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The invisible politics of Bitcoin: governance crisis of a decentralised infrastructure

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Abstract: Bitcoin is a decentralised currency and payment system that seeks to eliminate the need for trusted authorities. It relies on a peer-to-peer network and cryptographic protocols to perform the functions of traditional financial intermediaries, such as verifying transactions and preserving the integrity of the system. This article examines the political economy of Bitcoin, in light of a recent dispute that divided the Bitcoin community with regard to a seemingly simple technical issue: whether or not to increase the block size of the Bitcoin blockchain. By looking at the socio-technical constructs of Bitcoin, the article distinguishes between two distinct coordination mechanisms: governance by the infrastructure (achieved via the Bitcoin protocol) and governance of the infrastructure (managed by the community of developers and other stakeholders). It then analyses the invisible politics inherent in these two mechanisms, which together display a highly technocratic power structure. On the one hand, as an attempt to be self-governing and self-sustaining, the Bitcoin network exhibits a strong market-driven approach to social trust and coordination, which has been embedded directly into the technical protocol. On the other hand, despite being an open source project, the development and maintenance of the Bitcoin code ultimately relies on a small core of highly skilled developers who play a key role in the design of the platform.

Keywords: Bitcoin, Blockchain, Peer-to-peer (P2P)

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INTRODUCTION

Since its inception in 2008, the grand ambition of the Bitcoin project has been to support direct monetary transactions among a network of peers, by creating a decentralised payment system that does not rely on any intermediaries. Its goal is to eliminate the need for trusted third parties, particularly central banks and governmental institutions, which are prone to corruption.

Recently, the community of developers, investors and users of Bitcoin has experienced what can be regarded as an important *governance crisis* – a situation whereby diverging interests have run the risk of putting the whole project in jeopardy. This governance crisis is revealing of the limitations of excessive reliance on technological tools to solve issues of social coordination and economic exchange. Taking the Bitcoin project as a case study, we argue that online peer-to-peer communities involve inherently political dimensions, which cannot be dealt with purely on the basis of protocols and algorithms.

The first part of this paper exposes the specificities of Bitcoin, presents its underlying political economy, and traces the short history of the project from its inception to the crisis. The second part analyses the governance structure of Bitcoin, which can be understood as a two-layered construct: an *infrastructure* seeking to govern user behaviour via a decentralised, peer-to-peer network on the one hand, and an *open source community of developers* designing and architecting this infrastructure on the other. We explore the challenges faced at both levels, the solutions adopted to ensure the sustainability of the system, and the unacknowledged power structures they involve. In a third part, we expose the *invisible politics* of Bitcoin, with regard to both the implicit assumptions embedded in the technology and the highly centralised and largely undemocratic development process it relies on. We conclude that the overall system displays a highly technocratic power structure, insofar as it is built on automated technical rules designed by a minority of experts with only limited accountability for their decisions. Finally, drawing on the wider framework of internet governance research and practice, we argue that some form of social institution may be needed to ensure accountability and to preserve the legitimacy of the system as a whole – rather than relying on technology alone.

I. BITCOIN IN THEORY AND PRACTICE

A. THE BITCOIN PROJECT: POLITICAL ECONOMY OF A TRUSTLESS PEER-TO-PEER NETWORK

Historically, money has taken many different forms. Far from being an exclusively economic tool, money is closely associated with social and political systems as a whole – which Nigel Dodd refers to as *the social life of money* (Dodd 2014). Indeed, money has often been presented as an instrument which can be leveraged to shape society in certain ways and as Dodd has shown, this includes powerful utopian dimensions: for sociologist Georg Simmel for instance, an ideal social order hinged upon the definition of a "perfect money" (Simmel, 2004). In the wake of economic crises in particular, it is not uncommon to witness the emergence of alternative money or exchange frameworks aimed at establishing different social relations between individuals – more egalitarian, or less prone to accumulation and speculation (North, 2007). On the other hand however, ideals of self-regulating markets have often sought to *detach* money from

existing social relations, resulting in a progressive "disembedding" of commercial interactions from their social and cultural context (Polanyi, 2001 [1944]).

Since it first appeared in 2009, the decentralised cryptocurrency Bitcoin has raised high hopes for its potential to reshuffle not only the institutions of banking and finance, but also more generally power relations within society. The potential consequences of this innovation, however, are profoundly ambivalent. On the one hand, Bitcoin can be presented as a neoliberal project insofar as it radicalises Friedrich Hayek's and Milton Friedman's ambition to end the monopoly of nation-states (via their central banks) on the production and distribution of money (Hayek, 1990), or as a *libertarian dream* which aims at reducing the control of governments on the economy (De Filippi, 2014). On the other hand, it has also been framed as a solution for greater social justice, by undermining oligopolistic and anti-democratic arrangements between big capital and governments, which are seen to favour economic crises and inequalities. Both of these claims hinge on the fact that as a socio-technical assemblage, Bitcoin seems to provide a solution for "governing without governments", which appeals to liberal sentiments both from the left and from the right. Its implicit political project can therefore be understood as effectively getting rid of politics by relying on technology.

More generally, distributed networks have long been associated with a redistribution of power relations, due to the elimination of single points of control. This was one of the main interpretations of the shift in telecommunications routing methods from circuit switching to packet switching in the 1960s and the later deployment of the internet protocol suite (TCP/IP) from the 1970s onwards (Abbate, 1999), as well as the adoption of the end-to-end principle – which proved to be a compelling but also partly misleading metaphor (Gillespie, 2006). The idea was that information could flow through multiple and unfiltered channels, thus circumventing any attempts at controlling or censoring it, and providing a basis for more egalitarian social relations as well as stronger privacy. In practice however, it became clear that network design is much more complex and that additional software, protocols and hardware, at various layers of the network, could (and did) provide alternate forms of re-centralisation and control and that, moreover, the internet was not structurally immune to other modes of intervention such as law and regulation (Benkler, 2016).

However, there have been numerous attempts at *re-decentralising* the network, most of which have adopted peer-to-peer architectures as opposed to client-server alternatives, with the underlying assumption that such technical solutions provide both individual freedom and "a promise of equality" (Agre, 2003) [1]. Other technologies have also been adopted in order to add features relating to user privacy for instance, which involve alternative routing methods (Dingledine, Mathewson, & Syverson, 2004) and cryptography (which predates computing, see e.g. Kahn 1996). In particular, such ideas were strongly advocated starting from the late 1980s by an informal collective of hackers, mathematicians, computer scientists and activists known as *cypherpunks*, who saw strong cryptography as a means of achieving greater privacy and security of interpersonal communications, especially in the face of perceived excesses and abuses on the part of governmental authorities. [2] Indeed, all of these solutions pursue implicit or explicit goals, in terms of their social or political consequences, which can be summed up as enabling self-organised direct interactions between individuals, without relying on a third party for coordination, and also preventing any form of surveillance or coercion.

Yet cryptography is not only useful to protect the privacy of communications; it can also serve as a means to promote further decentralisation and disintermediation when combined with a peer-to-peer architecture. In 2008, a pseudonymous entity named Satoshi Nakamoto released a

white paper on the Cryptography Mailing list (metzdowd.com) describing the idea of a decentralised payment system relying on a distributed ledger with cryptographic primitives (Nakamoto, 2008a). One year later, a first implementation of the ideas defined in the white paper was released and the Bitcoin network was born. It introduces its own native currency (or unit of account) with a fixed supply – and whose issuance is regulated, only and exclusively, by technological means. The Bitcoin network can therefore be used to replace at least some of the key functions played by central banks and other financial institutions in modern societies: the issuance of money on the one hand, and, on the other hand, the fiduciary functions of banks and other centralised clearing houses.

Supported by many self-proclaimed libertarians, Bitcoin is often presented as an alternative monetary system, capable of bypassing most of the state-backed financial institutions – with all of their shortcomings and vested interests which have become so obvious in the light of the financial crisis of 2008. Indeed, as opposed to traditional centralised economies, Bitcoin's monetary supply is not controlled by any central authority, but is rather defined (in advance) by the Bitcoin protocol – which precisely stipulates the total amount of bitcoins that will ever come into being (21 million) and the rate at which they will be issued over time. A certain number of bitcoins are generated, on average, every ten minutes and assigned as a reward to those who lend their computational resources to the Bitcoin network in order to both operate and secure the network. In this sense, Bitcoin can be said to mimic the characteristics of gold. Just as gold cannot be created out of thin air, but rather needs to be extracted from the earth (through mining), Bitcoin also requires a particular kind of computational effort – also known as *mining* – in order for the network protocol to generate new bitcoins (and just as gold progressively becomes harder to find as the stock gets depleted over, also the amount of bitcoins generated through mining decreases over time).

The establishment and maintenance of a currency has traditionally been regarded as a key prerogative of the State, as well as a central institution of democratic societies. Controlling the money supply, by different means, is one of the main instruments that can be leveraged in order to shape the economy, both domestically and in the context of international trade. Yet, regardless of whether one believes that the State has the right (or duty) to intervene in order to regulate the market economy, monetary policies have sometimes been instrumentalised by certain governments using inflation as a means to finance government spending (e.g. in the case of the Argentine great depression of 1998-2002). Perhaps most critical is the fact that, with the introduction of fractional-reserve banking, commercial banks acquired the ability to (temporarily) increase the money supply by giving out loans which are not backed up by actual funds (Ferguson, 2008). [3] The fractional-reserve banking system (and the tendency of commercial banks to create money at unsustainable rates) is believed to be one of the main factors leading to the global financial crisis of 2008 – which has brought the issue of private money issuance back into the public debate (Quinn, 2009).

Although there have been many attempts at establishing alternative currencies, and cryptocurrencies have also been debated for a long time, the creation of the Bitcoin network was in large part motivated in response to the social and cultural contingencies that emerged during the global financial crisis of 2008. As explicitly stated by Satoshi Nakamoto in various blog posts and forums, Bitcoin aimed at eradicating corruption from the realm of currency issuance and exchange. Given that governments and central banks could no longer be trusted to secure the value of fiat currency and other financial instruments, Bitcoin was designed to operate as a *trustless* technology, which only relies on maths and cryptography. [4] The paradox being that this *trustless technology* is precisely what is needed for building a new form of "distributed trust"

(Mallard, Méadel, & Musiani, 2014).

Trust management is a classic issue in peer-to-peer computing, and can be understood as *the confidence that a peer has to ensure that it will be treated fairly and securely, when interacting with another peer, for example, during transactions or downloading files,* especially by preventing malicious operations and collusion schemes (Zhu, Jajodia, & Kankanhalli, 2006). To address this issue, Bitcoin has brought two fundamental innovations, which, together, provide for the *self-governability* and *self-sustainability* of the network. The first innovation is the *blockchain*, which relies on public-private key encryption and hashing algorithms to create a decentralised, append-only and tamper-proof database. The second innovation is *Proof-of-Work*, a decentralised consensus protocol using cryptography and economic incentives to encourage people to operate and simultaneously secure the network. Accordingly, the Bitcoin protocol represents an elegant, but purely technical solution to the issue of social trust – which is normally resolved by relying on trusted authorities and centralised intermediaries. With the blockchain, to the extent that trust is delegated to the technology, individuals who do not know (and therefore do not necessarily trust) each other, can now transact with one another on a peer-to-peer basis, without the need for any intermediary.

Hence Bitcoin uses cryptography not as a way to preserve the secrecy of transactions, but rather in order to create a *trustless infrastructure* for financial transactions. In this context, cryptography is merely used as a discrete notational system (DuPont, 2014) designed to promote the autonomy of the system, which can operate independently of any centralised third party [5]. It relies on simple cryptographic primitives or building blocks (SHA256 hash functions and public-key cryptography) to resolve, in a decentralised manner, the double-spending problem [6] found in many virtual currencies. The scheme used by Bitcoin (*Proof-of-Work*) relies on a peer-to-peer network of validators (or *miners*) who commit their computational resources (*hashing power*) to the network in order to record all valid transactions into a decentralised public ledger (a.k.a. the *blockchain*) in a chronological order. All valid transactions are recorded into a block, which incorporates a reference (or *hash*) to the previous block – so that any attempt at tampering with the order or the content of any past transaction will always and necessarily result in an apparent discontinuity in the chain of blocks.

By combining a variety of existing technologies with basic cryptographic primitives, Bitcoin has created a system that is provably secure, practically incorruptible and probabilistically unattackable [7] – all this, without resorting to any centralised authority in charge of policing the network. Bitcoin relies on a fully open and decentralised network, designed in such a way that anyone is free to use the network and contribute to it, without the need for any kind of previous identification. Yet, contrary to popular belief, Bitcoin is neither anonymous nor privacy-friendly. Quite the contrary, anyone with a copy of the blockchain can see the history of all Bitcoin transactions. Decentralised verification requires, indeed, that every transaction be made available for validation to all nodes in the network and that every transaction ever done on the Bitcoin network can be traced back to its origin. [8]

In sum, Bitcoin embodies in its very protocols a profoundly market-driven approach to social coordination, premised on strong assumptions of rational choice (Olson, 1965) and game-theoretical principles of non-cooperation (von Neumann & Morgenstern, 1953 [1944]). The (self-)regulation of the overall system is primarily achieved through a system relying on *perfect information* (the blockchain), combined with a consensus protocol and incentives mechanism (Proof-of-work), to govern the mutually adjusting interests of all involved actors. Other dimensions of social trust and coordination (such as loyalty, coercion, etc.) are seemingly

expunged from a system which expressly conforms to Hayek's ideals of *catallactic* organisation (Hayek, 1976, p. 107ff).

B. FROM INCEPTION TO CRISIS

1. A short history of Bitcoin

The history of Bitcoin – albeit very short – consists of a very intense series of events, which have led to the decentralised cryptocurrency becoming one of the most widely used forms of digital cash. The story began in October 2008, with the release of the Bitcoin white paper (Nakamoto, 2008a). In January 2009, the Bitcoin software was published and the first block of the Bitcoin blockchain was created (the so-called *Genesis block*) with a release of 50 bitcoins. Shortly after, the first Bitcoin transaction took place between Satoshi Nakamoto and Hal Finney – a well-known cryptographer and prominent figure of the cypherpunk movement in the 1990s. It is not until a few months later that Bitcoin finally acquired an equivalent value in fiat currency [9] and slowly made its way into the commercial realm, as it started being accepted by a small number of merchants. [10]

In the early days, Satoshi Nakamoto was actively contributing to the source code and collaborating with many of the early adopters. Yet, he was always very careful to never disclose any personal details, so as to maintain his identity secret. To date, in spite of the various theories that have been put forward, [11] the real identity of Satoshi Nakamoto remains unknown. In a way, the pseudonymity of Satoshi Nakamoto perfectly mirrors that of his brainchild, Bitcoin – a technology designed to substitute technology for trust, thus rendering the identification of transacting parties unnecessary.

Over the next few months, Bitcoin adoption continued to grow, slowly but steadily. Yet, the real spike in popularity of Bitcoin was not due to increased adoption by commercial actors, but rather to the establishment in January 2011 of *Silk Road* – an online marketplace (mostly used for the trading of illicit drugs) relying on Tor and Bitcoin to preserve the anonymity of buyers and sellers. Silk Road paved the way for Bitcoin to enter the mainstream, but also led many governmental agencies to raise several concerns that Bitcoin could be used to create black markets, evade taxation, facilitate money laundering and even support the financing of terrorist activities.

In April 2011, to the surprise of many, Satoshi Nakamoto announced on a public mailing list that he would no longer work on Bitcoin. *I've moved on to other things* he said, before disappearing without further justification. Yet, before doing so, he transferred control over the source code repository of the Bitcoin client to Gavin Andresen, one of the main contributors to the Bitcoin code. Andresen, however, did not want to become the sole leader of such a project, and thus granted control over the code to four other developers – Pieter Wuille, Wladimir van der Laan, Gregory Maxwell, and Jeff Garzik. Those entrusted with these administration rights for the development of the Bitcoin project became known as the *core developers*.

As the popularity of Bitcoin continued to grow, so did the commercial opportunities and regulatory concerns. However, with the exit of Satoshi Nakamoto, Bitcoin was left without any leading figure or institution that could speak on its behalf. This is what justified the creation, in September 2012, of the Bitcoin Foundation – an American lobbying group focused on standardising, protecting and promoting Bitcoin. With a board comprising some of the biggest names in the Bitcoin space (including Gavin Andresen himself), the Bitcoin Foundation was intended to do for Bitcoin what the Linux Foundation had done for open source software: paying developers to work full-time on the project, establishing best practices and, most importantly, bringing legitimacy and building trust in the Bitcoin ecosystem. And yet, concerns

were raised regarding the legitimacy of this self-selected group of individuals – many of whom had dubious connections or were allegedly related to specific Bitcoin scams [12] – to act as the referent and public face of Bitcoin. Beyond the irony of having a decentralised virtual currency like Bitcoin being represented by a centralised profit-driven organisation, it soon became clear that the Bitcoin Foundation was actually unable to take on that role. Plagued by a series of financial and management issues, with some of its ex-board members under criminal investigation and most of its funds depleted, the Bitcoin Foundation has today lost much of its credibility.

But even the fall of the Bitcoin Foundation did not seem to significantly affect Bitcoin – probably because the Foundation was merely a *facade* that never had the ability to effectively control the virtual currency. Bitcoin adoption has continued to grow over the past few years, to eventually reach a market capitalisation of almost US 7 billion dollars. Bitcoin still has no public face and no actual institution that can represent it. Yet, people continue to use it, to maintain its protocol, and to rely on its technical infrastructure for an increasing number of commercial (and non-commercial) operations. And although a few Bitcoin-specific regulations have been enacted thus far (see e.g. the NY State BitLicense), regulators around the world have, for the most part, refrained from regulating Bitcoin in a way that would significantly impinge upon it (De Filippi, 2014).

Bitcoin thus continues to operate, and continues to be regarded (by many) as an open source software platform that relies on a decentralised peer-to-peer network governed by distributed consensus. Yet, if one looks at the underlying reasons why Bitcoin has been created in the first place, and the ways it has eventually been adopted by different categories of people, it becomes clear that the original conception of Bitcoin as a decentralised platform for financial disruption has progressively been compromised by the social and cultural context in which the technology operates.

Following the first wave of adoption by the cypherpunk community, computer geeks and crypto-libertarians, a second (larger) wave of adoption followed the advent of Silk Road in 2011. But what actually brought Bitcoin to the mainstream were the new opportunities for speculation that emerged around the cryptocurrency, as investors from all over the world started to accumulate bitcoins (either by purchasing them or by mining) with the sole purpose of generating profits through speculation. This trend is a clear reflection of the established social, economic and political order of a society driven by the capitalistic values of accumulation and profit maximisation. Accordingly, even a decentralised technology specifically designed to promote disintermediation and financial disruption can be unable to protect itself from the inherent tendencies of modern capitalist society to concentrate wealth and centralise power into the hands of a few (Kostakis & Bauwens, 2014).

The illusion of Bitcoin as a decentralised global network had already been challenged in the past, with the advent of large mining pools, mostly from China, which nowadays control over 75% of the network. But this is only one part of the problem. It took a simple – yet highly controversial – protocol issue to realise that, in spite of the open source nature of the Bitcoin platform, the governance of the platform itself is also highly centralised.

2. The block size dispute

To many outside observers, the contentious issue may seem surprisingly specific. As described earlier, the blockchain underpinning the Bitcoin network is composed of a series of blocks listing the totality of transactions which have been executed so far. For a number of reasons (mainly related to preserving the security and stability of the system, as well as to ensure easy

adoption), the size of these blocks was initially set at 1 megabyte. In practice, however, this technical specification also sets a restriction on the number of transactions which the blockchain can handle in a particular time frame. Hence, as the adoption of Bitcoin grew, along with the number of transactions to be processed, this arbitrary limitation (which was originally perceived as being innocuous) became the source of heated discussions – on several internet forums, blogs, and conferences – leading to an important dispute within the Bitcoin community (Rizzo, 2016). Some argued that the one megabyte cap was effectively preventing Bitcoin from scaling and was thus a crucial impediment to its growth. Others claimed that many workarounds could be found (e.g. off-chain solutions that would take off the load from the main Bitcoin blockchain) to resolve this problem without increasing the block size. They insisted that maintaining the cap was necessary both for security reasons and for *ideological* reasons, and was a precondition to keeping the system more inclusive and decentralised.

On 15 August 2015, failing to reach any form of consensus over the issue of block sizes, a spinoff project was proposed. Frustrated by the reluctance expressed by the other Bitcoin developers to officially raise the block size limit (Hearn, 2015), two core developers, Gavin Andresen and Mike Hearn, released a new version of the Bitcoin client software (Bitcoin XT) with the latent capacity of accepting and producing an increased block size of eight megabytes. This client constitutes a particular kind of *fork* of the original software or reference client (called Bitcoin Core). Bitcoin XT was released as a soft fork, [13] with the possibility to turn into a hard fork, if and when a particular set of conditions were met. Initially, the software would remain identical to the Bitcoin Core software, with the exception that all the blocks mined with the Bitcoin XT software would be "signed" by XT. This signature serves as a proxy for a poll: starting from 11 January 2016, in the event that at least 75% of all most recent 1,000 blocks have been signed by XT, the software would start accepting and producing blocks with a maximum block size of eight megabytes – with the cap increasing linearly so as to double every two years. This would mark the beginning of an actual *hard fork*, leading to the emergence of two blockchain networks featuring two different and incompatible protocols.

The launch of Bitcoin XT proved highly controversial. It generated a considerable amount of debate among the core developers, and eventually led to a full-blown conflict which has been described as a *civil war* within the Bitcoin community (Hearn, 2016). Among the Bitcoin core developers, Gregory Maxwell in particular was a strong proponent of maintaining the 1 megabyte cap. According to him, increasing the block size cap would constitute a risky change to the fundamental rules of the system, and would inherently bring Bitcoin towards more centralisation – because it would mean that less powerful machines (such as home computers) could no longer continue to handle the blockchain, thus making the system more prone to being overrun by a small number of big computers and mining pools. Similarly, Nick Szabo – a prominent cryptographer involved since the early days in the cypherpunk community – declared that increasing the block size so rapidly would constitute a huge security risk that could jeopardise the whole network. Finally, another argument raised against the Bitcoin XT proposal was that increasing the block size would possibly lead to variable, and delayed confirmation times (as larger blocks may fail to be confirmed every ten minutes).

Within the broader Bitcoin community, the conflict gave rise to copious amounts of flame-wars in various online forums that represent the main sources of information for the Bitcoin community (Reddit, Bitcoin Info, Bitcoin.org, etc.). Many accused the proponents of Bitcoin XT of using populist arguments and alarmist strategies to bring people on their side. Others claimed that, by promoting a hard fork, Bitcoin XT developers were doing exactly what the Bitcoin protocol was meant to prevent: they were creating a situation whereby people from each side of

the network would be able to spend the same bitcoins twice. In some cases, the conflict eventually resulted in outright censorship and banning of Bitcoin XT supporters from the most popular Bitcoin websites. [14] Most critically, the conflict also led to a variety of personal attacks towards Bitcoin XT proponents, and several online operators who expressed support for Bitcoin XT experienced Distributed Denial of Service (DDoS) attacks.

In the face of these events, and given the low rate of adoption of Bitcoin XT by the Bitcoin community at large, [15] Mike Hearn, one of the core developers and key instigators of Bitcoin XT, decided to resign from the development of Bitcoin – which he believed was on the brink of technical collapse. Hearn condemned the emotionally charged reactions to the block size debate, and pointed at major disagreements among the appointed Bitcoin core developers in the interpretation of Nakamoto's legacy.

But the conflict did not end there. Bitcoin XT was only the first of a series of improvements which were subsequently proposed to the Bitcoin protocol. As Bitcoin XT failed to gain mass adoption, it was eventually abandoned on January 23rd. New suggestions were made to resolve the block size problem (see e.g., Bitcoin Unlimited, Bitcoin Classic, BitPay Core). The most popular today is probably Bitcoin Classic, which proposes to increase the block size cap to 2 megabytes (instead of 8) by following the same scheme as Bitcoin XT (i.e. after 75% of bitcoin miners will have endorsed the new format). One interesting aspect of Bitcoin Classic is that it also plans to set up a specific governance structure that is intended to promote more democratic decision-making with regard to code changes, by means of a voting process that will account for the opinions of the broader community of miners, users, and developers. Bitcoin Classic has received support from relevant players in the Bitcoin community, including Gavin Andresen himself, and currently accounts for 25% of the Bitcoin network's nodes.

It is, at this moment in time, quite difficult to predict where Bitcoin is heading. Some may think that the Bitcoin experiment has failed and that it is not going anywhere; [16] others may think that Bitcoin will continue to grow in underserved and inaccessible markets as a gross settlement network for payment obligations and safe haven assets; [17] while many others believe that Bitcoin is still heading *to the moon* and that it will continue to surprise us as time goes on. [18] One thing is sure though: regardless of the robustness and technical viability of the Bitcoin protocol, this governance crisis and failure in conflict resolution has highlighted the fragility of the current decision-making mechanisms within the Bitcoin project. It has also emphasised the tension between the (theoretically) decentralised nature of the Bitcoin network and the highly centralised governance model that has emerged around it, which ultimately relied on the goodwill and aligned interests of only a handful of people.

II. BITCOIN GOVERNANCE AND ITS CHALLENGES

Governance structures are set up in order to adequately pursue collective goals, maintain social order, channel interests and keep power relations under check, while ensuring the *legitimacy* of actions taken collectively. They are therefore closely related to the issue of *trust*, which is a key aspect of social coordination and which online socio-technical systems address by combining informal interpersonal relations, formal rules and technical solutions in different ways (Kelty, 2005). In the case of online peer-production communities, two essential features are decisive in shaping their governance structure, namely the fact that they are *volunteer-driven* and that they seek to *self-organise* (Benkler, 2006). Thus, compared to more traditional forms of organisations such as firms and corporations, they often need to implement alternative means of

coordination and incentivisation (Demil & Lecocq, 2006).

Nicolas Auray has shown that, although the nature of online peer-production communities can be very different (ranging from *Slashdot* to *Wikipedia* and *Debian*), they all face three key challenges which they need to address in order to thrive (Auray, 2012):

- definition and protection of *community borders*;
- establishment of *incentives* for participation and acknowledgment of the *status* of contributors;
- and, finally, pacification of *conflicts*.

Understanding how each of these challenges is addressed in the case of the Bitcoin project is particularly difficult, since Bitcoin is composed of two separate, but highly interdependent layers, which involve very different coordination mechanisms. On the one hand, there is the *infrastructural* layer: a decentralised payment system based on a global *trustless* peer-to-peer network which operates according to a specific set of protocols. On the other hand, there is the layer of the *architects*: a small group of developers and software engineers who have been *entrusted* with key roles for the development of this technology.

The Bitcoin project can thus be said to comprise at least two different types of communities – each with their own boundaries and protection mechanisms, rewards or incentive systems, and mechanisms for conflict resolution. One is the community of nodes within the network, which includes both *passive* users merely using the network to transfer money around, and "active" users (or miners) contributing their own computational resources to the networks in order to support its operations. The other is the community of developers, who are contributing code to the Bitcoin project with a view to maintain or improve its functionalities. What the crisis described above has revealed is the difficulty of establishing a governance structure which would properly interface both of these dimensions. As a consequence, a small number of individuals became responsible for the long-term sustainability of a large collective open source project, and the project rapidly fell prone to interpersonal conflict once consensus could no longer be reached among them.

This section will describe the specificities of the two-layered structure of the Bitcoin project and the mechanisms put in place to address these key challenges, in order to better understand any shortcomings they may display.

A. THE BITCOIN NETWORK: GOVERNANCE BY INFRASTRUCTURE

As described earlier, the Bitcoin network purports to be both *self-governing* and *self-sustaining*. [19] As a trustless infrastructure, it seeks to function independently of any social institutions. The rules governing the platform are not enforced by any single entity, instead they are embedded directly into the network protocol that every user must abide to. [20]

Given the open and decentralised nature of the Bitcoin network, its *community borders* are extremely flexible and dynamic, in that everyone is free to participate and contribute to the network – either as a passive user or as an active miner. The decentralised character of the network however, creates significant challenges when it comes to the protection thereof, mainly due to the lack of a centralised authority in charge of policing it. Bitcoin thus implemented a technical solution to protect the network against malicious attacks (e.g. so-called *sybil attacks*) through the Proof-of-Work mechanism, designed to make it economically expensive to cheat the network. Yet, while the protocol has proved successful thus far, it remains subject to a lot of criticism. Beyond the problems related to the high computational costs of Proof-of-Work, [21] the

Bitcoin network can also be co-opted by capital. If one or more colluding actors were to control at least 51% of the network's hashing power, they would be able to arbitrarily censor transactions by validating certain blocks at the expense of others (the so-called 51% attack).

With regard to *status recognition*, the Bitcoin protocol eliminates the problem at the root by creating a trustless infrastructure where the identity of the participant nodes is entirely irrelevant. In Bitcoin, there is no centralised authority in charge of assigning a network identifier (or account) to each individual node. The notions of identity and status are thus eradicated from the system and the only thing that matters – ultimately – is the amount of computational resources that every node is providing to the network.

Conversely, the reward system represents one of the constitutive elements of the Bitcoin network. The challenge has been resolved in a purely technical manner by the Bitcoin protocol, through the notion of *mining*. In addition to providing a protection mechanism, the Proof-of-Work algorithm introduces a series of economic incentives to reward those who are contributing to maintaining and securing the network with their computational resources (or *hashing power*). The mining algorithm is such that the first one to find the solution to a hard mathematical problem (whose difficulty increases over time) [22] will be able to register a new block into the blockchain and will earn a specific amount of bitcoins as a reward (the reward was initially set at 50 bitcoins and is designed to be halved every four years). From a game-theoretical perspective, this creates an interesting incentive for all network participants to provide more and more resources to the network, so as to increase their chances of being rewarded bitcoins. [23] Bitcoin's incentive mechanism is thus a complicated, albeit mathematically elegant way of bringing a decentralised network of self-interested actors to collaborate and contribute to the operations of the Bitcoin network by relying exclusively on mathematical algorithms and cryptography. Over time, however, the growing difficulty of mining due to the increasing amount of computational resources engaged in the network, combined with the decreasing amount of rewards awarded by the network, has eventually led to a progressive concentration of hashing power into a few *mining pools, *which are today controlling a large majority of the Bitcoin network – thereby making it more vulnerable to a 51% attack. [24] Hence, in spite of its original design as a fully decentralised network ruled by distributed consensus, in practice, the Bitcoin network has evolved into a highly centralised network ruled by an increasingly oligopolistic market structure.

Finally, with regard to the issue of *conflict resolution*, it is first important to determine what constitutes a conflict at the level of the Bitcoin infrastructure. If the purpose of the Bitcoin protocol is for a decentralised network of peers to reach consensus as to what is the right set of transactions (or *block*) that should be recorded into the Bitcoin blockchain, then a conflict arises whenever two alternative blocks (which are both valid from a purely mathematical standpoint) are registered by different network participants in the same blockchain – thus creating two competing versions (or *forks*) of the same blockchain. Given that there is no way of deciding *objectively* which blockchain should be favoured over the other, the Bitcoin protocol implements a specific fork-choice strategy stipulating that, if there is a conflict somewhere on the network, the longest chain shall win. [25] Again, as with the former two mechanisms, the longest-chain rule is a simple and straightforward mechanism to resolve the emergence of conflicts within the Bitcoin network by relying – solely and exclusively – on technological means.

It is clear from this description, that the objective of Satoshi Nakamoto and the early Bitcoin developers was to create a decentralised payment system that is both self-sufficient and self-

contained. Perhaps naively, they thought it was possible to create a new technological infrastructure that would be able to govern itself – through its own protocols and rules – and that would not require any third-party intervention in order to sustain itself. And yet, in spite of the mathematical elegance of the overall system, once introduced in a particular socio-economic context, technological systems often evolve in unforeseen ways and may fall prey to unexpected power relations.

In the short history of Bitcoin, indeed, there have been significant tensions related to *border protection*, *rewards systems* and *conflict resolution*. Some of these issues are inherent in the technological infrastructure and design of the Bitcoin protocol. Perhaps one of the most revealing of the possible ways of subverting the system is the notion of *selfish mining* whereby miners can increase their potential returns by refusing to cooperate with the rest of the network. [26] While this does not constitute a technical threat to the Bitcoin protocol *per se*, it can nonetheless be regarded as an *economic attack*, which contributes to potentially reducing the security of the Bitcoin network by changing the inherent incentive structure. [27] Other issues emerged as a result of more exogenous factors, such as the Mt. Gox scandal [28] of 2014 – which led to the loss of 774,000 bitcoins (worth more than US 450 million dollars at the time) – as well as many other scams and thefts that occurred on the Bitcoin network over the years. [29] Most of these were not due to an actual flaw in the Bitcoin protocol, but were mostly the result of ill-intentioned individuals and bad security measures in centralised platforms built on top of the Bitcoin network (Trautman, 2014).

Accordingly, it might be worth considering whether – independently of the technical soundness of the Bitcoin protocol – the Bitcoin network can actually do away with any form of external regulation and/or sanctioning bodies, or whether, in order to ensure the proper integration (and assimilation) of such a technological artefact within the social, economic and cultural contexts of modern societies, the Bitcoin network might require some form of surveillance and arbitration mechanisms (either internal or external to the system) in order to preserve legitimate market dynamics, as well as to guarantee a proper level of consumer protection and financial stability in the system.

B. THE BITCOIN ARCHITECTS: GOVERNANCE OF INFRASTRUCTURE

Just like many other internet protocols, Bitcoin was initially released as an open source software, encouraging people to review the code and spontaneously contribute to it. Despite their formal emphasis on *openness*, different open source software projects and communities feature very different social and organisational structures. The analysis of communication patterns among various open source projects has shown tendencies ranging from highly distributed exchanges between core developers and active users, to high degrees of centralisation around a single developer (Crowston & Howison, 2005). Moreover, different open source communities enjoy a more or less formalised governance structure, which often evolves as the project matures. Broadly speaking, open source communities have been categorised into two main types or configurations: *democratic-organic* versus "autocratic-mechanistic" (de Laat, 2007). The former display a highly structured and meritocratic governance system (such as the Debian community, most notably), whereas the latter feature less sophisticated and more

implicit governance systems, such as the Linux community, where most of the decision-making power has remained in the hands of Linus Torvald – often referred to as the "benevolent dictator'. Bitcoin definitely falls into the second category.

Indeed, since its inception, Satoshi Nakamoto was the main person in charge of managing the project, as well as the only person with the right to commit code into the official Bitcoin repository. It was only at a later stage, when Satoshi began to disengage from the Bitcoin project, that this power was eventually transferred to a small group of 'core developers'. Hence, just like many other open source projects, there is a discrepancy between those who can provide input to the project (the community at large) and those who have the ultimate call as to where the project is going. Indeed, while anyone is entitled to submit changes to the software (such as bug fixes, incremental improvements, etc.), only a small number of individuals (the core developers) have the power to decide which changes shall be incorporated into the main branch of the software. This is justified partly by the high level of technical expertise needed to properly assess the proposed changes, but also – more implicitly – by the fact that the core developers have been entrusted with the responsibility of looking after the project, on the grounds of their involvement (and, to some extent, shared *ideology*) with the original concept of Satoshi Nakamoto.

With this in mind, we can now provide a second perspective on the three key challenges facing Bitcoin, and analyse how they are being dealt with from the side of its *architects*: the Bitcoin developers.

The *definition and protection of community boundaries*, and of the work produced collectively, is a key issue in open source collectives. It classically finds a solution through the setting up of an alternative intellectual property regime and licensing scheme – *copyleft*, which ensures that the work will be preserved as a common pool resource – but also enforces a number of organisational features and rules intended to preserve some control over the project (O'Mahony, 2003; Schweik & English, 2007). In the case of Bitcoin, community borders are – at least in theory – quite clearly defined. Just like many other open source software projects, there exists a dividing line between the community of users and developers at large, who can provide input and suggest modifications to the code (by making a pull-request, for instance), and the core developers who are in charge of preserving the quality and the functionality of the code, and who are the only ones with the power to accept (or refuse) the proposed modifications (e.g. by merging pull-requests into the main branch of the code). However, the distinction between these two communities is not as clear-cut as it may seem, since the community at large also has an important (albeit indirect) influence on the decisions concerning the code.

Specifically, consensus formation among the Bitcoin core developers has been formalised through a process known as Bitcoin Improvement Proposals (BIPs) [30], which builds heavily on the process in place for managing the Python programming language (PEPs or Python Enhancement Proposals). Historically, both of these processes share similarities with (and sometimes explicitly refer to) what can be considered the "canonical" approach to consensus formation for designing and documenting network protocols: RFC or Request For Comments, used to create and develop the internet protocol suite (Flichy, 2007, p. 35ff). The BIP process requires that all source code and documentation be released and made available to anyone, so that a multiplicity of individuals can contribute to discuss and improve them. Yet, the final call as to whether a change will be implemented ultimately relies on the core developers assessing the degree of public support which a proposal has built, and finding a consensus among themselves:

> We are fairly liberal with approving BIPs, and try not to be too involved in decision making on behalf of the community. The exception is in very rare cases of dispute resolution when a decision is contentious and cannot be agreed upon. In those cases, the conservative option will always be preferred. Having a BIP here does not make it a formally accepted standard until its status becomes Active. For a BIP to become Active requires the mutual consent of the community. Those proposing changes should consider that ultimately consent may rest with the consensus of the Bitcoin users. [31]

This description provides a concise overview of the structures of legitimacy and accountability which govern the relationship between the Bitcoin architects (or core developers) and the Bitcoin users. While the community is open for anyone to participate, decision-making is delegated to a small number of people who try to keep intervention to a minimum. Yet, ultimately, the sovereignty of the overall project rests with *the people* – i.e. the Bitcoin users and miners. If the core developers were to make a modification to the code that the community disagrees with (the miners, in particular), the community might simply refuse to run the new code. This can be regarded as a form of "vetoing power' [32] or "market-based governance' [33] which guarantees that legitimacy of the code ultimately rests with the users.

Regarding *acknowledgment of status*, this requires balancing rewards for the most active and competent contributors, while promoting and maintaining the collective character of the overall endeavour. Indeed, open source developers are acutely aware of the symbolic retributions which they can acquire by taking part in a given project, and are also monitoring other contributors to assess their position within communities which display a strongly meritocratic orientation (Stewart, 2005). Some communities rank individuals by resorting to systems of marks which provide a quantitative metric for reputation; others rely on much less formalised forms of evaluation. In the case of Bitcoin, some measure of reputation can be derived from the platform used to manage the versioning of the software – *Github* – which includes metrics for users" activities (such as number of contributions, number of followers, etc.). However, the reputation of the core developers is on a completely different scale, and is mostly derived from their actual merit or technical expertise, as well as a series of less easily defined individual qualities which can be understood as a form of *charisma*.

Finally, *conflict management* is probably the most difficult issue to deal with in consensus-oriented communities, since it requires a way to avoid both *paralysing deadlocks* and *divisive fights*. Taking Wikipedia as an example, the community relies on specific mechanisms of mutual surveillance as the most basic way of managing conflicts; however, additional regulatory procedures of mediation and sanctions have been established and can be resorted to if needed (Auray, 2012, p. 225). The Debian community is also well known for its sophisticated rules and procedures (Lazaro, 2008). Though not immune to deadlocks and fighting, these communities have managed to scale while maintaining some degree of inclusivity, by shifting contentious issues from *substantive* to *procedural* grounds – thus limiting the opportunities for personal disputes and *ad hominem* attacks.

Obviously, the Bitcoin community lacks any such form of conflict management procedures. As described above, failure to reach consensus among the core developers concerning the block size dispute led to an actual forking of the Bitcoin project. Forking is a process whereby two (or more) software alternatives are provided to the user base, who will therefore need to make a choice: the adoption rate will ultimately determine which branch of the project will win the

competition, or whether they will both evolve as two separate branches of the same software. Forking is standard practice in free/*libre* and open source software development, and although it can be seen as a last resort solution which can sometimes put the survival of a project at risk (Robles & González-Barahona, 2012), it can also be considered a key feature of its governance mechanisms. For Nyman and Lindman: *The right to fork code is built into the very definition of what it means to be an open source program* – it is a reminder that developers have the essential freedom to take the code wherever they want, and this freedom also functions as a looming threat of division that binds the developer community together (Nyman & Lindman, 2013).

In sum, it can be stressed that, at all three levels (defining borders, acknowledging status, and managing conflicts), the governance of the Bitcoin project relies almost exclusively on its leaders, lending credit to the view that peer production can often lead to the formation of oligarchic organisational forms (Shaw & Hill, 2014). More specifically, in classic weberian terms – and as can often be observed in online communities – Bitcoin governance consists in a form of domination based on charismatic authority (O'Neil, 2014), largely founded on presumed technical expertise. The recent crisis experienced by the Bitcoin community revealed the limits of consensus formation between individuals driven by sometimes diverging political and commercial interests, and underlined the discrepancies between the overall goals of the project (a self-regulating decentralised virtual currency and payment system) and the excessively centralised and technocratic elites who are in charge of the project.

III. THE INVISIBLE POLITICS OF BITCOIN

Vires in Numeris (latin for: *Strength in Numbers*) was the motto printed on the first physical Bitcoin wallets [34] – perhaps as an ironic reference to the "*In God we Trust"* motto printed on US dollar bills. In the early days, the political objectives of Bitcoin were clearly and explicitly stated through the desire of changing existing power dynamics between individuals and the state. [35] Yet, while some people use Bitcoin as a vehicle for expressing their political views (e.g. the community of so-called cypherpunks and *crypto-libertarians*), others believe that there is no real political ideology expressed within the technology itself. [17] Indeed, if asked, many will say that one of the core benefits of Bitcoin is that it operates beyond the scope of governments, politics, and central banks. [36] But it does not take much of a stretch to realise that this desire to remain *a-political* constitutes a political dimension in and of itself (Kostakis & Giotitsas, 2014).

Decentralisation inherently affects political structures by removing a control point. Regarding Bitcoin, decentralisation is achieved through a peer-to-peer payment system that operates independently of any (trusted) third party. As a result, not only does Bitcoin question one of the main prerogatives of the state – that of money issuance and regulation, it also sheds doubts on the need (and, therefore, the legitimacy) of existing financial institutions. On the one hand, as a decentralised platform for financial transactions, Bitcoin sets a limit on the power of central banks and other financial institutions to define the terms and conditions, and control the execution of financial transactions. On the other hand, by enabling greater disintermediation, the Bitcoin blockchain provides new ways for people to coordinate themselves without relying on a centralised third party or trusted authority, thus potentially promoting individual freedoms and emancipation. [37] More generally, the blockchain is now raising high hopes as a solution which, beyond a payments system, could support many forms of direct interactions between free and equal individuals – with the implicit assumption that this would contribute to furthering democratic goals by promoting a more horizontal and self-organising social structure

(Clippinger & Bollier, 2014).

As Bitcoin evolves – and in the eventuality that it gets more broadly adopted – it will need to face a growing number of technical challenges (e.g. related to blockchain scalability), but it will also encounter a variety of social and political challenges – as the technology will continue to impinge upon existing social and governmental institutions, ushering in an increasingly divergent mix of political positions.

The mistake of the Bitcoin community was to believe that, once technical governance had been worked out, the need to rely on government institutions and centralised organisations in order to manage and regulate social interactions would eventually disappear (Atzori, 2015; Scott, 2014). Politics would progressively give way to new forms of technologically-driven protocols for social coordination (Abramowicz, 2015) – regarded as a more efficient way for individuals to cooperate towards the achievement of a collective goal while preserving their individual autonomy.

Yet, one cannot get rid of politics through technology alone, because the governance of a technology is – itself – inherently tied to a wide range of power dynamics. As Yochai Benkler elegantly puts it, there are no *spaces of perfect freedom from all constraints,* only different sets of constraints that one necessarily must choose from (Benkler, 2006). Bitcoin as a trustless technology might perhaps escape the existing political framework of governmental and market institutions; yet, it remains subject to the (invisible) politics of a handful of individuals – the programmers who are in charge of developing the technology and, to a large extent, deciding upon its functionalities.

Implicit in the governance structure of Bitcoin is the idea that the Bitcoin core developers (together with a small number of technical experts) are – by virtue of their technical expertise – the most likely to come up with the right decision as to the specific set of technical features that should be implemented in the platform. Such a *technocratic* approach to governance is problematic in that it goes counter to the original conception of the Bitcoin project. There exists, therefore, an obvious discrepancy between the libertarian vision of Bitcoin as a decentralised infrastructure that cannot be regulated by any third party institution, and the actual governance structure that dictates the technological development of Bitcoin – which, in spite of its open source nature, is highly centralised and undemocratic. While the (a)political dimension of the former has been praised or at least acknowledged by many, the latter has remained, for a long time, invisible to the public: the technical decisions to be taken by the Bitcoin developers were not presented as political decisions, and were therefore never debated as such.

The block size debate is a good illustration of this tendency. Although the debate was framed as a value-neutral technical discussion, most of the arguments in favour or against increasing the size of a block were, in fact, part of a hidden political debate. Indeed, except for the few arguments concerning the need to preserve the security of the system, most of the arguments that animated the discussion were, ultimately, concerned with the socio-political implications of such a technical choice (e.g. supporting a larger amount of financial transactions versus preserving the decentralised nature of the network). Yet, insofar as the problem was presented as if it involved only rational and technical choices, the political dimensions which these choices might involve were not publicly acknowledged.

Moreover, if one agrees that *all artefacts have politics* (Winner, 1980) and that technology frames social practice (Kallinikos, 2011), it follows that the design and features of the Bitcoin platform must be carefully thought through by taking into account not only its impact on the

technology as such (i.e. security and scalability concerns), but also its social and political implications on society at large.

Politics exist because, in many cases, consensus is hard to achieve, especially when issues pertaining to *social justice *need to be addressed. Social organisations are thus faced with the difficult challenge of accommodating incompatible and often irreconcilable interests and values. The solutions found by modern day liberal democracies involve strong elements of *publicity* and *debate*. The underlying assumption is that the only way to ensure the *legitimacy* of collective decisions is by making conflicts apparent and by discussing and challenging ideas within the public sphere (Habermas, 1989). Public deliberations and argumentation are also necessary to achieve a greater degree of *rationality* in collective decisions, as well as to ensure full *transparency* and *accountability* of the ways in which these decisions are both made and put into practice. But the antagonistic dimensions of social life constantly undermine the opportunities for consensus formation. A truly democratic approach needs, therefore, to acknowledge – and, ideally, to balance or compromise – these spaces of *irreconcilable dissent* which are the most revealing of embedded power relations (Mouffe & Laclau, 2001; Mouffe, 1993).

This is perhaps even more crucial for technologies such as the internet or Bitcoin, which seek to implement a global and shared infrastructure for new forms of coordination and exchange. Bitcoin as an *information infrastructure* must be understood here as a means of introducing and shaping a certain type of social relations (Star, 1999; Bowker et al., 2010). Yet, just like many other infrastructures, Bitcoin is mostly an *invisible* technology that operates in the background (Star & Strauss, 1999). It is, therefore, all the more important to make the design choices lying behind its technical features more visible, in order to shed light on the politics which are implicit in the technological design.

It should be clear, by now, that the political intentions of a technology cannot be resolved, only and exclusively, by technological means. While technology can be used to steer and mediate many kinds of social interactions, it should not (and cannot) be the sole and main driver of social change. As Bitcoin has shown, it is unrealistic to believe that human organisations can be governed by relying exclusively on algorithmic rules. In order to ensure the long-term sustainability of these organisations, it is necessary to incorporate, on top of the technical framework, a specific governance structure that enables people to discuss and coordinate themselves in an authentically democratic way, but also – and perhaps more importantly – to engage and come up with decisions as to how the technology should evolve. In that regard, one should always be wary that the decision-making process involve not only those who are building the technology (i.e. developers and software engineers) but also all those who will ultimately be affected by these decisions (i.e. the users of that technology).

Different dimensions of the internet have already been analysed from such a perspective within the broader framework of internet governance (DeNardis, 2012; Musiani et al., 2016), providing important insights about the performative dimensions of the underlying software and protocols, and the ways they have been put to use. These could prove useful in better understanding and formulating a novel governance structure for the Bitcoin project – one that is mediated (rather than dictated) by technological rules.

CONCLUSION: BITCOIN WITHIN THE WIDER FRAME OF INTERNET GOVERNANCE

The internet, understood as a complex and heterogeneous socio-technical construct, combines many different types of arrangements – involving social norms, legal rules and procedures, market practices and technological solutions – which, taken together, constitute its overall governance and power structures (Brousseau, Marzouki, & Méadel, 2012). Most of the research on internet governance has focused on the interplay between *infrastructures* on the one hand, and *superstructures* or institutions on the other – particularly those which have emerged on top of the network during the course of its history (such as ICANN or IETF), sometimes generating conflictual relationships with existing national and international legal frameworks, private corporations, or even civil society at large (Mueller, 2002; Mueller, 2010; Mathiason, 2009; DeNardis, 2009; Bygrave & Bing, 2009). [38]

Internet governance has been fraught with many frictions, controversies and disputes over the years – an international fight to control the basic rules and protocols of the internet described by some as a *global war* (DeNardis, 2014). Even the much praised governance model of the internet protocol suite – based on the IETF's (deceptively simple) rule of *"rough consensus and running code*" – effectively involved, at certain points, fair amounts of power struggles and even autocratic design (Russell, 2014). The idea that consensus over technical issues can be reached more easily because it only involves objective criteria and factual observations (i.e. something either works or doesn't) neglects the reality that "stories about standards are necessarily about power and control – they always either reify or change existing conditions and are always conscious attempts to shape the future in specific ways" (Russell, 2012).

Set within the wider frame and history of internet governance, the Bitcoin case is particularly instructive insofar as it draws on a certain number of new, but also already existing practices, to promote some of the ideals which have been associated with the internet since its inception: furthering individual autonomy and supporting collective self-organisation (Loveluck, 2015). As we have seen, Bitcoin can be understood as a dual-layered construct, composed of a global network infrastructure on the one hand, and a small community of developers on the other. Although the *trustlessness* of the network seeks to obliviate the need for a central control point, in practice, as soon as a technology is deployed, new issues emerge from unanticipated uses of technology – which ultimately require the setting up of social institutions in order to protect or regulate the technology. These institutions can be more or less attuned with the overall aims of the technology, and can steer it in different directions. For instance, while the IETF managed to implement a relatively decentralised and bottom-up process for establishing standards, the Domain Name System (DNS) has shown that even a distributed network might, at some point, need to rely on a centralised control point to administer *scarce resources* (such as domain names). This has led to the emergence of centralised – and somewhat contested – institutions, such as, most notably, the ICANN – a US-based non-profit corporation that is in charge of coordinating all unique identifiers across the world wide web.

The lessons from the past – taking account of both the success stories and failures of internet governance – can serve as useful indications as to what should be attempted or, on the contrary, avoided in terms of Bitcoin governance. In particular, it should be acknowledged that socio-technical systems cannot – by virtue of their embeddedness into a social and cultural context – ensure their own *self-governance* and *self-sustainability* through technology alone. Any technology will eventually fall prey to the social, cultural and political pressures of the context in

which it operates, which will very probably make it grow and evolve in unanticipated directions (Akrich, 1989; MacKenzie & Wajcman, 1999).

The Bitcoin project has evolved significantly over the years, for reasons which are both endogenous and exogenous to the system. From a small network run by a few crypto-libertarians and computer geeks eager to experiment with a new *liberation technology* (Diamond, 2010), the Bitcoin network quickly scaled into a global network which is struggling to meet the new demands and expectations of its growing user base and stakeholders.

The block size debate created an actual schism within the Bitcoin community – and, by doing so, ultimately stressed the need for a more democratic governance system. Drawing on the many different arrangements which have been experienced at different levels of internet governance, each with their own distinctive forms of deliberation and decision-making procedures (Badouard et al., 2012), the Bitcoin development process could perhaps be improved by introducing an alternative governance structure that would better account for the many other dimensions (other than technical) that the technology might have, especially with regard to its social, economic and political implications on society at large.

The Bitcoin Foundation was a first attempt in this direction, though it never managed to establish itself as a standardisation body precisely due to a lack of legitimacy and accountability in its own governance process. A centralised governance body (similar to ICANN) in charge of ensuring the legitimacy and accountability for the future developments of the Bitcoin project would obviously fail to obtain any kind of legitimacy from within the Bitcoin community – since eliminating the need for fiduciary institutions or other centralised authorities was the very purpose of the Bitcoin network. The technologically-driven approach currently endorsed by the Bitcoin project, aiming to create a governance structure that is solely and exclusively dictated by technological means (*governance by infrastructure*) has also been shown to be bound to failure, since a purely technological system cannot fully account for the whole spectrum (and complexity) of social interactions. In this regard, one of the main limitations of the Bitcoin protocol is that it is based on algorithmically quantifiable and verifiable actions (i.e. how much computing resources people are investing in the network) and it is therefore unable to reward those who contribute to the network in different manners, other than through hashing power.

A more interesting approach would involve using the underlying technology – the *blockchain* – not as a *regulatory technology* that will technologically enforce a particular set of predefined protocols and rules (as Bitcoin does), but rather as a platform on which people might encode their own sets of rules and procedures that will define a particular system of governance – one that can benefit from the distinctive characteristics of the blockchain (in terms of transparency, traceability, accountability, and incorruptibility) but would also leave room for the establishment of an institutional framework that could operate on top of that (decentralised) network. This would make sure that technology remains a tool of empowerment for people, who would use it to enable and support new models of governance, rather than the opposite.

Given the experimental nature and current lack of maturity of the technology, it is difficult to predict, at this specific point in time, what would be the best strategy to ensure that the Bitcoin project evolves in accordance with the interests of all relevant stakeholders. Yet, regardless of the approach taken, it is our belief that a proper governance structure for Bitcoin can only be achieved by publicly acknowledging its political dimensions, and replacing the current technocratic power structure of the Bitcoin project with an institutional framework capable of understanding (and accommodating) the politics inherent in each of its technical features.

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FOOTNOTES

1. See also Oram 2001. The case of file-sharing and its effects on copyright law have been particularly salient (David, 2010).

2. See Hughes, 1993; Levy, 2001.

3. In a fractional-reserve banking system, commercial banks are entitled to generate credits, by making loans or investment, while holding reserves which only account for a fraction of their deposit liabilities – thereby effectively creating money *out of thin air*. A report from the Bank of England estimates that, as of December 2003, only 3% of the money in circulation in the global economy was represented by physical cash (issued by the central bank), whereas the remaining 97% is made up of loans and co-existent deposits created by private or commercial banks (McLeay, Radia, & Thomas, 2014).

4. "[Bitcoin is] completely decentralized, with no central server or trusted parties, because everything is based on crypto proof instead of trust. The root problem with conventional currency is all the trust that's required to make it work. The central bank must be trusted not to debase the currency, but the history of fiat currencies is full of breaches of that trust. Banks must be trusted to hold our money and transfer it electronically, but they lend it out in waves of credit bubbles with barely a fraction in reserve. We have to trust them with our privacy, trust them not to let identity thieves drain our accounts… With e-currency based on cryptographic proof, without the need to trust a third party middleman, money can be secure and transactions effortless." (Nakamoto, 2009).

5. On 7 November 2008, Satoshi Nakamoto explained on the Cryptography mailing list that *[we will not find a solution to political problems in cryptography,] but we can win a major battle in the arms race and gain a new territory of freedom for several years. Governments are good at cutting off the heads of a centrally controlled network like Napster, but pure P2P networks like Gnutella and Tor seem to be holding their own* (Nakamoto 2008b).

6. The double-spending problem is a problem commonly found in many digital cash systems, whereby people can spend the same digital token twice by simply duplicating it. It is usually solved through the introduction of a centralised (trusted) third party, which is in charge of verifying that every transaction is valid, before authorising it.

7. Unless one or more colluding parties control over 51% of the network. See below for a more detailed explanation of the Bitcoin security model.

8. Of course, a variety of tools can be used to reduce the degree of transparency inherent in the blockchain. Just like public-key encryption has enabled more secure communications on top of the internet network, specific cryptographic techniques (such as homomorphic encryption and zero-knowledge proofs) can be used to conceal the content of blockchain-based transactions, without reducing the verifiability thereof. The most popular of these technologies is Zerocash, a privacy-preserving blockchain which relies on zero-knowledge proofs to enable people to transact on a public blockchain without disclosing neither the origin, the destination, nor the amount of the transaction.

9. In October 2009, Bitcoin was first estimated with an exchange rate of 1 USD for 1,309 BTC by the New Liberty Standard, calculated according the costs of electricity that had to be incurred in order to generate bitcoins at the time.

10. The first commercial Bitcoin transaction known to date is the purchase by a Florida-based programmer, Laslo Hanyecz, of a pizza purchased (by a volunteer) from Papa John's for a face value of 10,000 BTC.

11. Over the years, several people have been outed as being Satoshi Nakamoto – these include: Michael Clear (Irish graduate student at Trinity College); Neal King, Vladimir Oksman and Charles Bry (who filed a patent application for updating and distributed encryption keys, just a few days before the registration of the bitcoin.org domain name); Shinichi Mochizuki (Japanese mathematician); Jed McCaleb (founder of the first Bitcoin exchange Mt. Gox); Nick Szabo (author of the *bit gold* paper and strong proponent of the notion of "smart contract"); Hal Finney (a well-known cryptographer who was the recipient of the first Bitcoin transaction); and Dorian Nakamoto (an unfortunate case of homonymy). Most recently, Craig Steven Wright (an Australian computer scientist and businessman) claimed to be Satoshi Nakamoto, without however being able to provide proper evidence to support his claim (2016). To date, all of these claims have been dismissed and the real identity of Satoshi Nakamoto remains a mystery.

12. The Bitcoin Foundation has been heavily criticised due to the various scandals that its board members had been associated with. These include: Charlie Shrem, who had been involved in aiding and abetting the operations of the online marketplace Silk Road; Peter Vessenes and Mark Karpeles, who were highly involved with the scandals of the now defunct Bitcoin exchange Mt. Gox; and Brock Pierce, whose election in spite of his questionable history in the virtual currency space has created huge controversy within the Bitcoin Foundation, eventually leading to the resignation of nine members.

13. In general, forks can be categorised into *soft* and *hard* forks: the former retains some compatibility or interoperability with the original software, whereas the latter involves a clear break or discontinuity with the preceding system.

14. For instance, one of the largest US Bitcoin wallet and exchange company, Coinbase, was removed from Bitcoin.org upon making the announcement that they would be experimenting with Bitcoin XT.

15. As of 11 January 2016, only about 10% of the blocks in the Bitcoin network had been signed by XT nodes (Palmer, 2016).

16. Mike Hearn, interview with the authors, April 2016.

17. a. b. Patrick Murck, interview with the authors, April 2016.

18. Peter Todd and Pindar Wong, interview with the authors, April 2016.

19. See supra, part I.A.

20. This reveals a significant bias of the Bitcoin community towards technological determinism – a vision whereby technological artefacts can influence both culture and society, without the need for any social intervention or assimilation (Bimber, 1994).

21. As the name indicates, the Proof-of-Work algorithm used by Bitcoin requires a certain amount of work to be done before one can record a new set of transactions (a block) into Bitcoin's distributed transaction database (the blockchain). In Bitcoin, the work consists in finding a particular nounce to be embedded into the current block, so that processing the block with a particular hash function (SHA-256) will result in a string with a certain number of leading zeros. The first one to find this nounce will be able to register the block and will therefore be rewarded with a specific number of bitcoins (Nakamoto 2008a). The amount of work to be done depends on the number of leading zeros necessary to register a block – this number may increase or decrease depending on the amount of computational resources (or

hashing power) currently available in the network, so as to ensure that a new block is registered, on average, every 10 minutes. While this model was useful, in the earlier stages of the network, as an incentive for people to contribute computational resources to maintain the network, the Proof-of-Work algorithm creates a competitive game which encourages people to invest more and more hashing power into the network (so as to be rewarded more bitcoins), ultimately resulting in a growing consumption of energy.

22. The difficulty of said mathematical problem is dynamically set by the network: its difficulty increases with the amount of computational resources engaged in the network, so as to ensure that one new block is registered in the blockchain, on average, every 10 minutes.

23. In the early days, given the limited number of participants in the network, mining could be easily achieved by anyone with a personal computer or laptop. Subsequently, as Bitcoin's adoption grew and the virtual currency acquired a greater market value, the economic incentives of mining grew to the point that people started to build specific hardware equipments (ASICs) created for the sole purpose of mining, making it difficult for people to mine without such specialised equipment. Note that such an evolution had actually been anticipated by Satoshi Nakamoto himself, who wrote already in 2008 that, even if "at first, most users would run network nodes, [...] as the network grows beyond a certain point, [mining] would be left more and more to specialists with server farms of specialized hardware."

24. Bitcoin mining pools are a mechanism allowing for Bitcoin miners to pool their resources together and share their hashing power while splitting the reward equally according to the amount of shares they contributed to solving a block. Mining pools constitute a threat to the decentralised nature of Bitcoin. Already in 2014, one mining pool (GHash) was found to control more than half of Bitcoin's hashing power, and was thus able to decide by itself which transactions shall be regarded as valid or invalid – the so-called 51% attack. Today, most of the hashing power is distributed among a few mining pools, which together hold over 75% of the network, and could potentially collude in order to take over the network.

25. Note that the longest chain is to be calculated by taking into account the number of transactions, rather than the number of blocks. The reason for such an arbitrary choice is that the longest chain is likely to be the one that required the greater amount of computational resources, and is therefore – probabilistically – the less likely to have been falsified or tampered with (e.g. by someone willing to censor or alter the content of former transactions).

26. Selfish mining is the process whereby one miner (or mining pool) does not broadcast the validated block as soon as the solution to the mathematical problem for this blockchain has been found, but rather continues to mine the next block in order to benefit from the first-mover advantage in terms of finding the solution for that block. By releasing validated blocks with a delay, ill-intentioned miners can therefore attempt to secure the block rewards for all subsequent blocks in the chain, since – unless the network manages to catch up with them – their fork of the blockchain will always be the longest one (and thus the one that required the most Proof-of-Work) and will thus be the one that will ultimately be adopted by the network (Eyal & Sirer, 2014).

27. Selfish miners encourage honest, but profit-maximising nodes to join the coalition of non-cooperating nodes, thus eventually making the network more vulnerable to a 51% attack.

28. Mt. Gox was one of the largest Bitcoin exchanges, handling over 70% of all bitcoin transactions as of April 2013. Regulatory issues brought Mt. Gox to be banned from the US

banking system, thus making it harder for US customers to withdraw funds into their bank accounts. On 7 February 2014, Mt. Gox halted all bitcoin withdrawals, claiming that they had encountered issues due to the "transaction malleability" bug in the Bitcoin software (which enabled people to pretend a transaction did not occur, when it actually occurred, so as to bring the client to create an additional transaction). On 24 February, the Mt. Gox website went offline and an (allegedly leaked) internal document got released showing that Mt. Gox had lost 774,408 bitcoins in an (allegedly unnoticed) theft that had been going on for years. On 28 February, Mt. Gox filed for bankruptcy reporting a loss of US 473 million dollars in bitcoin.

29. These include, amongst others, the Bitcoin Saving and Trust bitcoin-based Ponzi scheme; the hacking of exchanges such as Bitcoinica, BitFloor, Flexcoin, Poloniex, Bitcurex, etc; or even online Bitcoin wallet services such as Inputs.io and BIPS.

30. *BIP stands for Bitcoin Improvement Proposal. A BIP is a design document providing information to the Bitcoin community, or describing a new feature for Bitcoin or its processes or environment. The BIP should provide a concise technical specification of the feature and a rationale for the feature. We intend BIPs to be the primary mechanisms for proposing new features, for collecting community input on an issue, and for documenting the design decisions that have gone into Bitcoin. The BIP author is responsible for building consensus within the community and documenting dissenting opinions.*
(https://github.com/bitcoin/bips/blob/master/bip-0001.mediawiki)

31. https://github.com/bitcoin/bips/blob/master/README.mediawiki

32. "Bitcoin governance is mainly dominated by veto power, in the sense that many parties can choose to stop a change; we haven't seen much use of power to push through changes. The main shortcoming is users have, in practice, less veto power than they should due to coercion." (Peter Todd, interview with the authors, April 2016).

33. "If multiple competing implementations of the Bitcoin protocol exist, mining pool operators and wallet providers must decide which code to run. Their decision is disciplined and constrained by market forces. For mining pool operators, poor policy decisions can lead miners to withdraw hashing power from the pool. Wallet providers may find users shift their keys to another provider and exchange services may find liquidity moves to other providers. This structure favors stability, resilience and a conservative development process. It also makes the development and standards setting process resilient to political forces." (Patrick Murck, interview with the authors, April 2016).

34. The first kinds of physical Bitcoin wallets consisted of a pre-loaded Bitcoin account whose private address was stored in the shape of physical coins that people could hold.

35. As detailed above in Part I.A.

36. Mike Hearn, Pindar Wong, and Patrick Murck, interview with the authors, April 2016.

37. Peter Todd, interview with the authors, April 2016.

38. For instance, what happens when the freedom of expression made possible by the network impinges on country-specific laws? And who should decide (and on what grounds) whether the new .amazon generic Top Level Domain (gTLD) should be attributed to the US American company which has trademarked the name, or to the Brazilian government which lays claim to a geographical area?

Cryptocurrencies

Prompt contrasting reactions by Latin American regulators

While used by organized crime, cryptocurrencies are also becoming accepted as a legitimate payment method by mainstream sectors of the economy in Latin America. Currently, some stores, start-ups, restaurants, hotels, and other online businesses are accepting Bitcoin and other cryptocurrencies as a valid payment method. Online exchange platforms are emerging rapidly and even ATMs have been installed to carry out transactions using digital currencies.

Argentina, Brazil, Mexico and Venezuela are countries where the adoption of cryptocurrencies is rising rapidly. Businesses and individuals have found that Bitcoin can be more stable than local currencies. During 2015, earnings received by Bitcoin holders performed more than 400% better than the Venezuelan Bolivar, more than 92% better than the Brazilian Real, more than 65% better than the Mexican Peso and more than 41% better than the Argentine Peso[1].

The Venezuelan case is the most significant because since 2004 the country has applied a trade exchange regime, inflation has been out of control and the country is in political and economic turmoil. Bitcoin appears as an attractive alternative to the Bolivar in some sectors of the economy such as tourism and online retailers.

Regulators in Latin American are reacting in different ways

In 2014 the Mexican Central Bank (Banxico) and the Protection Commission of Users of Financial Services (CONDUSEF) each published a press release warning users of the dangers of entering into transactions with cryptocurrencies. Both argued that cryptocurrencies are inherently unstable and untrustworthy because they are not regulated, are not backed by national governments, and are not considered as legal tender. Any person using such currencies does so at their own risk. As of today, Bitcoin, Ethereum, Litecoin and other cryptocurrencies have not been regulated in any way and there is no clear indication that they will be regulated any time soon in Mexico.

Argentina is one of the leading countries for Bitcoin use, in part due to the country's exchange and capital control limitations which were abolished by the new government in 2015. In 2014 the Argentinian Central Bank (BCRA) issued a press release in similar terms to the Mexican Central Bank's, warning users of the risks of cryptocurrencies. Yet Argentina's new President Macri has expressed openness to Bitcoin[2].

Ecuador's approach has been to reject cryptocurrencies and instead created its own electronic currency. The Ecuadorian government launched its own official cryptocurrency called the Electronic Money System ("Sistema de Dinero Electrónico"- SDE). Although the use of SDE is mandatory for public institutions and private banking, it has not been well adopted by the general population.

1 See http://motherboard.vice.com/read/can-bitcoin-still-thrive-in-argentina-without-price-controls-peso-dollar-Mauricio-Macri

2 See http://motherboard.vice.com/read/can-bitcoin-still-thrive-in-argentina-without-price-controls-peso-dollar-Mauricio-Macri

The Bolivian Central Bank (BCB) has forbidden the use and possession of cryptocurrencies, and outlawed any activity related with cryptocurrencies.

The foregoing examples illustrate the difficulties that governments are facing with respect to regulating cryptocurrencies as well as other disruptive digital business models such as Uber and Airbnb. Of course, regulation will be changing in the future but at the end it will be difficult for regulation to keep up with digital innovation, whether based on blockchain technology or other Internet-based platforms. The gap between regulation and new digital currencies may be even greater in developing countries such as in Latin America where citizens need to cope with economic instability.

Cryptocurrencies, among other applications and technologies, could help to fill the gaps that traditional actors (including the government) are not addressing. We suggest that governments consider not only the risks of these new innovations, but also the benefits they could bring to the economy and the community.

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BUSINESS DAY

Big Swings Continue as Bitcoin Briefly Dips Below $10,000

By THE ASSOCIATED PRESS JAN. 17, 2018, 5:12 P.M. E.S.T.

NEW YORK — The volatility of the digital currency markets was on display again Wednesday, as bitcoin briefly fell below $10,000 before rebounding back above $11,000 in the U.S. afternoon.

With the drop below $10,000, bitcoin had lost about half its value since hitting a high above $19,000 in mid-December. Other digital currencies bounced around as well.

Bitcoin has slumped 20 percent this week as traders worry that regulators in South Korea will crack down on trading of digital currencies. The price of bitcoin fell as much as 20 percent Wednesday, but later recovered and was nearly flat at $11,392 around 5:10 p.m. Eastern Time, according to Coindesk.

Bitcoin hasn't caught on as a currency for buying things, as intended. But it has drawn huge interest from traders, and its price has soared over the past year, and has also had several sharp drops.

The price of one bitcoin went from $1,000 at the beginning of last year to nearly $20,000 in mid-December. The latest plunge brings the price back to where it was in early December.

Many financial pros believe bitcoin is in a speculative bubble that could crash any time.

The possibility that South Korea will ban or restrict virtual currency trading has weighed on traders' minds the last few weeks because the nation is a major market for currencies like bitcoin.

Those worries have also depressed the prices of other digital currencies that gained sharply in recent months.

Ethereum fell 9 percent to $993 Wednesday, according to Coindesk. During the day it tumbled as much as 26 percent. Its current price is still roughly double where it was in November, and down sharply from its recent peak of $1,329 on Jan. 10.

Bitcoin and other digital currencies trade on private exchanges that have little regulation or protection for investors. In Decembe[illegible]cial exchanges, the Cboe and CME, started trading in bitcoin futures, which allow investors to make bets on the future price of bitcoin without actually holding bitcoins.

Bitcoin futures on the Cboe were little changed while CME-traded futures slipped 2 percent. Earlier they hit their lowest levels since trading began last month.

Bitcoin is extremely hard to value because it has no country or central bank backing it and it's not widely used to make transactions. Its value is tied only to what people believe it is worth at any given time.

Partly for that reason, it's gone through numerous highs and lows in its brief history since being formed in 2009: After a plunge in November 2013, it lost about half its value in 2014. The huge rally in 2017 also came with some sharp selloffs, although those wound up being temporary.

Public Statement

Statement on Cryptocurrencies and Initial Coin Offerings

SEC Chairman Jay Clayton

Dec. 11, 2017

The world's social media platforms and financial markets are abuzz about cryptocurrencies and "initial coin offerings" (*ICOs*). There are tales of fortunes made and dreamed to be made. We are hearing the familiar refrain, "this time is different."

The cryptocurrency and ICO markets have grown rapidly. These markets are local, national and international and include an ever-broadening range of products and participants. They also present investors and other market participants with many questions, some new and some old (but in a new form), including, to list just a few:

- Is the product legal? Is it subject to regulation, including rules designed to protect investors? Does the product comply with those rules?
- Is the offering legal? Are those offering the product licensed to do so?
- Are the trading markets fair? Can prices on those markets be manipulated? Can I sell when I want to?
- Are there substantial risks of theft or loss, including from hacking?

The answers to these and other important questions often require an in-depth analysis, and the answers will differ depending on many factors. This statement provides my general views on the cryptocurrency and ICO markets[1] and is directed principally to two groups:

- "Main Street" investors, and
- Market professionals – including, for example, broker-dealers, investment advisers, exchanges, lawyers and accountants – whose actions impact Main Street investors.

Considerations for Main Street Investors

A number of concerns have been raised regarding the cryptocurrency and ICO markets, including that, as they are currently operating, there is substantially less investor protection than in our traditional securities markets, with correspondingly greater opportunities for fraud and manipulation.

Investors should understand that to date no initial coin offerings have been registered with the SEC. The SEC also has not to date approved for listing and trading any exchange-traded products (such as ETFs) holding cryptocurrencies or other assets related to cryptocurrencies.[2] **If any person today tells you otherwise, be especially wary.**

We have issued investor alerts, bulletins and statements on initial coin offerings and cryptocurrency-related investments, including with respect to the marketing of certain offerings and investments by celebrities and others.[3] Please take a moment to read them. **If you choose to invest in these products, please ask questions and demand clear answers.** A list of sample questions that may be helpful is attached.

As with any other type of potential investment, if a promoter guarantees returns, if an opportunity sounds too good to be true, or if you are pressured to act quickly, please exercise extreme caution and be aware of the risk that your investment may be lost.

Please also recognize that these markets span national borders and that significant trading may occur on systems and platforms outside the United States. Your invested funds may quickly travel overseas without your knowledge. As a result, risks can be amplified, including the risk that market regulators, such as the SEC, may not be able to effectively pursue bad actors or recover funds.

To learn more about these markets and their regulation, please read the "Additional Discussion of Cryptocurrencies, ICOs and Securities Regulation" section below.

Considerations for Market Professionals

I believe that initial coin offerings – whether they represent offerings of securities or not – can be effective ways for entrepreneurs and others to raise funding, including for innovative projects. However, any such activity that involves an offering of securities must be accompanied by the important disclosures, processes and other investor protections that our securities laws require. A change in the structure of a securities offering does not change the fundamental point that when a security is being offered, our securities laws must be followed.[4] Said another way, replacing a traditional corporate interest recorded in a central ledger with an enterprise interest recorded through a blockchain entry on a distributed ledger may change the form of the transaction, but it does not change the substance.

I urge market professionals, including securities lawyers, accountants and consultants, to read closely the investigative report we released earlier this year (the "*21(a) Report*")[5] and review our subsequent enforcement actions.[6] In the 21(a) Report, the Commission applied longstanding securities law principles to demonstrate that a particular token constituted an investment contract and therefore was a security under our federal securities laws. Specifically, we concluded that the token offering represented an investment of money in a common enterprise with a reasonable expectation of profits to be derived from the entrepreneurial or managerial efforts of others.

Following the issuance of the 21(a) Report, certain market professionals have attempted to highlight utility characteristics of their proposed initial coin offerings in an effort to claim that their proposed tokens or coins are not securities. Many of these assertions appear to elevate form over substance. Merely calling a token a "utility" token or structuring it to provide some utility does not prevent the token from being a security. Tokens and offerings that incorporate features and marketing efforts that emphasize the potential for profits based on the entrepreneurial or managerial efforts of others continue to contain the hallmarks of a security under U.S. law. **On this and other points where the application of expertise and judgment is expected, I believe that gatekeepers and others, including securities lawyers, accountants and consultants, need to focus on their responsibilities.** I urge you to be guided by the principal motivation for our registration, offering process and disclosure requirements: investor protection and, in particular, the protection of our Main Street investors.

I also caution market participants against promoting or touting the offer and sale of coins without first determining whether the securities laws apply to those actions. **Selling securities generally requires a license, and experience shows that excessive touting in thinly traded and volatile markets can be an indicator of "scalping," "pump and dump" and other manipulations and frauds.** Similarly, I also caution those who operate systems and platforms that effect or facilitate transactions in these products that they may be operating unregistered exchanges or broker-dealers that are in violation of the Securities Exchange Act of 1934.

On cryptocurrencies, I want to emphasize two points. First, while there are cryptocurrencies that do not appear to be securities, simply calling something a "currency" or a currency-based product does not mean that it is not a security. Before launching a cryptocurrency or a product with its value tied to one or more cryptocurrencies, its promoters must either (1) be able to demonstrate that the currency or product is not a security or (2) comply with applicable registration and other requirements under our securities laws. Second, brokers, dealers and other market participants that allow for payments in cryptocurrencies, allow customers to purchase cryptocurrencies on

margin, or otherwise use cryptocurrencies to facilitate securities transactions should exercise particular caution, including ensuring that their cryptocurrency activities are not undermining their anti-money laundering and know-your-customer obligations.[7] **As I have stated previously, these market participants should treat payments and other transactions made in cryptocurrency as if cash were being handed from one party to the other.**

Additional Discussion of Cryptocurrencies, ICOs and Securities Regulation

Cryptocurrencies. Speaking broadly, cryptocurrencies purport to be items of inherent value (similar, for instance, to cash or gold) that are designed to enable purchases, sales and other financial transactions. They are intended to provide many of the same functions as long-established currencies such as the U.S. dollar, euro or Japanese yen but do not have the backing of a government or other body. Although the design and maintenance of cryptocurrencies differ, proponents of cryptocurrencies highlight various potential benefits and features of them, including (1) the ability to make transfers without an intermediary and without geographic limitation, (2) finality of settlement, (3) lower transaction costs compared to other forms of payment and (4) the ability to publicly verify transactions. Other often-touted features of cryptocurrencies include personal anonymity and the absence of government regulation or oversight. Critics of cryptocurrencies note that these features may facilitate illicit trading and financial transactions, and that some of the purported beneficial features may not prove to be available in practice.

It has been asserted that cryptocurrencies are not securities and that the offer and sale of cryptocurrencies are beyond the SEC's jurisdiction. Whether that assertion proves correct with respect to any digital asset that is labeled as a cryptocurrency will depend on the characteristics and use of that particular asset. In any event, it is clear that, just as the SEC has a sharp focus on how U.S. dollar, euro and Japanese yen transactions affect our securities markets, we have the same interests and responsibilities with respect to cryptocurrencies. This extends, for example, to securities firms and other market participants that allow payments to be made in cryptocurrencies, set up structures to invest in or hold cryptocurrencies, or extend credit to customers to purchase or hold cryptocurrencies.

Initial Coin Offerings. Coinciding with the substantial growth in cryptocurrencies, companies and individuals increasingly have been using initial coin offerings to raise capital for their businesses and projects. Typically these offerings involve the opportunity for individual investors to exchange currency such as U.S. dollars or cryptocurrencies in return for a digital asset labeled as a coin or token.

These offerings can take many different forms, and the rights and interests a coin is purported to provide the holder can vary widely. A key question for all ICO market participants: "Is the coin or token a security?" As securities law practitioners know well, the answer depends on the facts. For example, a token that represents a participation interest in a book-of-the-month club may not implicate our securities laws, and may well be an efficient way for the club's operators to fund the future acquisition of books and facilitate the distribution of those books to token holders. In contrast, many token offerings appear to have gone beyond this construct and are more analogous to interests in a yet-to-be-built publishing house with the authors, books and distribution networks all to come. It is especially troubling when the promoters of these offerings emphasize the secondary market trading potential of these tokens. Prospective purchasers are being sold on the potential for tokens to increase in value – with the ability to lock in those increases by reselling the tokens on a secondary market – or to otherwise profit from the tokens based on the efforts of others. These are key hallmarks of a security and a securities offering.

By and large, the structures of initial coin offerings that I have seen promoted involve the offer and sale of securities and directly implicate the securities registration requirements and other investor protection provisions of our federal securities laws. Generally speaking, these laws provide that investors deserve to know what they are investing in and the relevant risks involved.

I have asked the SEC's Division of Enforcement to continue to police this area vigorously and recommend enforcement actions against those that conduct initial coin offerings in violation of the federal securities laws.

Conclusion

We at the SEC are committed to promoting capital formation. The technology on which cryptocurrencies and ICOs are based may prove to be disruptive, transformative and efficiency enhancing. I am confident that developments in fintech will help facilitate capital formation and provide promising investment opportunities for institutional and Main Street investors alike.

I encourage Main Street investors to be open to these opportunities, but to ask good questions, demand clear answers and apply good common sense when doing so. When advising clients, designing products and engaging in transactions, market participants and their advisers should thoughtfully consider our laws, regulations and guidance, as well as our principles-based securities law framework, which has served us well in the face of new developments for more than 80 years. I also encourage market participants and their advisers to engage with the SEC staff to aid in their analysis under the securities laws. Staff providing assistance on these matters remain available at FinTech@sec.gov .

Sample Questions for Investors Considering a Cryptocurrency or ICO Investment Opportunity[8]

- Who exactly am I contracting with?
    - Who is issuing and sponsoring the product, what are their backgrounds, and have they provided a full and complete description of the product? Do they have a clear written business plan that I understand?
    - Who is promoting or marketing the product, what are their backgrounds, and are they licensed to sell the product? Have they been paid to promote the product?
    - Where is the enterprise located?
- Where is my money going and what will be it be used for? Is my money going to be used to "cash out" others?
- What specific rights come with my investment?
- Are there financial statements? If so, are they audited, and by whom?
- Is there trading data? If so, is there some way to verify it?
- How, when, and at what cost can I sell my investment? For example, do I have a right to give the token or coin back to the company or to receive a refund? Can I resell the coin or token, and if so, are there any limitations on my ability to resell?
- If a digital wallet is involved, what happens if I lose the key? Will I still have access to my investment?
- If a blockchain is used, is the blockchain open and public? Has the code been published, and has there been an independent cybersecurity audit?
- Has the offering been structured to comply with the securities laws and, if not, what implications will that have for the stability of the enterprise and the value of my investment?
- What legal protections may or may not be available in the event of fraud, a hack, malware, or a downturn in business prospects? Who will be responsible for refunding my investment if something goes wrong?
- If I do have legal rights, can I effectively enforce them and will there be adequate funds to compensate me if my rights are violated?

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[1] This statement is my own and does not reflect the views of any other Commissioner or the Commission. This statement is not, and should not be taken as, a definitive discussion of applicable law, all the relevant risks with respect to these products, or a statement of my position on any particular product. Additionally, this statement is not a comment on any particular submission, in the form of a proposed rule change or otherwise, pending before the Commission.

[2] The CFTC has designated bitcoin as a commodity. Fraud and manipulation involving bitcoin traded in interstate commerce are appropriately within the purview of the CFTC, as is the regulation of commodity futures tied directly to bitcoin. That said, products linked to the value of underlying digital assets, including bitcoin and other cryptocurrencies, may be structured as securities products subject to registration under the Securities Act of 1933 or the Investment Company Act of 1940.

[3] Statement on Potentially Unlawful Promotion of Initial Coin Offerings and Other Investments by Celebrities and Others (Nov. 1, 2017), *available at* https://www.sec.gov/news/public-statement/statement-potentially-unlawful-promotion-icos; Investor Alert: Public Companies Making ICO-Related Claims (Aug. 28, 2017), *available at* https://www.sec.gov/oiea/investor-alerts-and-bulletins/ia_icorelatedclaims; Investor Bulletin: Initial Coin Offerings (July 25, 2017), *available at* https://www.sec.gov/oiea/investor-alerts-and-bulletins/ib_coinofferings; Investor Alert: Bitcoin and Other Virtual Currency-Related Investments (May 7, 2014), *available at* https://www.investor.gov/additional-resources/news-alerts/alerts-bulletins/investor-alert-bitcoin-other-virtual-currency; Investor Alert: Ponzi Schemes Using Virtual Currencies (July 23, 2013), *available at* https://www.sec.gov/investor/alerts/ia_virtualcurrencies.pdf.

[4] It is possible to conduct an ICO without triggering the SEC's registration requirements. For example, just as with a Regulation D exempt offering to raise capital for the manufacturing of a physical product, an initial coin offering that is a security can be structured so that it qualifies for an applicable exemption from the registration requirements.

[5] Report of Investigation Pursuant to Section 21(a) of the Securities Exchange Act of 1934: The DAO (July 25, 2017), *available at* https://www.sec.gov/litigation/investreport/34-81207.pdf.

[6] Press Release, Company Halts ICO After SEC Raises Registration Concerns (Dec. 11, 2017), *available at* https://www.sec.gov/news/press-release/2017-227; Press Release, SEC Emergency Action Halts ICO Scam (Dec. 4, 2017), *available at* https://www.sec.gov/news/press-release/2017-219; Press Release, SEC Exposes Two Initial Coin Offerings Purportedly Backed by Real Estate and Diamonds (Sept. 29, 2017), *available at* https://www.sec.gov/news/press-release/2017-185-0.

[7] I am particularly concerned about market participants who extend to customers credit in U.S. dollars – a relatively stable asset – to enable the purchase of cryptocurrencies, which, in recent experience, have proven to be a more volatile asset.

[8] This is not intended to represent an exhaustive list. Please also see the SEC investor bulletins, alerts and statements referenced in note 3 of this statement.

EUROPEAN
COMMISSION

Brussels, 13.9.2017
COM(2017) 493 final

Recommendation for a

COUNCIL DECISION

authorising the opening of negotiations for a Convention establishing a multilateral court for the settlement of investment disputes

{SWD(2017) 302 final}
{SWD(2017) 303 final}

EXPLANATORY MEMORANDUM

1. CONTEXT OF THE PROPOSAL

• Reasons for and objectives of the proposal

In recent years, the inclusion of Investor-State Dispute Settlement (ISDS) in trade and investment agreements has become subject to increased public scrutiny and questioning. There are a number of problems that have been identified as stemming from ISDS, which is based on the principles of arbitration. These problems include the lack of or limited legitimacy, consistency and transparency of ISDS as well as the absence of a possibility of review.

To address these limitations, the Union's approach since 2015 has been to institutionalise the system for the resolution of investment disputes in EU trade and investment agreements through the inclusion of the Investment Court System (ICS). However, due to its bilateral nature, the ICS cannot fully address all the aforementioned problems. Moreover, the inclusion of ICSs in Union agreements has costs in terms of administrative complexity and budgetary impact.

The multilateral investment court initiative aims at setting up a framework for the resolution of international investment disputes[1] that is permanent, independent and legitimate; predictable in delivering consistent case-law; allowing for an appeal of decisions; cost-effective; transparent and efficient proceedings and allowing for third party interventions (including for example interested environmental or labour organisations). The independence of the Court should be guaranteed through stringent requirements on ethics and impartiality, non-renewable appointments, full time employment of adjudicators and independent mechanisms for appointment.

This initiative will only deal with procedural issues. Matters such as the applicable law or standards of interpretation, including ensuring the consistency with other international obligations (for example from International Labour Organisation and UN Conventions) will be addressed in the underlying investment agreements to be applied by the Multilateral Investment Court.

This initiative seeks to align the Union's policy in investment dispute resolution with the Union's approach in other areas of international governance and international dispute settlement favouring multilateral solutions. This initiative is not part of the Commission's Regulatory Fitness and Performance (REFIT) programme.

• Consistency with existing policy provisions in the policy area

The May 2015 Commission concept paper "Investment in TTIP and beyond – the path for reform - Enhancing the right to regulate and moving from current ad hoc arbitration towards an Investment Court"[2] set out a two-step approach for the reform of the traditional ISDS system. The first step was the inclusion of an institutionalised court system for the resolution of investment disputes in future Union trade and investment agreements (i.e. the ICS). As a

[1] Disputes arising from bilateral investment treaties concluded among Member States (i.e. intra-EU BITs) and disputes between an investor of a Member State and a Member State under the Energy Charter Treaty are outside the scope of this initiative. The Commission considers this type of treaties contrary to Union law.

[2] Available at http://trade.ec.europa.eu/doclib/docs/2015/may/tradoc_153408.PDF.

second step, the Union was to work towards the establishment of a multilateral investment court. This multilateral court would aim at replacing all the bilateral ICSs included in the Union trade and investment agreements and allow the Union, its Member States and partner countries to replace the ISDS provisions in their existing investment agreements with access to the multilateral investment court.

- **Consistency with other Union policies**

The present Recommendation is in line with the Commission Communication "*Trade for all*"[3] from October 2015 which sets out that the Commission will in parallel to its bilateral efforts "*engage with partners to build consensus for a fully-fledged, permanent International Investment Court*".

In fact, at the public release on 12 November 2015 of the EU's proposed text for the Transatlantic Trade and Investment Partnership (TTIP) on investment protection and investment dispute settlement, the Commission stated that the "*Commission will start work, together with other countries, on setting up a permanent International Investment Court. […] This would lead to the full replacement of the "old ISDS" mechanism with a modern, efficient, transparent and impartial system for international investment dispute resolution*".[4]

The Recommendation is also consistent with the May 2017 Commission Reflection Paper on Harnessing Globalisation,[5] which explicitly refers to this initiative when stating that "*[international investment] [d]isputes should no longer be decided by arbitrators under the so-called investor-state dispute settlement. This is why the Commission has proposed a multilateral investment court that would create a fair and transparent mechanism*".

In addition, on the occasion of the adoption by the Council of the decision authorising the signature of CETA, the Council stated that "*the Council supports the European Commission's efforts to work towards the establishment of a multilateral investment court, which will replace the bilateral system established by CETA, once established, and according to the procedure foreseen in CETA*".[6]

2. LEGAL BASIS, SUBSIDIARITY AND PROPORTIONALITY

- **Legal basis**

Article 218(3) of the Treaty on the Functioning of the European Union (TFEU) provides that the Commission shall submit recommendations to the Council, which shall adopt a decision authorising the opening of negotiations and nominate the Union negotiator. According to Article 218(4) of the TFEU, the Council may address directives to the negotiator.

- **Subsidiarity (for non-exclusive competence)**

Article 5(3) of the Treaty on European Union (TEU) provides that the subsidiarity principle does not apply to areas of exclusive EU competence.

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3 Available at http://trade.ec.europa.eu/doclib/docs/2015/october/tradoc_153846.pdf.

4 See http://europa.eu/rapid/press-release_IP-15-6059_en.htm.

5 Available at https://ec.europa.eu/commission/sites/beta-political/files/reflection-paper-globalisation_en.pdf.

6 Statement 36 of the Statements and Declarations entered on the occasion of the adoption by the Council of the decision authorising the signature of CETA. Brussels, 27 October 2016.

The Union has partly exclusive and partly shared competence with regard to investment protection.

Article 3 of the TFEU provides that the Union has exclusive competence with respect to the common commercial policy. According to Article 207 of the TFEU, foreign direct investment (FDI), including the possibility to negotiate and conclude international agreements covering FDI, is part of the Union's common commercial policy.

In its Opinion 2/15 regarding the EU-Singapore Free Trade Agreement (EUSFTA) the Court of Justice has confirmed that the Union has, on the basis of Article 207 of the TFEU, exclusive competence over the substantive standards of protection usually included in investment agreements to the extent that such standards apply to FDI.[7] In the same opinion, the Court of Justice has clarified that, in the case of non-direct investment, the competence with regard to those substantive standards is shared by the Union and the Member States.

In its Opinion 2/15, the Court has further clarified that the competence with respect to ISDS (in relation to both FDI and non-direct investment) is shared between the Union and its Member States, to the extent that the Member States are required to act as respondents in certain disputes.

The Union is a party, together with the Member States, to agreements providing for traditional ISDS (the Energy Charter Treaty - ECT) or an ICS (the EU-Canada Comprehensive Economic and Trade Agreement - CETA) and may be required to be the respondent in disputes brought under those agreements. Moreover, the Commission is negotiating several other FTAs and stand-alone investments agreements including an ICS. It is envisaged that the Union will be the respondent in at least some of the disputes brought under those agreements

The participation of the Union in the envisaged Convention is thus necessary in order to bring within its scope of application those disputes under the above mentioned agreements where the Union will be the respondent.

The existing agreements including ISDS or ICS to which the Union is a party (the ECT and CETA) provide that the Member States shall be respondents in some cases. The envisaged agreements including ICS could likewise provide that the Member States shall be respondents in certain disputes. Moreover, the Member States have been empowered by the Union under Regulation No 1219/2012[8] to maintain or conclude almost 1400 bilateral investment treaties, which include traditional ISDS. For those reasons, the multilateral reform of investment dispute resolution envisaged by this initiative has to be subscribed by Member States in addition to the Union.

- **Proportionality**

The present Recommendation for a Council Decision authorising the opening of negotiations for a Convention establishing a multilateral court for the settlement of investment disputes does not go beyond what is necessary to achieve the policy objectives at stake.

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7 Opinion of the CJEU of 16 May 2017, C-2/15,EU:C:2017:376 pursuant to Article 218(11) TFEU on the competence of the European Union to conclude the Free Trade Agreement with Singapore.

8 Regulation (EU) No 1219/2012 of the European Parliament and of the Council of 12 December 2012 establishing transitional arrangements for bilateral investment agreements between Member States and third countries (OJ L 351, 20.12.2012, p.40).

In line with the principle of proportionality, all reasonable policy options were considered in order to assess the likely effectiveness of such policy intervention. They are described in detail in the Impact Assessment Report.

- **Choice of the instrument**

A Commission Recommendation for a Council Decision authorising the opening of negotiations is in line with Article 218(3) of the TFEU which provides that the Commission shall submit recommendations to the Council, which shall adopt a decision authorising the opening of negotiations.

3. RESULTS OF EX-POST EVALUATIONS, STAKEHOLDER CONSULTATIONS AND IMPACT ASSESSMENTS

- **Ex-post evaluations/fitness checks of existing legislation**

A review of the ISDS is carried out periodically in the context of the ECT, where the Union and the Member States as Contracting Parties actively participate. Although modernisation of investment protection including dispute settlement remains a Union priority within the ECT review, the preferred vector for reform of investment dispute settlement is the multilateral reform embodied by this initiative.

Given its very recent introduction, no evaluation has yet been conducted on the ICS.

- **Stakeholder consultations**

The Commission actively engaged with stakeholders and conducted a comprehensive consultation throughout the Impact Assessment process.

Between 21 December 2016 and 15 March 2017 the Commission carried out an online public consultation which was launched on the DG TRADE website and posted on "EU survey" (i.e. the Commission's online tool for conducting public consultations). Stakeholders were invited to answer questions including on the problems and possible policy options, technical aspects of such options and possible impacts. The consultation showed overall broad support for a multilateral reform of investment dispute settlement as described in this initiative although questions remain, especially on its technical aspects.

The individual responses to the public consultation were published on the consultation website. The summary report of the online public consultation, as well as of all other activities carried out by the Commission as part of the stakeholder consultation, is annexed to the Impact Assessment Report.

- **Impact assessment**

An Impact Assessment on the multilateral reform of investment dispute settlement including the possible establishment of a multilateral investment court was conducted. The Impact Assessment Report and its Executive Summary Sheet, as well as the positive opinion of the Regulatory Scrutiny Board, are attached to this Recommendation.

As the multilateral investment court initiative only addresses procedural rules (i.e. dispute settlement) and not substantive rules (which are included in the underlying investment agreements), no relevant environmental or social impacts are expected to result from it.

- **Regulatory fitness and simplification**

The multilateral investment court will alleviate the administrative burden related to investment dispute settlement by centralising all disputes under a single set of procedural rules. It will ensure investors' access to a legitimate, independent and effective system for the resolution of international investment disputes regardless of their size and/or turnover. SMEs may benefit from additional assistance to take account of their lower turnover. Proceedings under the court are expected to be shorter and therefore less costly for investors as compared to the traditional, unreformed system. Moreover, enhanced predictability and consistency of interpretation of substantive investment provisions will contribute to fewer disputes.

- **Fundamental rights**

In line with article 21(1) of the TEU, the Union will be guided by the principles of democracy, the rule of law, human rights and fundamental freedoms as they relate to this initiative, including in particular Article 47 of the Charter of Fundamental Rights.

Action by the Union at multilateral level cannot compromise the level of protection of fundamental rights in the Union. The multilateral investment court is intended to create an additional remedy under international law for enforcing the obligations imposed upon States by international agreements. It is therefore without prejudice to the existing rights of foreign investors under domestic Union Law and the laws of the Member States or to the remedies for enforcing such domestic law rights.

4. BUDGETARY IMPLICATIONS

The exact financial implications of this initiative are impossible to determine at this stage insofar as the key elements of the multilateral investment court remain to be multilaterally negotiated. It is considered to be less expensive than the alternative of maintaining the ICS in agreements already negotiated or subject to negotiation and the existing system. A number of calculations have been made, based on a number of assumptions, and are included in the Impact Assessment Report.

5. OTHER ELEMENTS

- **Implementation plans and monitoring, evaluation and reporting arrangements**

The Commission will carry out regular monitoring once the multilateral court is operational. It will also regularly audit the Union's financial contributions to the costs of the court. An evaluation of the functioning of the multilateral investment court will be undertaken when it has been in force for a sufficient period of time allowing availability of meaningful data. The attached Impact Assessment Report contains further details on the foreseen monitoring and evaluation activities.

- **Procedural aspects**

The Commission welcomes the fact that the members of the Council of the European Union are increasingly engaging at an early stage with their parliaments on investment negotiations in line with their institutional practices. It encourages the members of the Council of the European Union to do the same with regard to this Recommendation for a Council Decision

having due regard to Council Decision 2013/488/EU on the security rules for protecting EU classified information[9].

The Commission makes this Recommendation and its attachment public immediately after its adoption.

The Commission recommends that the negotiating directives be made public immediately after their adoption.

[9] http://eur-lex.europa.eu/legal-content/EN/TXT/?uri=CELEX:32013D0488

Recommendation for a

COUNCIL DECISION

authorising the opening of negotiations for a Convention establishing a multilateral court for the settlement of investment disputes

THE COUNCIL OF THE EUROPEAN UNION,

Having regard to the Treaty on the Functioning of the European Union, and in particular Article 218(3) and (4) thereof,

Having regard to the Recommendation from the European Commission,

WHEREAS negotiations should be opened with a view to concluding a Convention between the European Union and its Member States and other interested countries establishing a multilateral court for the settlement of investment disputes,

HAS ADOPTED THIS DECISION:

Article 1

The Commission is hereby authorised to open negotiations, on behalf of the Union, for a Convention establishing a multilateral court for the settlement of investment disputes.

Article 2

The negotiations shall be conducted in line with the negotiating directives set out in the Annex to this Decision.

Article 3

This Decision and its attachment will be made public immediately after their adoption.

Article 4

This Decision is addressed to the Commission.

Done at Brussels,

For the Council
The President

EUROPEAN
COMMISSION

Brussels, 13.9.2017
COM(2017) 493 final

ANNEX 1

ANNEX

to the

Recommendation for a Council Decision

authorising the opening of negotiations for a Convention establishing a multilateral court for the settlement of investment disputes

{SWD(2017) 302 final}
{SWD(2017) 303 final}

ATTACHMENT

Regarding the process of the negotiations:

1. The Union shall strive to ensure that the process of the negotiation of the Convention allows all interested countries and international organisations to effectively participate in the negotiation and consensus building.

2. The Union shall be represented by the Commission throughout the negotiations. In accordance with the principles of sincere cooperation and of unity of external representation as laid down in the Treaties, the Union and the Member States of the Union participating in the negotiations shall fully coordinate and act accordingly throughout the negotiations.

3. Negotiations shall be conducted under the auspices of the United Nations Commission on International Trade law (UNCITRAL). In the event of a vote, the Member States which are Members of the United Nations Commission on International Trade law shall exercise their voting rights in accordance with these directives and previously agreed EU positions.

4. The Union shall strive to ensure that the negotiations are conducted in a transparent manner, including, where possible, through audio- and/or web-streaming, and that representatives of civil society organisations will have the opportunity to participate in the discussions as accredited observers.

Regarding the substance of the negotiations:

5. The Convention should allow the Union to submit disputes arising under agreements to which the Union is or will be a party to the jurisdiction of the multilateral court. Consequently, the Union should be in a position to become a Party to the Convention and the provisions of the Convention should be drafted in a way which allows their effective use by the European Union.

6. The Convention should also allow the Member States of the Union and third countries to submit disputes arising under agreements to which they are or will be Parties to the jurisdiction of the multilateral court.[1]

7. The principal mechanism of the Convention should be that the jurisdiction of the multilateral court extends to a bilateral agreement when both Parties to the agreement have agreed to submit disputes arising under the agreement to the jurisdiction of the multilateral court. In the case of multilateral agreements, the Convention should allow two or more Parties to such an agreement to agree to submit disputes under the multilateral agreement to the jurisdiction of the multilateral court.

8. The multilateral court should be composed of a tribunal of first instance and an appeal tribunal. The appeal tribunal should have the competence to review decisions issued by the tribunal of first instance on the grounds of errors of law or manifest errors in the appreciation of facts. The appeal tribunal should have the power to send back cases to the tribunal of first instance for the completion of the proceedings in light of the findings of the appeal tribunal ("remand").

9. The independence of the Court should be guaranteed. Members of the court (both of the tribunal of first instance and of the appeal tribunal) should be subject to stringent

[1] Disputes arising from bilateral investment treaties concluded among Member States (i.e. intra-EU BITs) and disputes between an investor of a Member State and a Member State under the Energy Charter Treaty are outside the scope of this decision.

requirements regarding their qualifications and impartiality. Rules on ethics and challenge mechanisms should be foreseen within the Convention. The members of the court should receive a permanent remuneration. They should be appointed for a fixed, long and non-renewable period of time and enjoy security of tenure, as well as all necessary guarantees of independence. Members should be appointed through an objective and transparent process.

10. The Convention should include the necessary flexibilities to adapt to an evolving membership, as well as to possible evolutions in the nature of agreements that could be submitted to the jurisdiction of the court. The Convention should not exclude the possibility for the court to rely on the secretarial support of an existing international organisation, nor to be integrated into the structure of any such organisation at a later stage.

11. Proceedings before the multilateral court should be conducted in a transparent manner, including the possibility of submitting third party interventions, similar to or utilising the rules and standards provided for within the UNCITRAL Rules on Transparency for treaty-based investor-state arbitration.

12. Decisions of the multilateral court should benefit from an effective international enforcement regime.

13. One objective of the negotiations should be that the multilateral court operates in a cost-effective way, ensuring its accessibility for small and medium-sized enterprises and natural persons. The fixed costs of the court, including costs of remuneration of its members and costs of administrative and secretarial support, should in principle be borne by the Contracting Parties to the Convention establishing the multilateral court. The distribution of such costs among the Contracting Parties should be decided on an equitable basis which may take into account factors such as the Parties' level of economic development, the number of agreements covered per Party, the Parties' respective volume of international investment flows or stocks.

14. The Union should strive to ensure that support can be made available to ensure that developing and least developed countries can operate effectively in the investment dispute settlement regime. Such an initiative may form part of the process of establishing a multilateral investment court or may be conducted separately.

15. The Convention establishing the multilateral court should be open for signature and accession by any interested country and regional economic integration organisation that is a party to an investment agreement. It should allow for an early entry into force as soon as a minimum number of ratification instruments have been deposited.

This text is made public exclusively for information purposes. The text is the outcome of the legal review conducted by the Canadian Government and the European Commission and will be translated and thereafter subject to completion of the internal approval processes in Canada and the European Union.

The text presented in this document is not binding under international law and will only become so after the entry into force of the Agreement.

* * *

COMPREHENSIVE ECONOMIC AND TRADE AGREEMENT (CETA) BETWEEN CANADA, OF THE ONE PART, AND THE EUROPEAN UNION [AND ITS MEMBER STATES,

THE KINGDOM OF BELGIUM,

THE REPUBLIC OF BULGARIA,

THE CZECH REPUBLIC,

THE KINGDOM OF DENMARK,

THE FEDERAL REPUBLIC OF GERMANY,

THE REPUBLIC OF ESTONIA,

IRELAND,

THE HELLENIC REPUBLIC,

THE KINGDOM OF SPAIN,

THE FRENCH REPUBLIC,

THE REPUBLIC OF CROATIA,

THE ITALIAN REPUBLIC,

THE REPUBLIC OF CYPRUS,

THE REPUBLIC OF LATVIA,

THE REPUBLIC OF LITHUANIA,

THE GRAND DUCHY OF LUXEMBOURG,

HUNGARY,

THE REPUBLIC OF MALTA,

THE KINGDOM OF THE NETHERLANDS,

THE REPUBLIC OF AUSTRIA,

THE REPUBLIC OF POLAND,

THE PORTUGUESE REPUBLIC,

ROMANIA,

THE REPUBLIC OF SLOVENIA,

THE SLOVAK REPUBLIC,

THE REPUBLIC OF FINLAND,

THE KINGDOM OF SWEDEN,

THE UNITED KINGDOM OF GREAT BRITAIN AND NORTHERN IRELAND],

OF THE OTHER PART,

hereafter jointly referred to as the "Parties",

resolve to:

FURTHER strengthen their close economic relationship and build upon their respective rights and obligations under the *Marrakesh Agreement Establishing the World Trade Organization*, done on 15 April 1994, and other multilateral and bilateral instruments of cooperation;

CREATE an expanded and secure market for their goods and services through the reduction or elimination of barriers to trade and investment;

ESTABLISH clear, transparent, predictable and mutually-advantageous rules to govern their trade and investment;

AND,

REAFFIRMING their strong attachment to democracy and to fundamental rights as laid down in the Universal Declaration of Human Rights, done at Paris on 10 December 1948, and sharing the view that the proliferation of weapons of mass destruction poses a major threat to international security;

RECOGNISING the importance of international security, democracy, human rights and the rule of law for the development of international trade and economic cooperation;

RECOGNISING that the provisions of this Agreement preserve the right of the Parties to regulate within their territories and the Parties' flexibility to achieve legitimate policy objectives, such as public health, safety, environment, public morals and the promotion and protection of cultural diversity;

AFFIRMING their commitments as parties to the UNESCO *Convention on the Protection and Promotion of the Diversity of Cultural Expressions*, done at Paris on 20 October 2005, and recognising that states have the right to preserve, develop and implement their cultural policies, to support their cultural industries for the purpose of strengthening the diversity of cultural expressions, and to preserve their cultural identity, including through the use of regulatory measures and financial support;

RECOGNISING that the provisions of this Agreement protect investments and investors with respect to their investments, and are intended to stimulate mutually-beneficial business activity, without undermining the right of the Parties to regulate in the public interest within their territories;

REAFFIRMING their commitment to promote sustainable development and the development of international trade in such a way as to contribute to sustainable development in its economic, social and environmental dimensions;

ENCOURAGING enterprises operating within their territory or subject to their jurisdiction to respect internationally recognised guidelines and principles of corporate social responsibility, including the OECD Guidelines for Multinational Enterprises, and to pursue best practices of responsible business conduct;

IMPLEMENTING this Agreement in a manner consistent with the enforcement of their respective labour and environmental laws and that enhances their levels of labour and environmental protection, and building upon their international commitments on labour and environmental matters;

RECOGNISING the strong link between innovation and trade, and the importance of innovation to future economic growth, and affirming their commitment to encourage the expansion of cooperation in the area of innovation, as well as the related areas of research and development and science and technology, and to promote the involvement of relevant public and private sector entities;

HAVE AGREED as follows:

CHAPTER TWENTY-NINE

DISPUTE SETTLEMENT

SECTION A

Initial provisions

Article 29.1

Cooperation

The Parties shall, at all times, endeavour to agree on the interpretation and application of this Agreement, and shall make every attempt through cooperation and consultations to arrive at a mutually satisfactory resolution of any matter that might affect its operation.

Article 29.2

Scope

Except as otherwise provided in this Agreement, this Chapter applies to any dispute concerning the interpretation or application of the provisions of this Agreement.

Article 29.3

Choice of forum

1. Recourse to the dispute settlement provisions of this Chapter is without prejudice to recourse to dispute settlement under the WTO Agreement or under any other agreement to which the Parties are party.

2. Notwithstanding paragraph 1, if an obligation is equivalent in substance under this Agreement and under the WTO Agreement, or under any other agreement to which the Parties are party, a Party may not seek redress for the breach of such an obligation in the two fora. In such case, once a dispute settlement proceeding has been initiated under one agreement, the Party shall not bring a claim seeking redress for the breach of the substantially equivalent obligation under the other agreement, unless the forum selected fails, for procedural or jurisdictional reasons, other than termination under paragraph 20 of Annex 29-A, to make findings on that claim.

3. For the purposes of paragraph 2:

   (a) dispute settlement proceedings under the WTO Agreement are deemed to be initiated by a Party's request for the establishment of a panel under Article 6 of the DSU;

   (b) dispute settlement proceedings under this Chapter are deemed to be initiated by a Party's request for the establishment of an arbitration panel under Article 29.6; and

   (c) dispute settlement proceedings under any other agreement are deemed to be initiated by a Party's request for the establishment of a dispute settlement panel or tribunal in accordance with the provisions of that agreement.

4. Nothing in this Agreement shall preclude a Party from implementing the suspension of obligations authorised by the WTO Dispute Settlement Body. A Party may not invoke the WTO Agreement to preclude the other Party from suspending obligations pursuant to this Chapter.

SECTION B

Consultations and mediation

Article 29.4

Consultations

1. A Party may request in writing consultations with the other Party regarding any matter referred to in Article 29.2.

2. The requesting Party shall transmit the request to the responding Party, and shall set out the reasons for the request, including the identification of the specific measure at issue and the legal basis for the complaint.

3. Subject to paragraph 4, the Parties shall enter into consultations within 30 days of the date of receipt of the request by the responding Party.

4. In cases of urgency, including those involving perishable or seasonal goods, or services that rapidly lose their trade value, consultations shall commence within 15 days of the date of receipt of the request by the responding Party.

5. The Parties shall make every attempt to arrive at a mutually satisfactory resolution of the matter through consultations. To this end, each Party shall:

   (a) provide sufficient information to enable a full examination of the matter at issue;

   (b) protect any confidential or proprietary information exchanged in the course of consultations as requested by the Party providing the information; and

   (c) make available the personnel of its government agencies or other regulatory bodies who have expertise in the matter that is the subject of the consultations.

6. Consultations are confidential and without prejudice to the rights of the Parties in proceedings under this Chapter.

7. Consultations shall take place in the territory of the responding Party unless the Parties agree otherwise. Consultations may be held in person or by any other means agreed to by the Parties.

8. A Party's proposed measure may be the subject of consultations under this Article but may not be the subject of mediation under Article 29.5 or the dispute settlement procedures under Section C.

Article 29.5

Mediation

The Parties may have recourse to mediation with regard to a measure if the measure adversely affects trade and investment between the Parties. Mediation procedures are set out in Annex 29-C.

SECTION C

Dispute settlement procedures and compliance

Sub-section A

Dispute settlement procedures

Article 29.6

Request for the establishment of an arbitration panel

1. Unless the Parties agree otherwise, if a matter referred to in Article 29.4 has not been resolved within:

   (a) 45 days of the date of receipt of the request for consultations; or

   (b) 25 days of the date of receipt of the request for consultations for matters referred to in Article 29.4.4,

   the requesting Party may refer the matter to an arbitration panel by providing its written request for the establishment of an arbitration panel to the responding Party.

2. The requesting Party shall identify in its written notice the specific measure at issue and the legal basis for the complaint, including an explanation of how such measure constitutes a breach of the provisions referred to in Article 29.2.

Article 29.7

Composition of the arbitration panel

1. The arbitration panel shall be composed of three arbitrators.

2. The Parties shall consult with a view to reaching an agreement on the composition of the arbitration panel within 10 working days of the date of receipt by the responding Party of the request for the establishment of an arbitration panel.

3. In the event that the Parties are unable to agree on the composition of the arbitration panel within the time frame set out in paragraph 2, either Party may request the Chair of the CETA Joint Committee, or the Chair's delegate, to draw by lot the arbitrators from the list established under Article 29.8. One arbitrator shall be drawn from the sub-list of the requesting Party, one from the sub-list of the responding Party and one from the sub-list of chairperson. If the Parties have agreed on one or more of the arbitrators, any remaining arbitrator shall be selected by the same procedure in the applicable sub-list of arbitrators. If the Parties have agreed on an arbitrator, other than the chairperson, who is not a national of either Party, the chairperson and other arbitrator shall be selected from the sub-list of chairpersons.

4. The Chair of the CETA Joint Committee, or the Chair's delegate, shall select the arbitrators as soon as possible and normally within five working days of the request referred to in paragraph 3 by either Party. The Chair, or the Chair's delegate, shall give a reasonable opportunity to representatives of each Party to be present when lots are drawn. One of the chairpersons can perform the selection by lot alone if the other chairperson was informed about the date, time and place of the selection by lot and did not accept to participate within five working days of the request referred to in paragraph 3.

5. The date of establishment of the arbitration panel shall be the date on which the last of the three arbitrators is selected.

6. If the list provided for in Article 29.8 is not established or if it does not contain sufficient names at the time a request is made pursuant to paragraph 3, the three arbitrators shall be drawn by lot from the arbitrators who have been proposed by one or both of the Parties in accordance with Article 29.8.1.

7. Replacement of arbitrators shall take place only for the reasons and according to the procedure set out in paragraphs 21 through 25 of Annex 29-A.

Article 29.8

List of arbitrators

1. The CETA Joint Committee shall, at its first meeting after the entry into force of this Agreement, establish a list of at least 15 individuals, chosen on the basis of objectivity, reliability and sound judgment, who are willing and able to serve as arbitrators. The list shall be composed of three sub-lists: one sub-list for each Party and one sub-list of individuals who are not nationals of either Party to act as chairpersons. Each sub-list shall include at least five individuals. The CETA Joint Committee may review the list at any time and shall ensure that the list conforms with this Article.

2. The arbitrators must have specialised knowledge of international trade law. The arbitrators acting as chairpersons must also have experience as counsel or panellist in dispute settlement proceedings on subject matters within the scope of this Agreement. The arbitrators shall be independent, serve in their individual capacities and not take instructions from any organisation or government, or be affiliated with the government of any of the Parties, and shall comply with the Code of Conduct in Annex 29-B.

Article 29.9

Interim panel report

1. The arbitration panel shall present to the Parties an interim report within 150 days of the establishment of the arbitration panel. The report shall contain:

   (a) findings of fact; and

   (b) determinations as to whether the responding Party has conformed with its obligations under this Agreement.

2. Each Party may submit written comments to the arbitration panel on the interim report, subject to any time limits set by the arbitration panel. After considering any such comments, the arbitration panel may:

   (a) reconsider its report; or

   (b) make any further examination that it considers appropriate.

3. The interim report of the arbitration panel shall be confidential.

Article 29.10

Final panel report

1. Unless the Parties agree otherwise, the arbitration panel shall issue a report in accordance with this Chapter. The final panel report shall set out the findings of fact, the applicability of the relevant provisions of this Agreement and the basic rationale behind any findings and conclusions that it makes. The ruling of the arbitration panel in the final panel report shall be binding on the Parties.

2. The arbitration panel shall issue to the Parties and to the CETA Joint Committee a final report within 30 days of the interim report.

3. Each Party shall make publicly available the final panel report, subject to paragraph 39 of Annex 29-A.

Article 29.11

Urgent proceedings

In cases of urgency, including those involving perishable or seasonal goods, or services that rapidly lose their trade value, the arbitration panel and the Parties shall make every effort to accelerate the proceedings to the greatest extent possible. The arbitration panel shall aim at issuing an interim report to the Parties within 75 days of the establishment of the arbitration panel, and a final report within 15 days of the interim report. Upon request of a Party, the arbitration panel shall make a preliminary ruling within 10 days of the request on whether it deems the case to be urgent.

Sub-section B

Compliance

Article 29.12

Compliance with the final panel report

The responding Party shall take any measure necessary to comply with the final panel report. No later than 20 days after the receipt of the final panel report by the Parties, the responding Party shall inform the other Party and the CETA Joint Committee of its intentions in respect of compliance.

Article 29.13

Reasonable period of time for compliance

1. If immediate compliance is not possible, no later than 20 days after the receipt of the final panel report by the Parties, the responding Party shall notify the requesting Party and the CETA Joint Committee of the period of time it will require for compliance.

2. In the event of disagreement between the Parties on the reasonable period of time in which to comply with the final panel report, the requesting Party shall, within 20 days of the receipt of the notification made under paragraph 1 by the responding Party, request in writing the arbitration panel to determine the length of the reasonable period of time. Such request shall be notified simultaneously to the other

Party and to the CETA Joint Committee. The arbitration panel shall issue its ruling to the Parties and to the CETA Joint Committee within 30 days from the date of the request.

3. The reasonable period of time may be extended by mutual agreement of the Parties.

4. At any time after the midpoint in the reasonable period of time and at the request of the requesting Party, the responding Party shall make itself available to discuss the steps it is taking to comply with the final panel report.

5. The responding Party shall notify the other Party and the CETA Joint Committee before the end of the reasonable period of time of measures that it has taken to comply with the final panel report.

Article 29.14

Temporary remedies in case of non-compliance

1. If:

   (a) the responding Party fails to notify its intention to comply with the final panel report under Article 29.12 or the time it will require for compliance under Article 29.13.1;

   (b) at the expiry of the reasonable period of time, the responding Party fails to notify any measure taken to comply with the final panel report; or

   (c) the arbitration panel on compliance referred to in paragraph 6 establishes that a measure taken to comply is inconsistent with that Party's obligations under the provisions referred to in Article 29.2,

   the requesting Party shall be entitled to suspend obligations or receive compensation. The level of the nullification and impairment shall be calculated starting from the date of notification of the final panel report to the Parties.

2. Before suspending obligations, the requesting Party shall notify the responding Party and the CETA Joint Committee of its intention to do so, including the level of obligations it intends to suspend.

3. Except as otherwise provided in this Agreement, the suspension of obligations may concern any provision referred to in Article 29.2 and shall be limited at a level equivalent to the nullification or impairment caused by the violation.

4. The requesting Party may implement the suspension 10 working days after the date of receipt of the notification referred to in paragraph 2 by the responding Party, unless a Party has requested arbitration under paragraphs 6 and 7.

5. A disagreement between the Parties concerning the existence of any measure taken to comply or its consistency with the provisions referred to in Article 29.2 ("disagreement on compliance"), or on the equivalence between the level of suspension and the nullification or impairment caused by the violation ("disagreement on equivalence"), shall be referred to the arbitration panel.

6. A Party may reconvene the arbitration panel by providing a written request to the arbitration panel, the other Party and the CETA Joint Committee. In case of a disagreement on compliance, the arbitration panel shall be reconvened by the

requesting Party. In case of a disagreement on equivalence, the arbitration panel shall be reconvened by the responding Party. In case of disagreements on both compliance and on equivalence, the arbitration panel shall rule on the disagreement on compliance before ruling on the disagreement on equivalence.

7. The arbitration panel shall notify its ruling to the Parties and to the CETA Joint Committee accordingly:

   (a) within 90 days of the request to reconvene the arbitration panel, in case of a disagreement on compliance;

   (b) within 30 days of the request to reconvene the arbitration panel, in case of a disagreement on equivalence;

   (c) within 120 days of the first request to reconvene the arbitration panel, in case of a disagreement on both compliance and equivalence.

8. The requesting Party shall not suspend obligations until the arbitration panel reconvened under paragraphs 6 and 7 has delivered its ruling. Any suspension shall be consistent with the arbitration panel's ruling.

9. The suspension of obligations shall be temporary and shall be applied only until the measure found to be inconsistent with the provisions referred to in Article 29.2 has been withdrawn or amended so as to bring it into conformity with those provisions, as established under Article 29.15, or until the Parties have settled the dispute.

10. At any time, the requesting Party may request the responding Party to provide an offer for temporary compensation and the responding Party shall present such offer.

Article 29.15

Review of measures taken to comply after the suspension of obligations

1. When, after the suspension of obligations by the requesting Party, the responding Party takes measures to comply with the final panel report, the responding Party shall notify the other Party and the CETA Joint Committee and request an end to the suspension of obligations applied by the requesting Party.

2. If the Parties do not reach an agreement on the compatibility of the notified measure with the provisions referred to in Article 29.2 within 60 days of the date of receipt of the notification, the requesting Party shall request in writing the arbitration panel to rule on the matter. Such request shall be notified simultaneously to the other Party and to the CETA Joint Committee. The final panel report shall be notified to the Parties and to the CETA Joint Committee within 90 days of the date of submission of the request. If the arbitration panel rules that any measure taken to comply is in conformity with the provisions referred to in Article 29.2, the suspension of obligations shall be terminated.

SECTION D

General Provisions

Article 29.16

Rules of procedure

Dispute settlement procedure under this Chapter shall be governed by the rules of procedure for arbitration in Annex 29-A, unless the Parties agree otherwise.

Article 29.17

General rule of interpretation

The arbitration panel shall interpret the provisions of this Agreement in accordance with customary rules of interpretation of public international law, including those set out in the *Vienna Convention on the Law of Treaties*. The arbitration panel shall also take into account relevant interpretations in reports of Panels and the Appellate Body adopted by the WTO Dispute Settlement Body.

Article 29.18

Rulings of the arbitration panel

The rulings of the arbitration panel cannot add to or diminish the rights and obligations provided for in this Agreement.

Article 29.19

Mutually agreed solutions

The Parties may reach a mutually agreed solution to a dispute under this Chapter at any time. They shall notify the CETA Joint Committee and the arbitration panel of any such solution. Upon notification of the mutually agreed solution, the arbitration panel shall terminate its work and the proceedings shall be terminated.