

DECENTRALIZED ENTITIES UNDER ARTICLE 101 TFEU: THE CASE OF
BLOCKCHAIN FORKS

Sciences Po Law School 10th Graduate Conference

16th - 17th June 2022.

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The present Conference Paper is written on the basis of the author's thesis submitted for the degree of Master of Laws in Law and Technology in Europe at Universiteit Utrecht. The author would like to thank Assoc. Prof. Thibault Schrepel for his comments and feedback. All errors are his own.

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ABSTRACT

Blockchain can be seen as one of the most significant inventions of humanity since the Internet. Its *raison d'être* originates from cyberlibertarianism and calls upon helping people to avoid the coercive power of a State. This technology is a decentralized, immutable, and highly transparent ledger, the initial objective of which was to create a trustworthy digital currency. However, blockchain is also used for other purposes, such as the design and the enforcement of smart contracts. Additionally, this technology has another crucial feature, namely its possibility to be forked. A blockchain fork represents a process when one blockchain network splits into two distinct ones due to either technical changes to its protocol or disagreements between the users regarding community rules. The forking process is innovative for two reasons. Firstly, it allows any participant to make their voice heard and to circumvent lengthy bureaucratic procedures when it comes to the implementation of a proposed change. Secondly, in case of a significant disagreement with the rules in place, forks allow any member of a blockchain community to easily establish a new entity without significant costs being involved.

This being said, one can clearly see that blockchain significantly altered the way people organize themselves and interact with each other. Nevertheless, it also poses well-founded questions regarding the applicability of Article 101 TFEU to this technology in general and to the process of forking in particular. The reasoning behind this statement is twofold. Firstly, as blockchain does not have centralized top-down governance in its network, it does not fall within Coase's Theory of the Firm. Meanwhile, the current understating of which kind of entities should be considered an undertaking for the purpose of Article 101(1) TFEU is based on this theory. This further results in ambiguity regarding whether blockchain should be seen as an undertaking in the first place. Secondly, there are concerns around the question of liability, as it is unclear who should be held liable for a collusive practice if no specific user or group of users has direct control over the blockchain network's activities. This regulatory loophole results in a scenario in which blockchain participants are left without any remedies if an anticompetitive practice is directed towards them. It is also the case when it comes to the activities of blockchain forks. Indeed, the recent *Bitmain* case has illustrated that a blockchain fork can engage in a potentially collusive practice with other entities to ensure its survival.

Bearing in mind the regulatory loopholes around blockchain forks and the high relevance of this topic for society, this paper will seek to examine their implications for competition law. Accordingly, it does not support a complete ban of the forking process, as it would deprive blockchain of its central feature and decrease its added value for the population. By contrast, it will seek to outline a specific trajectory that competition authorities and courts can take while assessing the legality of blockchain forks in light of Article 101(1) TFEU.

I. INTRODUCTION

It can be argued that blockchain is one of the most significant technological inventions since the Internet.¹ This new technology is a decentralized ledger, primarily used by individuals to make transactions online.² Blockchain is characterized by its immutable nature in the sense that it is almost impossible to change or hide an information on it.³ Hence, these characteristics make the network very transparent for its members,⁴ where every user's activity is registered and is accessible to the public.

Additionally to blockchain's inherent transparency, it is necessary to emphasize another peculiar characteristic of this technology, namely its possibility to be forked.⁵ The idea of a "blockchain fork" represents essentially a process by which an original blockchain network is splitting into two distinct ecosystems.⁶ Forks can occur for a variety of reasons, which can mainly be classified into two core categories: the first one is the necessity to fix technical issues of the original code, requiring blockchain core developers to make a new code and thus fork an existing blockchain.⁷ The second reason is primarily based on community norms and values, where blockchain users disagree as to the direction in which the ecosystem develops and, thus, split blockchain into two distinct ones.⁸ The fact that the code of public blockchains is open source makes it very easy for any user to create a fork. There have already been examples of successfully functioning forks, such as Ethereum Classic - the fork of Ethereum,⁹ and Bitcoin Cash - the fork of Bitcoin.¹⁰ It should be underlined that the forking process in blockchain

¹ Thibault Schrepel, 'Is Blockchain the Death of Antitrust law? The Blockchain Antitrust Paradox' (2019) 3 Georgetown Law Technology Review 281, 282.

² Marina Fyrigou-Koulouri, 'Blockchain Technology: An Interconnected Legal Framework For An Interconnected System' (2018) 9 Journal of Law, Technology & the Internet 1, 2-3; Jean Bacon, 'Blockchain Demystified: A Technical and Legal Introduction to Distributed and Centralised Ledgers' (2018) 25 Richmond Journal of Law & Technology 1, 7.

³ Eugenia Politou and Fran Casino, 'Blockchain Mutability: Challenges and Proposed Solutions' (2019) 10 IEEE Transactions on Emerging Topics in Computing 1, 2; Thibault Schrepel and Vitalik Buterin, 'Blockchain Code as Antitrust' (2021) 1 Berkley Technology Law Journal 2, 8.

⁴ Thibault Schrepel, 'Collusion by Blockchain and Smart Contracts' (2019) 33 Harvard Journal of Law and Technology 118, 144.

⁵ Fabian Schär, 'Blockchain Forks: A Formal Classification Framework and Persistency Analysis' (2020) Center for Innovative Finance - DLT (Blockchain) & Fintech 3-4.

⁶ Ittay Eyal and Emin Gün Sirer, 'Majority is not Enough: Bitcoin Mining is Vulnerable' (2013) Cornell University: Department of Computer Science 439.

⁷ Nate Maddrey, 'Blockchain Forks Explained' (*Medium*, 18 September 2018), <https://medium.com/digitalassetresearch/blockchain-forks-explained-8ccf304b97c8> accessed 1 June 2022.

⁸ Ittay Eyal and Emin Gün Sirer, 'Majority is not Enough: Bitcoin Mining is Vulnerable' (2013) Cornell University: Department of Computer Science 450.

⁹ Ethereum Classic, 'Ethereum Classic: Build Unstoppable Applications' (*Ethereum Classic*, 2021) <https://ethereumclassic.org> accessed 1 June 2022.

¹⁰ Jordan Clifford, 'The Bitcoin Cash Story: Understanding the Bitcoin spinoff' (*Medium*, 8 June 2018) <https://medium.com/scalar-capital/the-bitcoin-cash-story-e55b277491f9> accessed 1 June 2022.

community is not that rare. For instance, as of today, one can find 74 successful Bitcoin forks.¹¹ As to the classification matters, there are different types of forks, most common ones being a hard fork and a soft fork.¹² This paper will be discussing competition law issues around the former type.

Importantly, all the above-mentioned technological features are primarily applicable to the public permissionless blockchains - the most transparent and open type of this technology, as it allows practically anyone to read what is happening in its ecosystem and to contribute to its ledger.¹³ The commonly known Bitcoin and Ethereum are the classic examples of the public permissionless blockchains. It should be emphasised that the scope of this paper is limited to only this specific type of blockchain technology.

With respect to competition law, it remains unclear whether blockchain can be seen as an undertaking.¹⁴ However, this uncertainty does not impede competition authorities from scrutinizing the companies that are using blockchain as a way to engage in anti-competitive practices.¹⁵ Having said this, it is still debatable whether the activities of actual blockchain technologies should fall under the scope of European competition law. The effects of blockchain hard forks on competition are ambiguous. Indeed, on the one hand, process of hard forking creates a new blockchain ecosystem, which becomes a direct competitor to the already existing one.¹⁶ People can thus have a larger choice of different blockchain networks with various rules in place. Resultantly, it can be argued that forks have a pro-competitive effect as they prevent an occurrence of a monopoly or oligopoly on the cryptocurrency market. On the other hand, taking into account the fact that it is a highly profitable field,¹⁷ blockchain hard forks may involve a high level of fraudulent activities around them, such as a chance of hard forks colluding with other undertakings.¹⁸ The practice of collusion, and specifically cartels, has always been

¹¹ ForkDrop, 'How Many Bitcoin Forks Are There?' (*ForkDrop.io*, 2021) <https://forkdrop.io/how-many-bitcoin-forks-are-there> accessed 1 June 2022.

¹² Neo C.K. Yiu, 'An Overview of Forks and Coordination in Blockchain Development' (2021) Institute of Electrical and Electronics Engineers 5.

¹³ Siamak Solat and others, 'Permissioned vs. Permissionless Blockchain: How and Why There Is Only One Right Choice' (2020) 16 *Journal of Software* 95, 97.

¹⁴ Renato Nazzini and others, 'The implications of Bitcoin for competition, antitrust, and regulation in the banking industry' (2019) 1 *Concurrences* 26, 37.

¹⁵ For more detailed explanation regarding how blockchain technology can be used as a tool for anti-competitive practice by undertakings, see: Schrepeel (n 4) 140-143.

¹⁶ Joseph Abadi and Markus Brunnermeier, 'Blockchain Economics' (2018) Princeton University Working Papers 3.

¹⁷ Carmen Reinicke, 'Bitcoin hits another record. Here's how much you'd have if you invested \$100 in 2009' (*CNBC*, 12 February 2021) <https://www.cnn.com/2021/02/12/how-much-you-d-have-today-if-you-invested-100-in-bitcoin-in-2009.html> accessed 1 June 2022; see also: Nathan Reif, 'How Much of All Money Is in Bitcoin?' (*Investopedia*, 21 June 2021) <https://www.investopedia.com/tech/how-much-worlds-money-bitcoin/> accessed 1 June 2022.

¹⁸ Paddy Baker, 'US Judge Dismisses Bitcoin Cash "Hijack" Lawsuit Against Bitmain, Kraken' (*Coindesk*, 5 February 2020) <https://www.coindesk.com/us-judge-dismisses-bitcoin-cash-hijack-lawsuit-against-bitmain-kraken> accessed 11 June 2022.

seen as the most destructive one for the internal market.¹⁹ Accordingly, this work argues that it is crucial for European competition law to be applicable to such practices, even when they involve decentralized entities. Specifically, a set of criteria to assess the anti-competitiveness of hard forks should be developed, which not only allows to preserve pro-competitive effects of forks, but also limits the anti-competitive ones.

II. BLOCKCHAIN HARD FORKS EXPLAINED

The hard fork involves a drastic change in blockchain's code, making it fully incompatible with the original version.²⁰ Hard forks thus result in the creation of a completely new ecosystem, which proceeds to coexist with the original one. For this type of fork to be formed, all the miners need to upgrade their version of public software.²¹ A crucial feature of a hard fork is the fact that those holding cryptocurrency on the parent version of the blockchain are getting exactly the same amount of coins on its hard fork.²² For that reason the process of hard fork creation is often called a way to get free money.²³ Importantly, in case of a hard fork, a new crypto-coin is created. The value of this new cryptocurrency is often much lower than that of the parental blockchain, however it still directly depends on the number of users joining the newly created network. This further creates a competition between the two blockchains to attract new members to their ecosystem.²⁴ In the meantime, the users are most likely to debate on the topic of which of the two blockchains should be perceived as the original one.

As an example of a hard fork, one can bring Bitcoin ABC. The key motive behind this hard fork was allowing the members of its network to conclude smart contracts on top of its architecture.²⁵ Importantly, if a newly emerged blockchain hard fork wants to ensure its short- and long-term survival, it is of the utmost importance that it gets listed on as many cryptocurrency exchanges a

¹⁹ William E. Kovacic, 'The Value of Policy Diversification in Cartel Detection and Deterrence' Organisation for Economic Co-operation and Development DAF/COMP(2013)22 2.

²⁰ Jake Frankenfield, 'Soft Fork' (*Investopedia*, 14 January 2021) <https://www.investopedia.com/terms/s/soft-fork.asp> accessed 1 June 2022.

²¹ Intermediate, 'What are forks in cryptocurrency? Risks, Opportunities and Calendar for all 2018 forks' (*FXStreet*, 2021) <https://www.fxstreet.com/cryptocurrencies/resources/what-are-cryptocurrency-forks> accessed 1 June 2022.

²² Thibault Schrepel, 'Libra: a Concentrate of "Blockchain Antitrust"' (2020) 118 Michigan Law Review 160, 164.

²³ *ibid*; Danhui Xu, 'Free Money, But Not Tax-Free: A Proposal for the Tax Treatment of Cryptocurrency Hard Forks' 87 (2019) Fordham Law Review 2693, 2696.

²⁴ Moshe Shababo, 'Forks in the Blockchain: Discrepancies Between Competing Chains' (*500 Tech*, 29 December 2017) <https://500tech.com/blog/all/forks-in-the-blockchain-discrepancies-between-competing-chains> accessed 2 June 2022.

²⁵ Avi Mizrahi, 'Community Funding and Bringing Smart Contracts to BCH in the Weekly Update From Bitcoin.com' (*Bitcoin.com*, 3 June 2019) <https://news.bitcoin.com/community-funding-and-bringing-smart-contracts-to-bch-in-the-weekly-update-from-bitcoin-com/> accessed 2 June 2022.

possible. Hence, its core developers always seek to establish a good relationship with these companies from the very beginning.²⁶ Quite often support from renowned cryptocurrency exchange company even serves as a primary way of attracting new members to the network of a hard fork and thus increasing the value of its token.²⁷

Notably, creation of a hard fork can have a significant impact on the original public permissionless blockchain, its network, and the cryptocurrency based on it. First of all, it should be underlined that when the hard fork is created due to a conflict between blockchain members, it means that the issue has escalated to such an extent that there were no alternative options but to create another network.²⁸ Thus, it clearly represents an ideological schism within the community regarding its members' vision on how the public permissionless blockchain network should develop in the future. Besides, this rupture can also be fuelled by conflicting financial interests pursued by different members of the two poles. As a result, users with different ideas and interests will separate into two distinct networks, which further causes a centralisation of ideas and a lack of diversity of thoughts within each of the two new ecosystems.²⁹ As blockchain technology as a whole relies on the ideology of decentralisation, this outcome arguably goes against its *raison d'être*. Second of all, the way in which a relationship between a hard fork and a parental blockchain will develop can take two distinct courses. The first option is that both blockchain networks continue to peacefully co-exist without causing significant issues for each others' value.³⁰ However, this outcome is quite rare. Usually, while competing to get more users, one of the blockchains slowly outcompetes its counterpart regarding both the value of its token and the overall network performance.³¹ In the realm of this conflict both ecosystems often fight over which one should be deemed the primary one.³² As it will be illustrated further, the idea that the ecosystem with old rules is the original one does not always work. The exact situation heavily depends on the specific hard fork at stake and the degree and nature of introduced changes, and thus requires a case-by-case analysis. Third of all,

²⁶ Nathan Reiff, 'What Is Bitcoin Gold, Exactly?' (*Investopedia*, 1 June 2021) <https://www.investopedia.com/tech/what-bitcoin-gold-exactly/> accessed 1 June 2022.

²⁷ Syed Shoeb, 'What's the Role of Cryptocurrency Exchanges?' (*Tokens 24*, 21 December 2018) <https://www.tokens24.com/cryptopedia/basics/whats-the-role-of-cryptocurrency-exchanges> accessed 1 June 2022.

²⁸ Vivina Vishwanathan, 'What is forking and how does it impact cryptocurrencies such as Bitcoin' (*Mint*, 9 November 2017) <https://www.livemint.com/Money/UdAe9RnVOwPHKH3f3VUQ5L/What-is-forking-and-how-does-it-impact-cryptocurrencies-such.html> accessed 1 June 2022.

²⁹ Noah, 'Blockchain forks and chain splits: why we should avoid them' (*Good Audience*, 7 October 2018) <https://blog.goodaudience.com/blockchain-forks-and-chain-splits-why-we-should-avoid-them-f54c693a90f1> accessed 1 June 2022.

³⁰ Commodity, 'What Are Forks and How Do They Impact the Price of Cryptocurrency?' (*Commodity*, 2020) <https://commodity.com/cryptocurrency/what-are-forks/> accessed 1 June 2022.

³¹ *ibid.*

³² A K M Najmul Islam and others, 'Why do blockchains split? An actor-network perspective on Bitcoin splits' (2019) 148 *Technological Forecasting & Social Change* 1197432, 1197437.

when blockchain is forked, at least part of its core developers usually move to the new version of the network, thus leaving the old ecosystem with less knowledgeable people taking care of its security.³³ This as a consequence can endanger, even indirectly, all the participants of the forked blockchain and slow down the development process of its network as a whole.

III. INTERPLAY BETWEEN BLOCKCHAIN HARD FORKS AND COMPETITION LAW

III.A. General Remarks

Competition law plays a pivotal role within the general body of EU law. Overall, this body of legal rules has three key objectives.³⁴ Firstly, it is promoting the attainment of an internal market in the EU by eliminating the adverse impact big private undertakings can have on it. Secondly, it aims to contribute to the overall efficiency of the internal market, thus ensuring optimal allocation of resources and maximising consumer welfare throughout the territory of the EU. Thirdly, competition law seeks to protect small undertakings and consumers from negative influence powerful economic entities can exert. To achieve these three goals, European competition law prohibits certain types of behaviour. Accordingly, Article 101(1) TFEU deals with anti-competitive agreements between undertakings and Article 102 tackles all sorts of abuses of dominant position one undertaken can engage in.³⁵ As the scope of this work is limited to Article 101(1) TFEU, only collusive agreements between two or more undertakings will be analysed. Specifically, Article 101(1) TFEU deals with horizontal and vertical agreements.³⁶ The former type of conduct depicts an agreement between two or more undertakings on the same production level, whereas the latter describes agreements between those on different levels of production.

Notably, the issue of applicability of these norms to blockchain technology remains unsolved. For instance, it is unclear whether it can be seen as an undertaking in the meaning of Article 101(1) TFEU, making it complicated to scrutinise blockchains for any sort of anti-competitive behaviour.³⁷ At the same time, it is clear that the process of forking does have a variety of consequences for the cryptocurrency market, rendering the competition law application to blockchain technology crucial.

³³ Noah (n 29).

³⁴ Paul Craig and Gráinne de Búrca, *EU Law: Texts, Cases, and Materials* (6th edn, OUP 2015) 1001 - 1002; Weijer VerLoren van Themaat and Berend Reuder, *European Competition Law: A Case Commentary* (2nd edn, Edward Elgar Publishing 2018) 6; Consolidated Version of the Treaty on the Functioning of the European Union Protocol (No 27) on the Internal Market and Competition [2008] OJ C 115 309.

³⁵ Marcin Szczepeński, 'EU Competition Policy: Key to a fair single market' (2019) European Parliamentary Research Service 5-8.

³⁶ Craig and de Búrca (n 34) 1001; European Commission, 'Guidelines on the applicability of Article 101 of the Treaty on the Functioning of the European Union to horizontal co-operation agreements' [2011] OJ C 11/1 paras 1-3.

³⁷ Renato Nazzini and others, 'The implications of Bitcoin for competition, antitrust, and regulation in the banking industry' (2019) 1 *Concurrences* 37.

On the one hand, each blockchain fork becomes a direct competitor to the original one. It increases the choice of blockchain ecosystems that people have, so that they can pick that network, the rules and practices of which they find the most appealing.³⁸ Hence, if perceived from this angle, hard forks are pro-competitive. On the other hand, being almost free from legal scrutiny, forks are predisposed to fraudulent activities within and around them. One of these risks is a possibility of forks engaging in collusive practices. A newly created fork can collude with another blockchain or a different entity in order to increase the value of its token, which might be at the expense of the parental blockchain and members of the network. Notably, collusive behaviour, especially the formation of cartels, is seen as the most disruptive practice for the internal market.³⁹

It should be underlined that the European competition authorities and courts can scrutinise undertakings that use blockchain to engage in collusive practice.⁴⁰ However, this is not the case with the blockchain technology itself and its members, including the hard forking process. Being a decentralised entity, blockchain fork lacks the specific governing body, such as the Board of Directors, that can be held responsible for such practice.⁴¹ This also makes it complex to place blockchain within the scope of the definition of an undertaking. As a result, courts around the world are hesitant to take blockchain-related cases, thus creating a *non liquet* when it comes to regulating blockchain forks. Nonetheless, this reluctant attitude ought to be changed and more concrete guidelines must be developed when it comes to dealing with blockchain forks and their effects on competition in the internal market.

III.B. Why Applying Competition Law to Blockchain?

As blockchain is a decentralised entity, all the changes and decisions are made through a consensus of all of its users. Notably, the primary idea of blockchain was to avoid liability of its users, but this question is a double-edged sword. By renouncing the application of competition rules, blockchain users risk facing illegal practices against which they have no remedies. Moreover, as all blockchain activities are decided collectively, it is practically impossible to order the perpetrator to stop an anticompetitive behaviour at this moment.⁴² Indeed, even if the order has been issued, there is no

³⁸ Joseph Abadi and Markus Brunnermeier, 'Blockchain Economics' (2018) NBER Working Paper Series 25407 3; see also: Moshe Shababo, 'Forks in the Blockchain: Discrepancies Between Competing Chains' (*500 Tech*, 29 December 2017) <https://500tech.com/blog/all/forks-in-the-blockchain-discrepancies-between-competing-chains> accessed 1 June 2022.

³⁹ William E Kovacic, 'The Value of Policy Diversification in Cartel Detection and Deterrence' Organisation for Economic Co-operation and Development DAF/COMP(2013)22 2.

⁴⁰ For more detailed explanation regarding how blockchain technology can be used as a tool for anti-competitive practice by undertakings, see: Thibault Schrepel, 'Collusion by Blockchain and Smart Contracts' (2019) 33 *Harvard Journal of Law and Technology* 140-143.

⁴¹ OECD, 'Antitrust and the trust machine' (2020) OECD Blockchain Policy Series 8.

⁴² *ibid* 9.

specific person capable of enforcing it. At the same time, hard forks might have an anti-competitive effect right from their emergence, as they would start attracting as many users as possible during the early stage of their existence.

The exact incentives as to why competition law, and especially Article 101(1) TFEU,⁴³ should apply to blockchain technology in general, and to the forking process in particular, can be divided into two categories. Firstly, the current regulatory gap results in the situation when individual blockchain users have nobody to hold accountable for anticompetitive practices directed at them by other members of the network. The present competition between miners under the proof of work consensus mechanism particularly sparks this concern.⁴⁴ As a result, ordinary blockchain users risk becoming victims of anticompetitive practices occurring inside of a blockchain network without having the possibility of bringing them to an end with the help of the law. This is especially the case when a blockchain hard fork occurs via anti-competitive means and ensures its survival at the detriment of individual users of the parental ecosystem. For instance, the fact that the actual process of forking is not regulated opens the door for hard fork members to collude with another undertaking, such as cryptocurrency exchange service, against the old blockchain and harm its participants.⁴⁵ This specifically includes hard forks meant to be a simple will of some parental blockchain members to have an easy path to enrichment through hurting the interests of others. Currently, however, it is impossible for the victims to hold them accountable for such harmful practices. As the blockchain hard fork is not yet seen as an undertaking under Article 101(1) TFEU, even if a certain practice looks like a collusion or a cartel, it might not be classified as one. Indeed, as for now, it is impossible for competition authorities to perceive an entity as an undertaking if it has neither a central identifiable governing body nor a bank account and assets.⁴⁶ This also makes it practically impossible to impose a fine on a blockchain hard fork for a collusive behaviour. Importantly, by analogy it is also possible to see an alternative scenario, when a parental blockchain ecosystem tries to suppress the newly emerged hard fork by colluding with other entities against it. At the same time, for exactly the same reasons, the members of the injured hard fork would not be able to protect themselves.

Secondly, it should be emphasised that to bring a legal action before a court on its own, an entity needs to fall within a certain legal fiction.⁴⁷ This further confers specific rights and obligations upon it, such as the possibility of being awarded compensation or of being fined. As blockchain users

⁴³ Consolidated Version of the Treaty on the Functioning of the European Union (TFEU) [2016] OJ C202/1 art 101(1).

⁴⁴ Eitan Altman and others, 'Blockchain Competition Between Miners: A Game Theoretic Perspective' (2020) 2 *Frontiers in Blockchain* 1, 2.

⁴⁵ For instance, see: Linus Nyman and Tommi Mikkonen, 'To Fork or Not to Fork: Fork Motivations in SourceForge Projects' (2011) IFIP International Conference on Open Source Systems 7.

⁴⁶ OECD (n 41) 7-8.

⁴⁷ For more information about the importance of legal fiction, see: Christopher D Stone, 'Should Trees Have Standing?—Towards Legal Rights for Natural Objects' (1972) 45 *Southern California Law Review* 450, 494.

aimed to avoid legal obligations, they also lost the rights they could have had under competition law. At the same time, blockchain network can suffer from an anticompetitive practice coming from other undertakings. Without being recognised *ab initio* as one itself, however, it will be incapable of seeking help from the competition authorities. Indeed, to attract more users, some blockchain core developers and miners can cooperate with other firms.⁴⁸ This is especially so when it comes to cryptocurrency exchanges and companies providing mining hardwares. The former one can simply not accept the newly created cryptocurrency or give a specific advantage to the one it favours. The latter can provide specifically favourable treatment for one blockchain network, but exclude the other one. Notably, this is exactly what has happened with Bitcoin hard forks, Bitcoin Cash and Bitcoin Gold, and none of these networks could actually seek help from competition authorities. They owe their survival to other cryptocurrency exchanges that supported them and that they were able to attract enough of new users on their own.⁴⁹ Similarly, it should be pointed out that blockchain is in competition with companies that are providing services for online transactions.⁵⁰ While competing with these business giants, blockchain can thus experience anti-competitive practices coming from their side. Nonetheless, once again, no remedies are available for those who are victims of such practices at this point in time.

III.C. Case Study: United American Corp. v. Bitmain

One of the most prominent examples of possibly anticompetitive practices caused by blockchain hard forks is the *Bitmain* case.⁵¹ Accordingly, United American Corporation accused some of the supporters of the Bitcoin ABC, computing company Bitmain, and exchange service Kraken of a collusive behaviour against Bitcoin SV, thus violating Section 1 of the Sherman Antitrust Act. The court concluded that the United American Corporation was not able to present sufficient arguments under both state and federal US antitrust laws to show their violation.⁵² Accordingly, the lawyers of United American Corporation could not link the current practice with the already existing US

⁴⁸ Tim McDonnell, 'The pandemic is turning fracking companies into Bitcoin miners' (*Quartz*, 29 March 2021) <https://qz.com/1988503/bitcoin-miners-and-fracking-companies-are-working-together/> accessed 1 June 2022.

⁴⁹ Nathan Reiff, 'All About the Bitcoin Cash Hard Fork' (*Investopedia*, 21 May 2021) <https://www.investopedia.com/news/all-about-bitcoin-cash-hard-fork/> accessed 1 June 2022.

⁵⁰ Mariam Nishanian, 'Smart contracts pose a disruptive force to credit cards' (*American Banker*, 24 October 2017) <https://www.americanbanker.com/payments/opinion/smart-contracts-and-blockchain-can-compete-with-credit-cards> accessed 1 June 2022.

⁵¹ Case 1:18-cv-25106-KMW *United American Corp v Bitmain Inc et al* [2018] SDFla para 1; Kristian Soltes, 'The US District Court for the Southern District of Florida receives an antitrust claim against bitcoin companies concerning alleged coordination in order to restrain trade (United American Corp / Bitmain)' (2019) 1 e-Competitions Antitrust Case Laws e-Bulletin 1, 2-3.

⁵² Order, *Dismissing Complain without Prejudice and Granting Leave to Amend: Case No 1:18-cv-25106-Williams/McAliley* [2020] SD Fla 2.

antitrust case law.⁵³ The issue at stake did not resemble to any of the anticompetitive conduct, such as price fixing or bid rigging, by the Bitmain.⁵⁴ Henceforth, the exact harm to the competition could not be established.⁵⁵ Moreover, the market definition was not clearly specified. The judge also stated that being the first of its kind, the practice at stake could not be considered *per se* anticompetitive.

The *Bitmain* case had great potential to be the pioneer decision on the issue of forks compatibility with competition law; however, it was not explored to its best. By deciding that the case was inadmissible, the court failed to provide legal practitioners with a possible framework on hard forks creation and when that should be deemed anticompetitive. Moreover, it failed to identify the assessment scheme for collusive behaviour between hard fork users and other undertakings. This judgment further sends a clear message: currently, competition law is incapable of effectively tackling problems related to blockchain hard forks. It also illustrates that the anti-competitive practices indeed can happen in the world of blockchain, and that so far, its users do not have sufficient legal protection from them.

IV. BLOCKCHAIN HARD FORKS UNDER ARTICLE 101(1) TFEU: A UNIFIED ASSESSMENT SCHEME

IV.A. General Remarks and Blockchain Nucleus

At first glance, competition law concerns around blockchain forks might call upon a simple ban on forking blockchains and preventing Article 101(1) TFEU violations *ex ante*. However, regardless of these risks, this work does not support the idea to declare the forking process illegal, as it is one of the key features of blockchain technology.⁵⁶ Indeed, the possibility to fork a blockchain allows the core developers to fix the bugs in its code, which is crucial when it comes to the network's security.⁵⁷ Similarly, it gives some users the option to make their voice heard or to exit the already existing system and create a new one better fitting their desires without necessarily hurting the participants of the previous blockchain.⁵⁸ Hence, without the possibility to be forked, blockchain technology

⁵³ Alison Frankel, 'Case claiming antitrust manipulation of Bitcoin Cash network falls short, for now' (*Reuters*, 97 February 2020) <https://www.reuters.com/article/us-otc-crypto-idUKKBN20030T> accessed 1 June 2022.

⁵⁴ Jones Day, 'Bitmain obtains dismissal of all claims in antitrust suit alleging Bitcoin Cash cryptocurrency market manipulation' (*Jones Day*, 1 March 2021) <https://www.jonesday.com/en/practices/experience/2021/03/bitmain-obtains-dismissal-of-all-claims-in-antitrust-suit-alleging-bitcoin-cash-cryptocurrency-market-manipulation> accessed 1 June 2022.

⁵⁵ *ibid.*

⁵⁶ Diva Rai, 'Blockchain and Competition Law' (*iPleaders: Intelligent Legal Solutions*, 7 May 2021) <https://blog.iplayers.in/blockchain-competition-law/> accessed 1 June 2022.

⁵⁷ Intermediate, 'What are forks in cryptocurrency? Risks, Opportunities and Calendar for all 2018 forks' (*FXStreet*, 2021) <https://www.fxstreet.com/cryptocurrencies/resources/what-are-cryptocurrency-forks> accessed 1 June 2022.

⁵⁸ Alastair Berg and Chris Berg, 'Exit, Voice, and Forking' (2017) 1 SSRN Electronic Journal 1, 5-6.

would lose a significant part of its value for its users.⁵⁹ Concomitantly, there is no doubt that a hard fork becomes a new ecosystem, which can be seen as a direct competitor of the parental one.⁶⁰ Particularly, the hard fork starts competing with the old blockchain when it comes to attracting new users to its ecosystem to increase the value of its token. This raises the level of competition on the market and provides a larger choice of blockchain networks for the people.⁶¹ Resultantly, hard forks can maximise the welfare of the users via enhancing the efficiency of blockchains and precluding a dominant power from appearing on a market. Such pro-competitive effects of hard forks should not be disregarded by the competition authorities when deciding upon the legality of this phenomenon. This therefore creates the need for a well-balanced regulatory framework at EU level, which effectively tackles the risks hard forks entail, but successfully preserves all their benefits for the internal market.

This being said, this work advocates for a common set of criteria that can be applied by competition agencies and courts while assessing hard forks and their practices. Nevertheless, as it stands, European competition law is not able to successfully cover issues surrounding blockchain hard forks. The primary complexity stems from the fact that applying legal rules to decentralised entities requires the creation of new legal fiction that can be equalised to an undertaking. In that respect, one can look into the Theory of Granularity developed by Dr. Thibault Schrepel, specifically into the concept of a blockchain nucleus.⁶² This phenomenon is a coalitions of several influential participants who can unite and lobby their proposals about blockchain development.⁶³ Contrary to the decentralised nature of blockchain, its nucleus is well-defined and can arguably be seen as either a new legal fiction or a new type of undertaking.⁶⁴ The members of the nucleus have a high interest to ensure the survival and the effective functioning of the blockchain ecosystem in question.⁶⁵ Therefore, it is possible for European competition law in general, and Article 101(1) TFEU in particular, to be applicable to such an entity. The exact size of the nucleus and its members are to be determined by competition authorities and courts on a case-by-case basis and requires a heavily context-dependent analysis.⁶⁶ Identification of a blockchain nucleus is indeed very helpful, as it

⁵⁹ By analogy, see: Schrepel (n 1) 331.

⁶⁰ For instance, see: Yujin Kwon and others 'Bitcoin vs. Bitcoin Cash: Coexistence or Downfall of Bitcoin Cash?' (2019) IEEE Symposium on Security and Privacy (SP) 936-937.

⁶¹ Joseph Abadi and Markus Brunnermeier, 'Blockchain Economics' (2018) NBER Working Paper Series 25407 3.

⁶² Thibault Schrepel, 'The Theory of Granularity: A Path for Antitrust in Blockchain Ecosystems' (2020) SSRN 35.

⁶³ Philipp Hacker, 'Corporate Governance for Complex Cryptocurrencies?' in *Regulating Blockchain. Techno-Social and Legal Challenges*, Philipp Hacker and others (eds) (OUP 2019) 16.

⁶⁴ *ibid* 36.

⁶⁵ *ibid* 38.

⁶⁶ *ibid* 39.

allows competition authorities to find a group of blockchain participants that have an influence on the ecosystem and that can be held liable.⁶⁷ What is crucial is a correct identification of this nucleus, as the outcome of this process has a pivotal effect on the overall assessment of the practice.⁶⁸ However, after the blockchain nucleus is found, rules established by Article 101(1) TFEU can be successfully applied to its activities.

IV.B. Guidelines on Hard Forks Assessment under Article 101(1) TFEU

After tackling the issue around decentralised nature of blockchain hard forks, it is possible to finally move to the assessment scheme. Notably, the proposed guidelines are based upon the bottom-up approach competition agencies must have regarding the regulation of technology. Such less-intrusive bottom-up approach would allow competition authorities to not only ensure that the main rules on fair competition are adhered to by blockchain hard forks, but also allows to preserve the core technological features of blockchain.⁶⁹ Accordingly, as a first step, competition authorities need to correctly identify the hard fork nucleus. After it is found, competition agents have to look at whether it cooperates with an undertaking or another blockchain nucleus to ensure its survival. If the answer to this question is negative, Article 101(1) TFEU is not applicable. If the answer to this question is positive, then the competition agency can move on to identify the type of an agreement. Depending on the specific facts of the case at issue, there can be either an agreement or a concerted practice. If either of the two are proven, the competition authority can move on to see whether there is by object or by effect restriction on competition. If an agreement or a concerted practice falls within the by object category, then competition agents can directly move to analysing whether this practice can be exempted. In case the practice is categorised as a restriction by effect, it is firstly required to check whether the effect it has on competition is appreciable. Accordingly, agreements between two hard fork nuclei the combined market share of which is below 10% and those between hard fork nuclei and another undertaking with a combined market share below 15% will not be covered.⁷⁰ The final step of the assessment by competition authorities is to assess whether or not a collusive practice involving a hard fork can be exempted either under block exemptions or under individual exemptions of Article 101(3) TFEU. Depending on the exact circumstances of the case, a practice of hard fork can be exempted, but if this is not the case, members of its nucleus, together with their accomplices, will be held liable for a collusive practice.

⁶⁷ Schrepel (n 62) 38-39.

⁶⁸ *ibid.*

⁶⁹ Schrepel (n 1) 329-330.

⁷⁰ European Commission, Notice on agreements of minor importance which do not appreciably restrict competition under Article 101(1) of the Treaty on the Functioning of the European Union (*De Minimis* Notice) [2014] OJ C 291 arts II-8(a), II-8(b).

As a result, by systematically applying the proposed assessment method, competition authorities will send a clear message to the core developers and promote a system where the majority of hard forks will simply not infringe Article 101(1) TFEU. It would thus ensure the *effet utile* of this provision. Indeed, due to a theoretical possibility of being held liable for a collusive practice, hard fork supporters will potentially refrain from engaging in similar behaviour from the very beginning. This attitude will potentially be further motivated by the impossibility for the perpetrators to cover their activities. Indeed, the immutable and transparent nature of blockchain technology can play to the competition authority's advantage by allowing it to easily monitor the activities happening in its network.⁷¹ This would also be beneficial for the blockchain participants, as their ideology will be respected and key features of blockchain technology will be preserved.⁷² At the same time, they will be granted with more predictability and security.⁷³

V. CONCLUSION & FURTHER RESEARCH

As a closing remark, it can be concluded that blockchain technology certainly brought considerable challenges to the *status quo* of European competition law.⁷⁴ In that regard, application of Article 101(1) TFEU to blockchain hard forks is especially crucial in order to protect the internal market from collusive practices involving them. To successfully tackle this new institution, competition authorities and courts need to transpose core competition law notions to the blockchain world. The proposed by this paper regulatory scheme is intended to assist them with this endeavour. Importantly, the Commission has acknowledged the pivotal role blockchain currently plays for the EU stakeholders and, together with other EU bodies, is exploring means of regulating this decentralized ledger technology.⁷⁵ However, it remains to be seen which regulatory pathway this initiative will take in the end and the response to it from the blockchain communities.

This work has provided competition agencies with the assessment framework of blockchain hard forks in light of Article 101(1) TFEU and contributed to the legal scholarship dealing with regulatory matters around decentralised ledger technology. Hence, its results can have implications for other sectors, such as the field of finance, where blockchain hard forks occupy a predominant place.⁷⁶ What remains problematic by contrast is the general technological illiteracy of legislative and

⁷¹ OECD, 'Blockchain Technology and Competition Policy-Issues Paper by the Secretariat' (2018) DAF/COMP/WD(2018)47 6.

⁷² *ibid* 331.

⁷³ Thibault Schrepel and Vitalik Buterin, 'Blockchain Code as Antitrust' (2020) Berkeley Technology Law Journal 5.

⁷⁴ Schrepel (n 1) 323.

⁷⁵ European Commission, 'Shaping Europe's digital future: Blockchain Strategy' (2021) European Commission 5.

⁷⁶ Rebecca Lewis and others, 'Blockchain and financial market innovation' (2017) 7 Economic Perspectives 10.

enforcement bodies. The current knowledge and communication gap between those trusting East Coast Code and the proponents of technological progress under West Coast Code must therefore be minimised.⁷⁷ It will therefore allow competition agencies to ensure the effectiveness of competition law *aquis* in the world of new technologies. Accordingly, by comprehending it, the regulator will be able to apply the law in a technologically-friendly manner. Further research in the field is however still necessary.

⁷⁷ Lennon YC Chang and Peter Grabosky, 'The Governance of Cyberspace' in Peter Drahos (ed) *Regulatory Theory: Foundations and applications* (Australian National University Press 2017) 536.