering Directive (5AMLD), which defines VCs as “a digital representation of value that is neither issued by a central bank or a public authority, nor necessarily attached to a fiat currency, but is accepted by natural or legal persons as a means of payment and can be transferred, stored or traded electronically.”</p> <p>The European Commission’s FinTech Action Plan from March 2018 also reports on the creation of a EU Blockchain Observatory and Forum, appointed with the task to “report on the challenges and opportunities of crypto assets later in 2018 and is working on a comprehensive strategy on distributed ledger technology and blockchain addressing all sectors of the economy”</p> <p>The plan also emphasises that international coordination and consistency will be essential and states that the “Commission will continue monitoring the developments of crypto-assets [...] with the ESAs, the ESB and the FSB as well as other international standard setters. Based on the assessment of risks, opportunities and the suitability of the applicable regulatory framework, the Commission will assess whether regulatory action</p>	<p>The FinTech Action Plan acknowledges that an “assessment of the suitability of the current EU regulatory framework with regard to ICOs [...] more generally is necessary”.</p> <p>As with VCs, the Commission will continue monitoring the developments of [...] ICOs with the ESAs, the ESB and the FSB as well as other international standard setters. Based on the assessment of risks, opportunities and the suitability of the applicable regulatory framework, the Commission will assess whether regulatory action at EU level is required.”</p>	<p>The European legislators recently adopted the Fifth Anti-Money Laundering Directive (5AMLD), which requires Member States to bring VC exchange platforms (VCEP) and custodial wallet providers (CWP) within the scope of their AML/CFT regulation (Keatinge et al., 2018).</p>

at EU level is required.”

<p><i>ESAs</i></p>	<p>In February 2018, ESMA, EBA, and EIOPA released a joint warning on the risks of VCs.</p> <p>Moreover, EBA suggested that VC transactions should remain outside the scope of Payment Services Directive as of now, as “the denomination of ‘currency’ that has been associated with this particular innovation suggests an analogy with existing fiat currencies that is, on close scrutiny, not warranted”.</p> <p>In June 2018, ESMA adopted “new measures on the provision of contracts for differences (CFDs) and binary options to retail investors”, which entails limits also to cryptocurrencies.</p>	<p>In November 2017, ESMA released two statements related to ICOs: one “alerts investors to the high risks” associated with them; the other warning “firms involved in ICOs to the fact that they must give careful consideration as to whether their activities constitute regulated activities [...] depending on how they are structured”, and in particular whether they “qualify as financial instruments”. According to the statement, ICOs may be regulated by the Prospectus Directive, the Markets in Financial Instruments Directive (MiFID), the Alternative Investment Fund Managers Directive (AIFMD), and the Fourth Anti-Money Laundering Directive.</p>	<p>EBA supported the idea to bring VCEP and CWP into the scope of 5AMLD. It further proposes, among other things, that “the status of VCEPs and CWPs should be clarified”, “competent authorities [should be able to] easily to exchange information in relation to VCEPs and CWPs” and “carry out fit and proper tests of owners and controllers of VCEPs and CWPs”.</p>
<p><i>ECB</i></p>	<p>In 2015, an ECB report defines VCs as a digital representation of value, not issued by a central bank, credit institution or e-money institution, which in some circumstances can be used as an alternative to money.</p> <p>In 2016 the ECB commented that VCs “do not qualify as currencies from a Union perspective”,</p>	<p>-</p>	<p>In 2016 the ECB strongly supported the idea to bring VCEP and CWP into the scope of 5AMLD.</p> <p>Yves Mersch stated in 2018 that “there is a “need to hold VC</p>

exchanges to the same rigorous standards as the rest of the financial system”.

and that “they are not in fact currencies”.

ECB President Draghi in 2018 [stated](#) that **“Bitcoin and other digital currencies are in the unregulated space and should be regarded as very risky assets,** that “work is under way in the Single Supervisory Mechanism to identify potential prudential risks that these digital assets could pose to supervised institutions”, and [that](#) “bitcoins are not coins but mainly assets”. He also reportedly added that is 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 ([Allen and Lastra](#) 2018).

Yves Mersch also [stated](#) in 2018 that “VCs currently do not fulfil the three basic functions of money”.

Finally, in 2016 the ECB and the Bank of Japan [launched](#) “their joint research project entitled “Stella”, which studies the possible use of Distributed Ledger Technology (DLT) for financial market infrastructures.

Germany

BaFin [takes the view](#) that VCs are units of account "within the meaning of section 1 (11) sentence 1 of the Kreditwesengesetz, comparable to foreign exchange with the difference that they do not refer to a legal tender. Included are also value units which function as private means of payment" [... **They are not] currencies nor foreign notes or coins, [...] e-money [... and] do not represent any claims on an**

Assess on a "case-by-case basis whether a token constitutes a financial instrument within the meaning of the German Securities Trading Act or MiFID II, **a security** within the meaning of the German Securities Prospectus Act, **or a capital investment** within the meaning of the German Capital Investment Act", depending on the type of issuance. ([BaFin](#),

BaFin [stated](#) that exchanges “buying and selling VCs commercially in their own name for the account of others carry out principal broking services which are subject to authorisation”.

issuer". [2017](#))

The Bundesbank [stated](#) in February 2018 that “Bitcoin is not a virtual currency”. However, in 2016 [revealed](#) (with the Deutsche Börse Gruppe) a “prototype functional prototype for the blockchain technology-based settlement of securities”.

Bitcoins are **not considered as financial instruments as the law stands**, so "crypto" assets do not fall within the scope of direct supervision of the AMF. They **cannot be classified as currencies or considered a means of payment in the legal sense** of the term. They are therefore not subject to the regulatory framework for means of payment ([AMF and ACPR, 2017](#)).

BdF, in a March 2018’s [report](#), **stated that “crypto-assets are not currency”**. It also calls for coordinated action and **potentially supplement regulation with a limitation of the possibility for certain regulated companies to develop activities in crypto assets**.

A 2016 ordinance included two provisions that allowed the use of blockchain technology for [...] “mini-bonds”. The main impact [...] was to provide the “first definition of ‘blockchain’ in French law, [...]. Another ordinance, from December 2017, “went further and made it possible to use blockchain technology for a broader range of financial instruments.” ([The Law Library of Congress, 2018](#))

The respondents [of a public consultation] agree essentially with the findings of the regulator's preliminary legal analysis [...] on the difficulty of providing a unique response to the qualification of tokens issued in ICOs given their diversity. The AMF had also presented three possible regulatory options:

- Promote a best practice guide without changing existing legislation (option 1);**
- Extend the scope of existing texts to treat ICOs as public offerings of securities (option 2);**
- Propose new legislation adapted to ICOs (option 3).** ([AMF, 2018](#))

BdF, in a March 2018’s [report](#), **stated that “the conversion of crypto-assets into fiat currency by internet platforms that play the role of intermediary between buyers and sellers is considered to be a payment service and requires an authorisation”**.

Platforms which offer [cryptocurrency derivatives] must abide by the authorisation and business conduct rules [...]. ([AMF, 2018](#))

France

<i>Spain</i>	<p>Comisión Nacional del Mercado de Valores (CNMV) and Banco de España note that, to date, no VC issue has been registered, authorised or verified by any supervisory agencies in Spain (CNMV and Banco de España 2018). Moreover, CNMV takes the view that for the time being (until further EU harmonisation in this area is achieved), a case-by-case ‘substance over form’ approach is needed (Allen and Lastra 2018).</p>	<p>CNMV and Banco de España note that, to date, no ICO has been registered, authorised or verified by any supervisory agencies in Spain. (CNMV and Banco de España 2018). CNMV considers that a good number of the operations structured as ICOs should be treated as issues or public offerings of transferable securities (CNMV, 2018)</p>	-
<i>Italy</i>	<p>The Ministry of Economy and Finance (MEF) launched in February 2018 a consultation regarding a draft regulation. Aims at recognize VCs as means of exchange, separate from legal tender, for purchases of goods and services, and expand AML laws for exchanges. In May 2017, a legislative decree (introducing the AML5) requires identities of parties in VCs transaction, and also defines VCs as means of exchange, not legal tender (sources in English: here and here).</p>	<p>The Commissione Nazionale per le Società e la Borsa (CONSOB) issued a warning in December 2017 (referring to recent ESMA statements) of the risks of ICOs.</p>	<p>The Ministry of Economy and Finance (MEF) launched in February 2018 a consultation regarding a draft regulation, which also aims at expand AML laws for exchanges.</p>
<i>Lithuania</i>	<p>Bank of Lithuania has published a position paper in October 2017, adopting the view of the EBA in that VC are “ungoverned and unregulated digital money, which may be used as a means of payment”, but not issued and guaranteed by a central bank. VC “may also comprise means of accumulation for saving or investment purposes”. In March 2018 it also announced issuance of a digital collector coin within the year.</p>	<p>In June 2018, the Ministry of Finance has published ICO guidelines, which state that “Organizing ICO is not regulated by specific legislation, however, taking into account different ICO models and different characteristics of tokens, in some cases, such activity may be subject to the requirements of the legislation of the Republic of Lithuania and supervision of the Bank of Lithuania.” This depends primarily on whether the token issue</p>	<p>Bank of Lithuania has published a position paper in October 2017, prescribing financial institutions to run their VC activities separately, and warns about their risks.</p> <p>The June 2018’s ICO guidelines also specifies that “only the</p>

	<p>grants “governance rights” or not, ending in a range of legislation from the Civil Code to Securities, Crowdfunding laws, and others. AML and CFT law applies.</p>	<p>entities that are planning to provide regulated financial services and (or) projects which released tokens that have characteristics of securities will be under its scrutiny”. Financial institutions should comply with AML/CFT legislation when running VC activities.</p>
<p><i>United Kingdom</i></p> <p>The Financial Conduct Authority (FCA) defined VCs in April 2017 as “any publicly available electronic medium of exchange that features a permissionless distributed ledger and a decentralised system for exchanging value”. It also set a regulatory sandbox (Project Innovate).</p> <p>The Treasury Committee of the House of Commons has an open inquiry about the “use of digital currencies and distributed ledger technology in the UK”. Oral witness from an FCA director suggests that whether VCs may fall within its regulation depends ultimately on their characteristics.</p> <p>BoE’s Governor stated that “a better path would be to regulate elements of the crypto-asset ecosystem to combat illicit activities, promote market integrity, and protect the safety and soundness of the financial system”.</p>	<p>According to the FCA, ICOs “have various parallels with Initial Public Offerings, private placement of securities, or crowd sales. Depending on how they are structured, they may, therefore, fall into the regulatory perimeter”.</p>	<p>-</p>
<p><i>Sweden</i></p> <p>The Riksbank recently commented that “Crypto-assets or cryptocurrencies are not the same thing</p>	<p>A report by the Swedish Financial Supervisory Authority defines ICOs as</p>	<p>The Riksbank states that “issuing virtual currencies is</p>

as money.

The statement seems in contradiction with an October 2013's preliminary ruling of the **Swedish Skatterättsnämnden (Tax Board)**, which considered bitcoins transactions as equivalent to **that of currency**, similarly to the Swedish Administrative Supreme Court.

investment projects and means of securing capital, while also warning against their unregulated nature, referring to ESMA's opinions.

not subject to regulation and the issuers are not under financial supervision".

The Swedish **Financial Supervisory Authority** deemed **trade in VCs a financial service subject to reporting**.

The cabinet of Malta has recently approved "Crypto Bills", published in the official gazette on May 22, 2018 and enacted by Parliament on 4 July 2018:

Innovative Technology Arrangements and Services Act, **providing the regulatory framework to register "innovative technology services" and certify "innovative technology arrangements"**.

Malta Digital Innovation Authority Act (MDIA), **establishing an Authority** for "the development of visions, skills, and other qualities relating to technology innovation.

Under the Virtual Financial Asset Act (VFA), a **virtual financial asset (VFA) is defined as "any form of digital medium recordation that is used as a digital medium of exchange, unit of account or store of value and that is not (i) electronic money, (ii) a financial instrument, or (iii) virtual token"**, where a **virtual token is "a form of digital medium recordation that has no utility, value or**

The cabinet of Malta has recently approved "Crypto Bills", published in the official gazette on May 22, 2018 and enacted by Parliament on 4 July 2018:

the VFA would in particular regulate ICOs, including requirements for the whitepaper and advertisement rules. Moreover, **"an issuer is required to appoint, and have at all times in place, a VFA agent** who shall be registered with the competent authority", which would be a "person of trust", ensuring "compliance with the provisions of this Act and of any rules or regulations issued thereunder", along with other monitoring and reporting tasks.

As the Malta Financial Services Authority (MSFA) stated on July 20, the VFA "is not

The cabinet of Malta has recently approved "Crypto Bills", published in the official gazette on May 22, 2018 and enacted by Parliament on 4 July 2018:

the Malta Digital Innovation Authority Act (MDIA) **establishes an Authority** for "the exercise [...] of regulatory functions regarding innovative technology arrangements", for example consumer protection and registration of technology services providers.

Under the Virtual Financial Asset Act, a **VFA exchange is a "DLT exchange** operating in or from within Malta, **on which**

Malta

application outside of the DLT platform on which it was issued and may only be redeemed for funds on such platform directly by the issuer of such DLT asset, provided that electronic money shall be excluded from this definition."

Finally, the Malta Financial Services Authority **developed** a **"financial instrument test"** to assess the nature of a "DLT asset".

yet in force and will take effect on such date as the Minister for Digital Economy may establish by notice in the Government Gazette". Moreover, the MSFA is "currently **devising** the Virtual Financial Assets Framework [...] underlying and complementing" the VFA, publishing a Consultation paper in the process.

only virtual financial assets may be transacted in accordance with the rules of the platform or facility, which is **licensed by the competent authority** under this Act to provide such services" (the Malta Financial Services Authority).

The Austrian Ministry of Finance **defines** VCs as **intangible commodities** ("unkörperliche Wirtschaftsgüter"). Thus, mining is considered as a commercial activity.

The OeNB **does not consider** Bitcoin as a currency **but as a speculative investment** not subject to regulation, with high associated risks. It also warns that Bitcoin is also not covered by the E-Money Act or the Payment Services Act.

The FMA also states that "Bitcoins are a virtual currency and are not subject to supervision by the Financial Market Authority. For some bitcoin-based business models, it may, however, be necessary to hold a licence issued by the Financial Market Authority"

OeNB's governor recently shared his **support** for the proposal of the Austrian Ministry of Finance **to introduce a prospectus obligation and an authorization requirement** by the Financial Market Authority (FMA) for ICOs.

The FMA itself states that "an **assessment** under supervisory law must always be based on the specific design of the ICO **on a case-by-case basis**".

The Austrian Ministry of Finance **considers** VC's **exchanges and VC ATMs** ("Kryptowährung-Geldautomaten") **as commercial activities**.

Moreover, OeNB's governor recently shared his **support** for bringing VCEP and CWP into the scope of 5AMLD.

Austria

<i>Belgium</i>	<p>In January 2014, BNB and FSMA published a joint press release warning against the “risks of virtual money”, stating that they are “not issued by a central bank or a licensed issuer of electronic money” and that they are subject to “no regulation, supervision or oversight”.</p> <p>The Minister of Justice in 2017 stated that he plans to regulate VCs, in particular with respect to exchange rates and conversion.</p>	<p>In January 2014, BNB and FSMA published a joint press release stating that there is “no regulation, supervision or oversight on [...] issuers of virtual money, barter sites, internet platforms where virtual money is used for payment, and digital wallets.”</p>
<i>Bulgaria</i>	<p>In February 2018, the National Bank of Bulgaria warned consumers about VCs’ risks, following the joint release by the ESAs.</p> <p>In 2015, a Bulgarian court reportedly affirmed that “Bitcoin is not a legal tender”, that “bitcoins and other virtual currencies are not legally recognized and treated as financial instruments”, and that “the activities associated with buying, selling and paying with Bitcoins are not regulated by an applicable national and European law and are not subject to licensing requirements. [...] The conclusion of Bitcoin transactions does not require any approval by the Commission for Financial Supervision for investment activities and provision of investment services.”</p>	<p>The court “concludes that the hypothetical exercise of activities [...] related to the offering of financial instruments whose underlying is a currency, such as for example, contracts for difference or contracts with derivative financial instruments that require authorization as an investment firm cannot be an argument for rejecting their application for registration.”</p>

<p><i>Croatia</i></p>	<p>In September 2017, the Croatian National Bank provided a warning with VC-related risks, stating that VCs “are not electronic money [...] or payment services.”</p> <p>In February 2018, the Croatian National Bank defines VCs as a “digital display of values [...] considered as a specific type of property that its holders are willing to keep and / or electronically exchange and use sporadically for each other to make payments, consistent with the belief that such currencies have real value.” It also reiterates that VCs are not money.</p>	<p>In September 2017, the Croatian National Bank also shared the FCA’s warning against ICOs.</p>	<p>In September 2017, the Croatian National Bank also added that it “does not issue a license to business entities issuing or trading in virtual currencies nor has a legal basis for their supervision.”</p>
<p><i>Cyprus</i></p>	<p>In February 2014, The Central Bank of Cyprus stated that VCs are not legal tender, and that it “does not authorise any activity falling within its mandate unless legal compliance is ensured. Any activity without the required license is liable for breach of law.”</p>	<p>-</p>	<p>In February 2014, The Central Bank of Cyprus stated that “there are no specific regulatory protection measures to cover losses from the use of virtual currencies if a platform that exchanges or holds them collapses”.</p>
<p><i>Czech Republic</i></p>	<p>In February 2018, the Vice-Governor of the Czech National Bank (CNB) stated that no VC “conforms to the three basic functions of money” and that to him they “resemble commodities”. He added that “we [at the CNB] do not want to ban them and we are not hindering their development, but we are also not actively helping or promoting them and we are not protecting them or the customers that</p>	<p>-</p>	<p>In 2016, Czech’s AML regulation has been amended to include service providers of VCs, defined as “a person who buys, sells, stores, manages or mediates the purchase or sale of a virtual currency as the subject of his / her business, or provides other services related to the</p>

use them”.

virtual currency”.

In March 2014, the Danish Nationalbanken **stated** that bitcoin is not a currency, and that it is “not covered by depositors or consumer protection legislation”.

In February 2018, the Danish Finanstilsynet **endorsed** “consumer warning about cryptocurrency from the EU’s three financial supervisory authorities – EBA, EIOPA and ESMA”, following its 2013’s warning.

In November 2017, the Danish Finanstilsynet also **pointed out** that “cryptocurrencies that are only usable as a means of payment, remain unregulated [...]. However, certain tokens increasingly resemble financial instruments, which could potentially cause them to fall within the scope of the regulation. Whether this is the case, will always depend on a case by case assessment.”

In November 2017, the Danish Finanstilsynet **stated** that “even though an offered token is not a financial instrument, the way an ICO is structured, or the way investments in them take place, can still be regulated activities”.

It also added that “businesses involved with ICOs [...] should carefully consider, if their activities fall within the scope of the financial regulation [...]. For example, the Prospectus Directive, the Alternative Investment Fund Managers Directive, the [AML] Directive and more could be relevant. Whether an ICO is regulated or not will always be subject to an individual assessment by the Danish FSA.”

In November 2017, the Danish Finanstilsynet **noted** that “certain tokens increasingly resemble financial instruments”, thus warning “businesses involved with [...] cryptocurrencies [...] to carefully consider, if their activities fall within the scope of the financial regulation. For example, the Prospectus Directive, the Alternative Investment Fund Managers Directive, the [AML] Directive and more could be relevant.”

Denmark

<i>Estonia</i>	<p>In November 2017, amendments were passed to the AML legislation. VC is defined as “a value represented in the digital form, which is digitally transferable, preservable or tradable and which natural persons or legal persons accept as a payment instrument, but that is not the legal tender of any country or funds [...] or a payment transaction”.</p> <p>Moreover, Estonian officials have been reportedly planning to offer digital tokens to e-residents as an incentive.</p>	-	<p>According to new AML legislation, VC service providers require a license, and AML rules are extended to VC-to-fiat exchanges and VCs wallet service provides.</p>
<i>Finland</i>	<p>In November 2017, the Finnish FSA stated that it “appears that bitcoin and other cryptocurrencies are primarily used as speculative investments and their use for payment is secondary”, warning against VCs’ risks.</p> <p>Moreover, in January 2014, the Finnish Central Bank defined VCs as “mediums of exchange used by Internet communities”, adding that “Bitcoin does not fulfil the criteria for an official currency, or indeed the criteria for a payment instrument”, and that it “is not currently supervised or regulated in any way”.</p>	-	<p>In November 2017, the Finnish FSA shared ESMA’s view about ICOs’ risks. In particular, it affirmed that “organisers must find out whether some regulatory requirement is applicable to the ICO. Regulatory requirements applicable to the ICO are determined according to the how the ICO is structured. The ICO may, for example, be subject to crowdfunding regulations, securities legislation, regulations on alternative investment fund managers or it may also be structured such that it falls outside the regulated space.”</p>
<i>Greece</i>	<p>In February 2018, the Bank of Greece shared EU ESAs’ warnings about VCs’ risks.</p>	-	-

<i>Hungary</i>	<p>In December 2016, the National Bank of Hungary released the most recent warning about VCs' risks, highlighting their unregulated nature.</p>	-	-
<i>Ireland</i>	<p>In March 2018 a Central Bank of Ireland's Director defined a VC, in a speech, as “a digital representation of value that is neither issued nor guaranteed by a central bank or public authority and does not have the legal status of currency or money”, endorsing ESAs' warnings.</p>	<p>In March 2018 a Central Bank of Ireland's Director stated, in a speech, that “ICOs are capital- or finance-raising events, whereby a business or an individual raises money from the public by issuing so-called coins or tokens in exchange for something, generally either real or virtual currencies”, endorsing ESAs' warnings.</p> <p>Moreover, he added that “if the token issued in an ICO is deemed to be a “transferable security,” then a range of financial services legislation— including MiFID, the Prospectus Directive, etc., - will apply. However that question needs to be considered on a case by case basis.”</p>	<p>In March 2018 a Central Bank of Ireland's Director stated, in a speech, that “the Fifth Anti Money Laundering Directive, for example, will bring Virtual Currency Exchanges and Custodian Wallet Providers within the scope of European Anti Money Laundering (AML) rules”.</p>
<i>Latvia</i>	<p>In November 2017, Latvia's AML legislation was amended, and defines VC as a digital representation of value that “may be digitally transmitted, stored, or traded, and acts as an exchange instrument without being legal tender”.</p>	-	<p>In November 2017, Latvia's AML legislation was amended, extending AML rules to exchanges.</p>

<p><i>Luxembourg</i></p>	<p>In March 2018, the Commission de Surveillance du Secteur Financier released a warning on VCs' risks, defining VCs as “means of exchange or digital representations of unsecured values which are neither issued nor controlled by central banks and of which supply, and / or demand may be limited.” It added that VCs “do not have a course legal basis and do not represent means of exchange whose value is guaranteed by a central bank.”, and that they are unregulated.</p> <p>Moreover, the Finance Minister reportedly stated in Parliament that VCs “are currency because they are accepted as a means of payment for goods and services by a sufficiently large circle of people”.</p>	<p>In March 2018, the Commission de Surveillance du Secteur Financier released a warning on ICOs' risks.</p>	<p>In March 2018, the Commission de Surveillance du Secteur Financier released a warning on VCs' risks, also specifying that despite lack of regulation, the provision of any financial services requires nonetheless an authorization from the Minister of Finance.</p>
<p><i>Netherlands</i></p>	<p>In January 2018, De Nederlandsche Bank published a position paper highlighting that “crypto’s do not currently fulfil the role of money – in fact, they are hardly ever used for payment, and they are not a universally accepted and stable medium of exchange, a suitable unit of account or a reliable store of value.” It also mentions that DNB “alerted the general public to the risks of bitcoin and other crypto’s as early as 2013 because there is no supervision, no deposit guarantee scheme and no counterparties from which losses may be recovered”</p> <p>It added that DNB does “not currently support a ban on crypto’s”, and that it would “also ensure that banks and other financial institutions that offer current accounts and other services to crypto firms take</p>	<p>In January 2018, De Nederlandsche Bank published a position paper, also warning about ICOs' risks.</p> <p>Moreover, also the Autoriteit Financiële Markten issued an ICO-related warning, noting that “most tokens can be structured [...] so that they fall outside the scope of the Financial Supervision Act” (Wtf). Token may qualify as a security if “for instance represents a share in the project or if the token gives entitlement to part of the (future) returns from the project”. Assessment would be done on a case by case basis, and “issuers need to properly analyse the</p>	<p>In January 2018, De Nederlandsche Bank published a position paper, welcoming the extension of AML rules to exchanges.</p> <p>It also stated that DNB is also looking into whether the provision of a combination of services, in which crypto’s are converted into euros or other currencies, or vice versa, and a payment service is provided, qualifies as issuing electronic money or as providing a payment service. [...] If such</p>

	<p>sufficient measures to adequately and demonstrably control the resulting potential risks of financial and economic crime.”</p> <p>DNB has also been running an internal experiment (DNBCoin).</p>	<p>extent of any overlap with financial regulation and supervision before launching their ICO”.</p>	<p>combined services qualify, they come under the scope of our supervision legislation and require a licence”.</p>
<p><i>Poland</i></p>	<p>In July 2017, Narodowy Bank Polski and the Polish Financial Supervision Authority issued a warning about VCs’ risks, stating that VCs “are neither issued nor guaranteed by a country’s central bank, they cannot be considered to be money, which means they are neither legal tender, nor a currency, they cannot be used to pay taxes, and they are not widely accepted in retail and service outlets.” They “cannot be considered e-money, and they are not regulated under the provisions of the Act [...] on Payment Services and the Act [...] on Trading in Financial Instruments.</p> <p>In January 2018, Polish Prime Minister reportedly stated intentions to ban VCs or regulate them in a way to avoid pyramid schemes.</p>	<p>-</p>	<p>-</p>
<p><i>Portugal</i></p>	<p>Banco de Portugal’s view is that VCs are “not regulated or supervised by Banco de Portugal or by any other financial system authority, either domestic or European”. Moreover, it highlights that VCs “are not legal tender in Portugal”.</p>	<p>-</p>	<p>Banco de Portugal states that entities that issue and trade virtual currencies are not required to have authorisation from or be registered with Banco de Portugal, and as a result their activity is not subject to any type of prudential or conduct</p>

<i>Romania</i>	<p>In February 2018, the National Bank of Romania released its position about VCs, reaffirming its views from previous warnings about VCs' risks, and noticing a “lack of regulation and a lack of supervision of global currency schemes”. It further defines VCs as speculative assets.</p>	<p>In February 2018, the National Bank of Romania discouraged “any involvement” in VCs. Reportedly, many exchanges' accounts in local banks have been closed.</p>
<i>Slovakia</i>	<p>In November 2013, Národná banka Slovenska issued a warning “to inform the general public that virtual currencies, such as the so-called Bitcoin, are not national currencies. As such, they are not subject to national regulation. Activities related to virtual currencies are not recognized or defined in European or Slovak law, nor are they regulated or supervised by Národná banka Slovenska or the European Central Bank.” Moreover, it added that “any unauthorised currency production or issue into circulation constitutes a criminal offence”.</p> <p>In January 2018, the Finance Minister reportedly stated that VCs have “two roles now: one as a means of exchange and the other, as an investment asset”, adding that that “this sphere has to be regulated globally, although he does not plan to regulate it in Slovakia for now”.</p>	<p>-</p>

<i>Slovenia</i>	In January 2018, Banka Slovenije published a Q&A , defining VCs as “ a form of unregulated digital representation of value that is neither issued nor backed by a central bank or a public authority, nor necessarily attached to a fiat currency, but is accepted by natural or legal persons as a means of payment, and can be transferred, stored or traded electronically ”. It is also specified that VCs are not foreign currencies, nor e-money.	In September 2017, the Financial Stability Board released a warning about VCs and ICOs risks, noting that “the amount and credibility of information about the project, the process of crowdfunding via an ICO and the issuance of coin are also not regulated or supervised systemically ”	In January 2018, Banka Slovenije published a Q&A , stating that “ stakeholders in virtual currency schemes that facilitate the purchase (e.g. trade platforms), storage (e.g. digital wallet providers) and trading of virtual currencies in Slovenia are not systemically regulated and supervised ”.
-----------------	--	--	--

Sources: Governments and agencies’ websites, Allen and Astra (2018), [The Law Library of Congress \(2018\)](#).