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Stablecoin – the stable cryptocurrency¹

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This article deals with the emerging topic of stablecoins, which is an umbrella term used to refer to a stable cryptocurrency. The authors shall address a number of questions, namely: what are stablecoins; when are they used; what are the most common characteristics of stablecoins. The authors shall also present a taxonomy of stablecoins based on the mechanism employed to stabilize their value. A more thorough exploration of the market for stablecoins will follow, with particular attention given to the controversies surrounding the most popular of stablecoins – Tether.

DOI	https://doi.org/10.31268/StudiaBAS.2020.26
Słowa kluczowe	<i>stablecoin</i> , kryptowaluta, pieniądz elektroniczny, cyfrowy token, cyfrowa waluta
Keywords	stablecoin, cryptocurrency, e-money, digital token, digital currency
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Introduction

Blockchain and its multiple applications are currently one of the hottest issues within the digital economy. The numerous² possible applications of this technology include the creation of the first cryptocurrency³ ever – Bitcoin.

The ongoing technological and social changes reflect the evolution towards the New Economy. The prospect of the cashless economy is now more realistic than ever before. In this context, a discussion on the future of money in the New Economy has a solid foundation. A lot of ideas, sometimes mutually contradictory, have been put forward: from a return to the gold standard and monetary unification to the development of private money under the so-called free bank-

1 The article was prepared through the project financed under the program “Regional Excellence Initiative 2019–2022” of the Ministry of Science and Higher Education. Project number: 004/RID/2018/19. Amount of funding: PLN 3,000,000.

2 Cf., e.g., V. Dhillion, D. Metcalf, M. Hooper, *Zastosowania technologii blockchain*, Warszawa 2018.

3 The European Central Bank classified cryptocurrencies as virtual currencies of decentralized nature with bi-directional flow of money, in which units can be bought and sold. Virtual currencies are defined as a digital representation of value, not issued by a central bank, credit institution or e-money institution, which in some circumstances can be used as an alternative to money. European Central Bank, *Virtual Currency Schemes – a further analysis*, Frankfurt am Main 2015, <https://www.ecb.europa.eu/pub/pdf/other/virtualcurrencyschemesen.pdf> [accessed: 22 May 2020].

ing.⁴ Bitcoin fits perfectly into the New Economy pattern. It is based on new technologies, it provides its users with a high degree of anonymity, and it is transparent (the idea of Bitcoin was presented in 2008 in a paper by S. Nakamoto⁵). The safety (owing to cryptography) and decentralization it provides (issuance is no longer handled by central banks, but instead by a decentralized peer-to-peer network) are only a couple of features which appeal to the advocates of Bitcoin. Bitcoin was the first cryptocurrency developed with roughly five thousand⁶ more cryptocurrencies now following in its footsteps (it is not possible to estimate the exact number).⁷

Despite being enormously popular, Bitcoin and other cryptocurrencies give rise to broad controversies in terms of their legal status⁸ and their role as money. The reputation of cryptocurrencies as speculative assets is confirmed by actions of market participants.⁹ Bitcoin performs the function of money (medium of exchange, store of value and measure of value) only to a limited extent.¹⁰

One of the obstacles for Bitcoin to become a medium of exchange in its own right is its highly volatile exchange rates. The mean monthly exchange rate volatility of Bitcoin is higher than that of gold or foreign currencies.¹¹ Therefore, the real challenge today is to develop a cryptocurrency that is free of this unwanted feature. The answer is stablecoins.

The purpose of this article is to characterize the phenomenon of stablecoins. First, the paper provides a definition of stablecoins, their features and ideas for their practical application. Next, stablecoins are classified in terms of their construction. The market of stablecoins is also described with a focus on the phenomenon and controversies involving Tether. The paper closes with an overview of the possible development of the stablecoin market.

Stablecoins – definition and nature

Bitcoin, the first cryptocurrency, was created in 2008, and the first stablecoins (bitUSD and Tether) in 2014. Despite the fact that stablecoins have been around for a number of years,

4 P. Marszałek, *Kryptowaluty – pojęcie, cechy, kontrowersje*, „Studia BAS” 2019, No. 1(57), pp. 105–125, <https://doi.org/10.31268/StudiaBAS.2019.06>.

5 S. Nakamoto, *Bitcoin: A Peer-to-Peer Electronic Cash System*, 2008, www.bitcoin.org/bitcoin.pdf [accessed: 22 May 2020].

6 According to coinmarketcap.com, a popular source of information on the cryptocurrencies market, there is an estimated 5,158 cryptocurrencies; <https://coinmarketcap.com> [accessed: 2 March 2020].

7 It is relatively simple to create a new cryptocurrency. However, a great many cryptocurrencies are of closed and private character which makes it impossible to count them.

8 Trade in cryptocurrencies across different countries can be legal, limited or illegal. Cf. P. Marszałek, *op. cit.*, pp. 113–119.

9 Cf. F. Glaser, M. Haferkorn, M. Siering, M.C. Weber, K. Zimmermann, *Bitcoin – Asset or Currency? Revealing Users’ Hidden Intentions*, Proceedings of the European Conference on Information Systems, Tel Aviv 2014; D.G. Baur, K. Hong, A.D. Lee, *Bitcoin: Medium of Exchange or Speculative Assets?*, “Journal of International Financial Markets, Institutions & Money” 2017.

10 P. Marszałek, *op. cit.*, pp. 113–119.

11 G.P. Dwyer, *The economics of Bitcoin and similar private digital currencies*, “Journal of Financial Stability” 2015, Vol. 17, pp. 81–91.

the academic circles have not yet shown much interest in them. The main body of the subject literature on stablecoins, except a study by D. Bullmann, J. Klemm and A. Pinna¹² and an article by W.C. Wei,¹³ is made up of expert and business analyses. The scarcity of studies on stablecoins results in the lack of one single definition of the phenomenon.

For the purposes of this paper we shall adopt the definition provided by D. Bullmann, J. Klemm and A. Pinna, under which stablecoins are digital units of value that are not a form of any specific currency (or a basket thereof) but rather, by relying on a set of stabilization tools, try to minimize fluctuations in their price in such currencies.¹⁴ For comparison, below are several other definitions:

- under a report by the Blockchain organization, stablecoin is a cryptocurrency that has been designed with the aim of minimizing price volatility;¹⁵
- G. Samman and A. Masanto argue that the stablecoin is a digital token that is meant to hold a stable value;¹⁶
- T. Sameeh states that the term “stablecoin” refers to any cryptocurrency coin or token¹⁷ pegged or backed by an asset with a relatively stable price, such as fiat currencies or gold;¹⁸
- G. Calle and D. Zalles propose a definition which strictly refers to the payment nature of stablecoins, according to which they are blockchain-based payment instruments that aim to eliminate the volatility of the cryptocurrency and achieve price stability required by its end-users.¹⁹

A comparison of the above-presented definitions implies certain observations. First, a number of definitions (Blockchain, G. Samman and A. Masanto, T. Sameeh) use the notions of cryptocurrency and token. Such an approach may lead to a very concise and simple definition (like the one applied by Blockchain). However, this simplicity may turn out to be deceitful as the notion of cryptocurrency can also be defined in a number of ways. On top of that, the definition by G. Samman and A. Masanto triggers some doubts about whether stablecoins,

12 D. Bullmann, J. Klemm, A. Pinna, *In search of stability in crypto-assets: are stablecoins the solution?*, The European Central Bank, Occasional Paper Series, No. 230, August 2019.

13 W.C. Wei, *The impact of Tether grants on Bitcoin*, „Economics Letters” 2018, Vol. 171, pp. 19–22.

14 D. Bullmann, J. Klemm, A. Pinna, *op. cit.*, p. 3.

15 Blockchain, *The state of stablecoins*, 2018, www.blockchain.com/en/static/pdf/StablecoinsReportFinal.pdf [accessed: 22 May 2020].

16 G. Samman, A. Masanto, *The State of Stablecoins 2019: Hype vs. Reality in the Race for Stable, Global, Digital Money*, https://static1.squarespace.com/static/564100e0e4b08c9445a5fc5d/t/5c71e43ef9619ae6c83c30af/1550967911994/The+State+of+Stablecoins+2019_Report+2_20_19.pdf [accessed: 22 May 2020].

17 In this context, the notion of coin does not denote a piece of metal serving as legal tender. T. Sameeh refers to the division of cryptocurrencies into coins and tokens. Coins are created on their own blockchain. Tokens are created on existing blockchains (often the Ethereum platform). Cf. <https://www.bitdegree.org/tutorials/token-vs-coin/> [accessed: 22 May 2020]. As each single cryptocurrency is either a token or a coin, this definition is redundant.

18 T. Sameeh, *Your most comprehensive guide to stablecoins*, 2018, www.cointelligence.com/content/stablecoins-guide/ [accessed: 22 May 2020].

19 G. Calle, D.B. Zalles, *Will Businesses Ever Use Stablecoins?*, R3 Reports 2019, www.r3.com/reports/will-businesses-ever-use-stablecoins/ [accessed: 22 May 2020].

which are coins rather than tokens, should be accounted for. It follows from the usage of the notion of token, which can be used in either broader or narrower context (the latter excluding the notion of coins).

Second, under some definitions stablecoins are backed by assets. Collateralizing stablecoins with assets of multiple types (currencies, securities, or other cryptocurrencies) is one of the most common means of pegging exchange rates, but not the only one. The issuance of stablecoins fully backed with currency-type reserves can be compared to central banks' implementation of the exchange mechanism called currency board.²⁰ Those definitions which use phrases such as "stabilization tools" appear to be more comprehensive.

Third, the above-presented definitions assume different approaches to the key feature of stablecoins, i.e., stability. It should be noted that any currency pegged against the American Dollar on a one-to-one basis (i.e., the exchange rate always remains stable) would be vulnerable to a drop in its purchasing power following a drop in the dollar's purchasing power. Thus, its actual value would drop at the pace dictated by the inflation rate. Most stablecoins strive to maintain a stable exchange rate against a given reference currency or a basket of currencies. However, on the cryptocurrency market there are some solutions which stabilize the value by creating a modern version of gold parity. Under this solution, token becomes a digital representation of a certain amount of gold (e.g., 1 gram) in a process known as "gold tokenization."²¹ The price of such a token changes along with the changes in the price of gold on global markets.²² The creators of such tokens take advantage of the reputation of gold as an asset the value of which does not fluctuate much over long periods of time. Tokens of this type are not the subject of interest of this paper. An interesting insight into how the creators of stablecoins (and also tokens representing gold) perceive the notion of stability can be found in a report by G. Samman and A. Masanto:²³

- stability means the possibility of purchasing a similar goods and services basket from one day to the next;
- stability means being easily redeemable for the corresponding amount of assets that the stablecoin is pegged against;
- stability means being easily predictable with respect to price outputs;
- stability means growing at the rate of local inflation – which means maintaining value in real terms;
- stability is relative versus the volatility of other currencies.

Importantly, the variety of operational targets and mechanisms for achieving stability is, at least in part, a consequence of the multiple definitions of stability.

²⁰ As regards this type of stablecoins, the central bank is replaced by a private institution in which users put similar amount of trust; hence the name "trustcoin." J.P. Koning, *Fedcoin: A Central Bank-issued Cryptocurrency*, R3 Reports 2016, p. 4, https://www.r3.com/wp-content/uploads/2017/06/fedcoin_central-bank_R3.pdf [accessed: 22 May 2020].

²¹ D. Bullmann, J. Klemm, A. Pinna, *op. cit.*, p. 34.

²² Examples of this type of tokens include: Digix Gold Token and HelloGold.

²³ G. Samman, A. Masanto, *op. cit.*

Fourth, definitions of stablecoins rarely answer the following question without leaving a lot of space for doubts: can digital currencies issued by central banks be called stablecoins?²⁴ Some sources provide two categories of stablecoins: public (digital versions of national currencies) and private (issued by commercial entities).²⁵ The notion of digital cash issued by central banks in the form of cryptocurrency in response to the high volatility of Bitcoin has been the subject of scientific debate since as early as 2016.²⁶ A number of central banks got involved in research projects on the development of the so-called Central Bank Digital Currency (CBDC). A report by C. Barontini and H. Holden indicates that as many as 70% of the central banks surveyed show interest in further development of CBDC.²⁷ However, work on this solution has not yet gone beyond the research stage. For this reason, CBDC-type of projects are not the subject of interest of this paper.

To sum up, the notion of stablecoin is applied to many initiatives that often vary greatly from each other. In this article, stablecoins are construed as defined by D. Bullmann, J. Klemm and A. Pinna. The advantages of this definition include using notions that do not require further specification (cryptocurrency, token) and a precise explanation of the meaning of stability. Moreover, the definition excludes such initiatives as CBDC and “tokenized gold.”

Classification of stablecoins

According to the classification provided by D. Bullmann, J. Klemm and A. Pinna,²⁸ based on the mechanism stabilizing the value of stablecoins against a reference currency, there are four types of stablecoins. A comparison of the types is presented in Table 1.

Under an often used stabilization mechanism, the trustee maintains the collateral of the issued stablecoins with the entity in charge of the initiative showing readiness to redeem the issued stablecoins and release the collateral at the request of the owner of the stablecoins. It is essential that the value of stablecoins supply collateral, denominated in the reference currency at the market price of the collateral, not be smaller than the value of the issued stablecoins denominated in the reference currency at the pegged exchange rate.

Collateral can take the following form:

- reference currency units;
- cryptoasset units, e.g., another cryptocurrency units;
- other assets, including non-financial assets, e.g., gold.

²⁴ A negative answer to this question is provided in the definition by D. Bullmann, J. Klemm and A. Pinna.

²⁵ A differentiation like this can be found in the memorandum by B. Regnard-Weinrabe, H. Vasu, H. Pack, H.D. Al Nakib, *Stablecoins*, Harvard Law School Forum on Corporate Governance 2019, <https://corpgov.law.harvard.edu/2019/02/10/stablecoins/> [accessed: 22 May 2020].

²⁶ It appeared under the name *Fedcoin* and was defined as a central-bank-issued cryptocurrency; J.P. Koning, *op. cit.*

²⁷ Among other places, projects of this type are developed in Sweden (e-Krona) and Uruguay (e-Peso); C. Barontini, H. Holden, *Proceeding with caution - a survey on central bank digital currency*, “BIS Papers” 2019, No. 101.

²⁸ D. Bullmann, J. Klemm, A. Pinna, *op. cit.*

Table 1. A comparison of four types of stablecoins

	Tokenized funds	On-chain collateralized stablecoins	Off-chain collateralized stablecoins	Algorithmic stablecoins
Use of collateral	Yes	Yes	Yes	No
Type of collateral (if applicable)	Units of reference currency	Other crypto-assets	Other assets (non-crypto) including non-financial assets (e.g., commodities)	Not applicable
Use of over-collateralization	No	Yes	Yes	No
Trustee	Yes	No	Yes	No
Degree to which smart contracts are used	Small	High	Medium	High
Involvement of a trusted third party	Great	Medium	Great	Minimal
The requirement to post additional collateral (margin calls)	No	Yes	Yes	No
Payment required during initial allocation	Yes	Yes	Yes	Optional

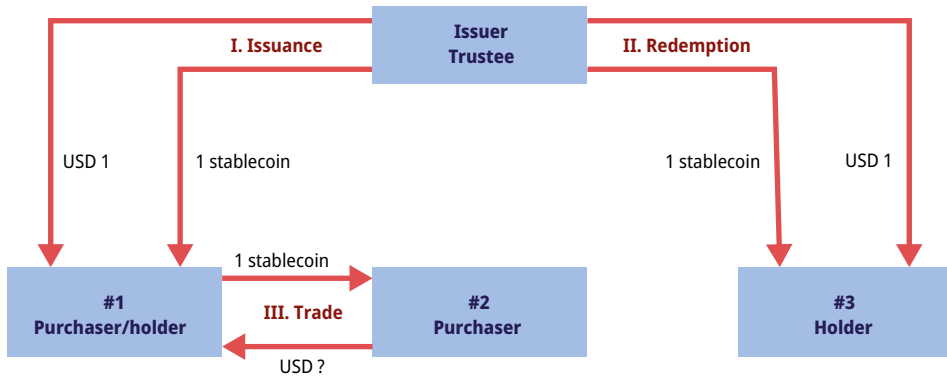
Source: Own elaboration.

As regards tokenized funds, the choice of reference currency units as a form of collateral ensures automatic adjustment of collateral value to the value of the stablecoins issued on condition that the new stablecoin units are always generated only in case of depositing reference currency units at the peg. Likewise, redemption must also take place at the pegged exchange rate (adjusting for transaction fees, if any). It should be noted that the price of the tokenized funds on the secondary market is impacted by the supply-demand mechanism and can differ from the issuer's intended peg.

However, if the issuer's actions follow the above-described rules and the issuer is found credible by market players, and assuming there are no transaction fees, the price expressed in the reference currency should not differ from the peg as an alternative to the seller would be redemption of stablecoins by the issuer, and to the buyer – purchase directly from the issuer (i.e., buying newly issued stablecoin units).

As regards stablecoins whose collateral takes the form other than reference currency units, the adjustment of collateral value and the value of the issued stablecoins is not automatic as the market collateral price, expressed in the reference currency, changes. Therefore, in order to prevent a drop of the market value of collateral below the value of the issued stablecoins, additional components of the stabilization mechanism are needed, i.e.:

- over-collateralization;
- margin calls (i.e., requests for posting further assets as collateral under specific circumstances).

Figure 1. Issuance, redemption and trade in tokenized funds*

* The peg: 1 stablecoin = 1 U.S. dollar

Source: Own elaboration.

Over-collateral means that on purchasing new stablecoin units directly from the issuer, the buyer is required to deposit collateral that exceeds the value of the units purchased, denominated in the reference value at the pegged exchange rate, in a specified proportion. For instance, if the peg is 1:1 and the required initial proportion of collateral value against the value of the issued stablecoins is 150%, the buyer depositing collateral of 150 units of the reference currency receives only 100 stablecoin units. At the same time, if the same buyer wishes to redeem the collateral, he is required to offer 100 stablecoin units for redemption (in this context, depositing collateral and obtaining stablecoin units directly from the issuer can be regarded as a loan).

In the face of the changing market value of collateral, the adoption of over-collateral does not guarantee that the market value of collateral does not drop below the value of the issued stablecoins, denominated at the pegged exchange rate. Thus, there is a call for a mechanism under which a drop in the value of the collateral in the reference currency below a certain point (still higher than 100% value of the issued stablecoins, denominated at the peg) would result in the collateral being supplemented to a desired level. The mechanism is margin calls. In case the depositor fails to respond to the call, his collateral position is sold on the market with a corresponding amount of stablecoin units purchased on the market to be withdrawn, with the potential value difference (adjusted for penalty fees) being passed on to the depositor.

The final type of stablecoins is algorithmic stablecoins. This type differs significantly from the other types of stablecoins discussed above. Its construction does not require any assets as collateral (with maintaining reserves as a possibility, but not necessarily representing the value of the issued stablecoins). In contrast to the other types of stablecoins, the mechanism for value stabilization is based on algorithms that estimate market supply and demand of particular stablecoins (this information is delivered to the stablecoin smart contract by the so-called oracles). Depending on the balance of the market forces, the smart contract sells

newly issued units or buys up units already on the market in order to stabilize the exchange rate of stablecoins against the reference currency (whenever the smart contract does not have reserves, it buys up stablecoin units in exchange for the rights to future revenues).

The functions of stablecoins

Bitcoin, the most popular cryptocurrency, was designed to be used in direct online payments, from one user to another, without the intermediation of financial institutions.²⁹ Meanwhile, Bitcoin (and other cryptocurrencies) is mainly used as an investment asset rather than payment instrument. However, stablecoins represent a hope for the return to the idea of widely-adopted direct payments.

Stablecoins are used on the market for the following three major reasons:³⁰

- to “lock in” profits, as a tool for temporarily storing value without leaving the cryptocurrency market;
- as a stable “tax haven,” as a tax evasion tool;
- to allow access to the reference currency outside the banking system.

First, the main function of stablecoins is using them when converting between other cryptocurrencies.³¹ Speculative investors “freeze” their profits temporarily before making another investment decision thus reducing their exposure to the risk of price fluctuation in case of having an unstable cryptocurrency. Using stablecoins instead has become popular on cryptocurrencies exchanges where traditional currencies are not accepted. Second, when cashing a cryptocurrency investment the investor is obliged to pay tax (e.g., in the case of Poland, capital gains tax). Exchanging cryptocurrencies for stablecoins is a means to evade introducing money into the financial system of a given country, which would require paying tax or reporting assets. Third, stablecoins provide digital access to currencies that have similar properties to a desired fiat currency (e.g., the U.S. dollar) globally, i.e., outside the currency’s issuing country, without having to open a bank account in that country.³²

To sum up, stablecoins can be used for speculative and arbitration purposes, to make transactions outside the banking system, for cashing out profits from investments, and to evade paying taxes.

Stablecoins – features and risks

Stablecoins present some advantages as perceived by users. However, it is worth looking at stablecoins from the perspective of both advantages and disadvantages: stability, decentralization, anonymity, ease of use, level of adoption, safety and risk.

²⁹ S. Nakamoto, *op. cit.*

³⁰ G. Calle, D.B. Zalles, *op. cit.*

³¹ W.C. Wei, *op. cit.*, pp. 19–22.

³² G. Calle, D.B. Zalles, *op. cit.*

What makes stablecoins stand out against other cryptocurrencies are their less intense exchange rate fluctuations. However, this feature varies among types of stablecoins, with considerable differences in their price volatility being a possibility – the differentiating factor being their construction mechanism.³³ Particular advantages of stablecoins can be enjoyed by the citizens of countries threatened with hyperinflation and instability on the financial market.

Decentralization is one of the most significant and innovative features of many cryptocurrencies. While some stablecoins allow for decentralization, a great number of initiatives are centralized projects, including one of the most often used stablecoins – Tether. Tether users do not put their trust in a central bank, as in the case of fiat money, but in a private enterprise which controls the process of creation of stablecoins. Consequently, one of the major advantages of cryptocurrencies is lost; however, it is not the case of every stablecoin project.

What users prize highly is the anonymity, or quasi-anonymity,³⁴ that stablecoins provide. In this respect, stablecoins do not differ from other cryptocurrencies. The anonymity level is higher than in the case of bank transactions, but lower than in the case of cash whose flow is completely unregistered. Obviously, it arouses controversies with regard to the potential use of stablecoins in trading in illegal goods and services. However, analyses show that criminals find cryptocurrencies too difficult to use and not anonymous enough.³⁵ Anonymity is also no longer a feature enjoyed by those stablecoin-issuing entities which seek to be granted e-money license.

When it comes to ease of use, a huge advantage of stablecoins (and other cryptocurrencies, too) is their 24/7 availability which allows making payments without delays, a feature not offered by traditional banking. Particularly huge benefits, in terms of saving costs and time, can be applied to international transfers.

Stablecoins are not commonly adopted by the market, with the retail and services sectors being particularly reluctant to them. For the time being, stablecoins are still a niche instrument, only used in the above-discussed instances. A broader adoption of stablecoins is hampered by regulatory and technological obstacles.

The safety of stablecoins is a multifaceted issue. Their construction ensures high levels of safety due to the application of distributed ledger technology and cryptographic methods. Their safety means they cannot be forged and that they safeguard the possession of one's own assets (in practice, stablecoins cannot be confiscated by the authorities). On the other hand, stablecoins carry with them an array of risks and threats.

First, in principle, stablecoins price fluctuation risk is smaller than in the case of other cryptocurrencies, but its level depends on the type of initiative and can change over time. Second, stablecoins are susceptible to regulatory risk owing to the ever-changing legal environment. For instance, having to adjust to U.S. regulations had a negative impact on the Basis project, which was eventually abandoned. Among other things, legal changes can lead to the delegalization of cryptocurrencies, or impact the way they are taxed and recorded for accounting

³³ D. Bullmann, J. Klemm, A. Pinna, *op. cit.*, pp. 35–37.

³⁴ In principle, the information on the executed transactions is non-confidential (recorded in the distributed ledger), but the users are anonymized due to the application of cryptographic methods.

³⁵ A. Wikarczyk, *Rynek kryptowalut – sytuacja bieżąca i kierunki rozwoju*, "Studia BAS" 2019, No. 1(57), p. 147.

purposes. A particular type of risk involving tokenized funds is the risk of credibility loss of the issuing institution. When market players decide that the institution does not have enough reserves to effectively back the issuance, the exchange rate will plummet. Another risk is the risk of encountering dishonest intermediaries. The lack of regulations and supervision tools over the cryptocurrencies market exposes market players to higher risks of being deceived, for instance, when trading in stablecoins on cryptocurrency exchanges. Cryptocurrency exchanges are also vulnerable to hacker attacks.³⁶ There are some guidelines which help reduce the risk of losing assets when the exchange is not working properly, e.g., storing assets in a private virtual wallet, but they may be challenging to apply. These and some other risk factors affect the safe use of stablecoins.

The stablecoin market

The stablecoin market is undergoing rapid changes. It is difficult to determine the exact number of stablecoins. Many initiatives are being developed while some other have been closed or abandoned. As has been mentioned before, stablecoins are a diverse group of initiatives. The most important differentiating factor is their construction mechanism, described in detail in the previous section. The other criteria include:

- the blockchain on which transactions are recorded;
- the currency or basket of currencies against which the exchange rate is stabilized;
- business model;
- the country of project and/or project registration;
- stablecoin availability on the cryptocurrency exchange;
- the type of institution involved in the project creation and/or financing.

As far as the construction mechanism is concerned, one of the most widespread categories of stablecoins is tokenized funds. Technologically, it is the simplest construction on which Tether, the most popular stablecoin, is based. The category of on-chain collateralized stablecoins is also quite large and involves the popular stablecoin Dai. Relatively unpopular are algorithmic stablecoin initiatives, but most of them are still in the planning or development phase. They are very ambitious projects with highly complex construction. Table 2 provides only one instance of an off-chain collateralized stablecoin. The inclusion of only one stablecoin of this category results from the definition of stablecoin adopted for the purposes of this paper. Under a great number of reports on the analyses of the stablecoins market,³⁷ this category includes projects referred to as "tokenized gold."³⁸ These projects are excluded from our analysis as their construction depends on representing a certain amount of gold in the form of token. Thus, the stabilization mechanism they use does not stabilize their price at a certain level (which requires

³⁶ The risk factors involving the cryptocurrency exchange include deliberate fraud of funds, hacker attacks or random incidents (e.g., server failure or sudden death of the holder of the access password to exchange systems, cf.: <https://edition.cnn.com/2019/02/05/tech/quadruga-gerald-cotten-cryptocurrency/index.html>).

³⁷ Cf., e.g., Blockchain, *The state of stablecoins*, op cit.

³⁸ Cf., e.g., Hellogold, Digix gold.

determining the reference currency peg), but instead links the purchasing power of tokens with the purchasing power of gold.

Table 2. Examples of stablecoins according to their construction mechanism and currency peg

Currency peg / type (construction mechanism)	Tokenized funds	On-chain collateralized stablecoins	Off-chain collateralized stablecoins	Algorithmic stablecoins
USD	Gemini Dollar; Paxos; StableUSD (Stably); Tether; TrueUSD; USD Coin; White Standard	Alchemint; Aurora; BitShares; bitUSD; Dai; MinexCoin; Moneytoken (IMT); PHI	BridgeCoin (SweetBridge)	NuBits; Steem
EUR	Stasis Euro			
SDR				Terra

Source: Own elaboration.

The majority of stablecoin projects use the Ethereum blockchain to record transactions on. According to some estimates, the Ethereum network is used by ca 50% stablecoins.³⁹ Examples of other blockchains whose infrastructure is used include EOS, NEO and TRON,⁴⁰ Hashgraph, Ripple, Stellar, NXT, or own blockchain.⁴¹ For most stablecoins the reference currency is the U.S. dollar. A less numerous group of initiatives is pegged against other currencies or peg their exchange rate against the basket of currencies.⁴² Business models developed by creators of stablecoins are numerous, too. There are non-profit projects, and projects which generate profits coming from a payment stream referred to as a dividend payable to token holders,⁴³ by charging transaction fees,⁴⁴ coin/token creation and withdrawal fees (for the conversion of fiat money into stablecoins and vice versa),⁴⁵ and making profits from the interest generated by the assets held.⁴⁶

³⁹ D. Bullmann, J. Klemm, A. Pinna, *op. cit.*, p. 32.

⁴⁰ *Ibidem.*

⁴¹ G. Samman, A. Masanto, *op. cit.*, p. 70.

⁴² *Ibidem*; D. Bullmann, J. Klemm, A. Pinna, *op. cit.*, p. 34.

⁴³ This mechanism usually applies to algorithmic stablecoins and dual models of linked tokens of which one is stabilized and the other one (paying out dividends) is used to stabilize the former.

⁴⁴ It is a fee on each transaction concluded to cover the costs of using the network and/or fees for the network nodes recording transactions on blockchain.

⁴⁵ Similar charges are collected on investing in investment funds when charging a commission for the purchase or redemption of units.

⁴⁶ While issuers of tokenized stablecoins can potentially safely invest funds serving as collateral in, e.g., bank deposits, "tokenized gold" projects charge vaulting fees for the physical gold. G. Samman, A. Masanto, *op. cit.*, pp. 70–71.

Stablecoins are a growing worldwide phenomenon. Stablecoin project teams are located in many countries across the world including the U.S.A., Switzerland, the U.K., Canada, Australia and Malta. The primary physical location of stablecoin project teams is not always the same as the legal domicile of the stablecoin project.

The leading legal domicile for stablecoins include the U.S.A., Switzerland, Australia, the Cayman Islands and the Isle of Jersey.⁴⁷ The projects use multiple sources of financing, but most often the investors are venture capitalists and funds focused on cryptoassets.⁴⁸ The popularity of stablecoins on the market is reflected by the number of cryptoasset exchanges listing the given stablecoin. Under this criterion, the most popular is Tether which is listed on as many as nearly 50 exchanges. Trading in other stablecoins is usually conducted on a few exchanges. The popularity of Tether is also confirmed by the fact that there are at least 150 different cryptocurrencies trading against Tether – a number much higher than in the case of any other stablecoin.⁴⁹

The first stablecoins were developed in 2014 with their market growing rapidly since 2018.⁵⁰ According to some estimates, the market value of all stablecoins in 2018 was ca USD 3 bn, i.e., ca 1.5% of the value of all cryptoassets.⁵¹ The market is dominated by one single stablecoin: Tether. Its market value is ca 93% of the market value of all stablecoins. At the same time, Tether accounts for ca 99% of the transactions in stablecoins (as of 2018).⁵²

Tether is a stablecoin issued by Tether Limited, created in 2014 under the name RealCoin. Its construction mechanism puts it in the tokenized funds category. The market value of Tethers is USD 8.8 bn⁵³ with a daily trade volume exceeding USD 58 bn – higher than that of Bitcoin (USD 52 bn).⁵⁴ Some other big stablecoins projects include:⁵⁵

- USD Coin (capitalization above USD 700 m and trade volume of USD 720 m);
- Paxos Standard (capitalization of almost USD 250 m and trade volume of USD 400 m);
- TrueUSD (capitalization of almost USD 140 m and trade volume of USD 320 m);
- Dai (capitalization above USD 100 m and trade volume of USD 15 m).

Despite the controversies surrounding Tether, its position amongst stablecoins and cryptocurrencies is going strong. The greatest controversies are whether Tether issuance is indeed 100% backed with USD reserves and whether Tether was used to manipulate Bitcoin's exchange rate. Despite market expectations, no audit has been conducted in Tether Limited to verify the volume and composition of reserves held by the company.⁵⁶ Although Tether Limited earlier

47 Blockchain, *The state of stablecoins, op cit.*, p. 17.

48 *Ibidem*, p. 19.

49 *Ibidem*, pp. 14–16.

50 G. Samman, A. Masanto, *op. cit.*, pp. 44–47.

51 Blockchain, *The state of stablecoins, op cit.*, p. 14.

52 *Ibidem*, p. 15.

53 In terms of capitalization, Tether ranks fourth, following Bitcoin, Ethereum and XRP. For comparison, the market value of Bitcoin is USD 176 bn.

54 Data as of 15 May 2020 are taken from coinmarketcap.com.

55 <https://coinmarketcap.com/> [accessed: 15 May 2020].

56 <https://arstechnica.com/tech-policy/2018/02/tether-says-its-cryptocurrency-is-worth-2-billion-but-its-audit-failed/> [accessed: 15 May 2020].

assured that every single Tether is backed by one U.S. dollar,⁵⁷ the company now declares that every Tether is 100% backed with reserves including currencies, cash equivalents and, occasionally, other assets and loan receivables.⁵⁸ The amount and also quality and structure of the reserves used by Tether Limited to back token issuance are key factors in deciding whether Tether Limited can be considered trustworthy. Following periodical reports of insufficient reserves held by the company, the exchange rate of Tether departs at times from the chosen peg. Some other controversies concern the allegations of using Tether to artificially inflate Bitcoin's price in 2017. The suspicious activity was detected on the Bitfinex cryptocurrency exchange.⁵⁹ It is of note that there are personal and capital ties between Bitfinex and Tether.⁶⁰ January 2018 saw the online anonymous publication of *The Tether Report*,⁶¹ and initial evidence on Bitcoin's exchange rate manipulation was provided in a publication by J.M Griffin and A. Shams⁶² of the University of Texas. However, the managers of the Bitfinex exchange denied any price manipulations.⁶³ The concerns surrounding Tether could be alleviated if the company increased their transparency levels by entering into long-term cooperation with a respectable auditor and a well-established bank.

The factors behind the development of the stablecoins market

The major drawback of the current cross-border payment systems is the long time spent on clearing and settling payments. Moreover, these systems often generate high transaction costs. Owing to the distributed ledger technology, which cuts transaction time, stablecoins are potentially an attractive alternative to this type of systems.

Stablecoins being a cashless instrument fit well into the global trend of cashless economy. There is a possibility that in the face of the COVID-19 pandemic societies will be more willing to take advantage of cashless instruments.

On the other hand, modern technologies can create certain barriers and contribute to the phenomenon of digital divide. Many individuals can find the digital wallet (buying stablecoins and settling payments with them) too complicated to use.

The other factors that hinder a wider adoption of stablecoins in retail and large-value transactions include: unclear legal situation, the lack of institutional focus and the reluctance towards stablecoins demonstrated by auditors.⁶⁴ Unclear legal situation is an issue concern-

57 *Tether: Fiat currencies on the Bitcoin blockchain*, p. 4, <https://tether.to/wp-content/uploads/2016/06/Tether-WhitePaper.pdf> [accessed: 15 May 2020].

58 "Every tether is always 100% backed by our reserves, which include traditional currency and cash equivalents and, from time to time, may include other assets and receivables from loans made by Tether to third parties, which may include affiliated entities"; <https://tether.to/> [accessed: 15 May 2020].

59 <https://www.nytimes.com/2018/06/13/technology/bitcoin-price-manipulation.html> [accessed: 15 May 2020].

60 <https://www.nytimes.com/2017/11/21/technology/bitcoin-bitfinex-tether.html> [accessed: 15 May 2020].

61 <http://www.tetherreport.com/> [accessed: 15 May 2020].

62 J.M. Griffin, A. Shams, *Is Bitcoin Really Un-Tethered?*, <https://ssrn.com/abstract=3195066> [accessed: 15 May 2020].

63 <https://www.nytimes.com/2018/06/13/technology/bitcoin-price-manipulation.html>.

64 G. Calle, D.B. Zalles, *op. cit.*

ing not only stablecoins but also all types of cryptocurrencies. Legal solutions differ across countries.⁶⁵ All the currently binding laws were not established with cryptocurrencies in mind, and the cryptocurrencies were created without concern for supervisory requirements. The fact that contemporary legislators are cautious towards modern solutions is understandable. It must be stressed that as cryptocurrencies and stablecoins are global phenomena they also require global coordination in terms of their regulation. As regards stablecoins, their features place them somewhere in between “standard” cryptocurrencies and e-money or CBDC. The institutions engaged in issuance of or trade in cryptocurrencies increasingly often are applying for an e-money license from supervisory authorities, which in itself is a positive trend. Obtaining a license is of particular importance to stablecoin issuers as it enhances their credibility.

The second factor involves optimizing the designs to the actual needs of the users, e.g., retail consumers, enterprises or financial institutions. Central banks are already working on different types of the CBDC to meet diverse needs.⁶⁶

The third factor applies to off-chain collateralized stablecoins. In order to foster trust the issuers of stablecoins ought to undergo periodic audits. However, well-established audit companies might show reluctance towards stablecoin issuers due to the high risks involved with them. Consequently, the issuers are forced to rely on less established auditors.

Conclusions

In December 2019, The European Commission and Council of the European Union released a joint statement⁶⁷ in which they stressed the importance of identifying all types of risks involved and addressing them properly prior to operating any stablecoin initiatives in the EU. Even though the statement is not legally binding it demonstrates explicitly the standpoint of EU authorities on stablecoins and lays the groundwork for legally regulating the status of stablecoin initiatives across the EU. The Union’s authorities also stressed that stablecoins present opportunities in terms of cheap and fast cross-border payments, and that the growing interest in these instruments on the part of market players signifies certain shortcomings of the current payment system.

The stablecoin phenomenon described in this article reflects the actual needs of market participants. The stablecoin market is still in its initial phase with new ideas and solutions being developed and tested. Today, it is not clear which type of stablecoins will prevail and remain. Even though Tether now has a dominant position on the market, its weaknesses may

65 P. Marszałek, *op. cit.*, pp. 105–125.

66 Digital currencies of central banks can assume the following forms: 1) widely accessible digital tokens serving as central-bank-issued “digital cash”; 2) digital tokens available only for interbank payments; 3) widely accessible, general purpose central bank accounts; C. Barontini, H. Holden, *op. cit.*

67 Council of the EU, *Joint statement by the Council and the Commission on “stablecoins,”* <https://www.consilium.europa.eu/en/press/press-releases/2019/12/05/joint-statement-by-the-council-and-the-commission-on-stablecoins/> [accessed: 9 February 2020].

cause market participants to lose their trust in this instrument unless those shortcomings are eliminated. In fact, lack of further competition on the market can be seen as a problem. More competition on this market would eliminate the projects with the biggest flaws. In the current market situation, it is Tether Limited that is in a position to introduce positive changes, although external (e.g., regulatory) intervention may be necessary to initiate the whole process.

Stablecoins are still facing a great many challenges in terms of widespread adoption. Without doubt, overcoming these challenges would increase the credibility of stablecoins enormously. The first step on this road is regulating their legal status as well as regulating the status of virtual currency exchanges. Other areas of financial markets implementing blockchain solutions, such as crowdfunding using Initial Coin Offerings, would also benefit from those rules. Safety and credibility of financial markets are of the utmost importance for the economy, and preventing cryptoasset-exchange-related frauds would further that goal.

Even though it hasn't happened yet (due to a still relatively small scale of stablecoin markets), in the near future stablecoins may present new challenges for the conduct of monetary policy. Both electronic money schemes and tokenized-funds-type stablecoins pose a challenge to monitoring monetary aggregates and liquidity conditions in the economy as well as controlling short-term interest rates. Further analysis will be needed on the impact of these solutions on monetary transmission mechanisms and the credibility of currencies. Some old discussions can also be revisited thanks to new evidence, such as the discussion of rules vs discretion in monetary policy as seen through the lens of algorithmic stablecoins.

The future of stablecoins is uncertain. It is conceivable that the need for a stable cryptocurrency can be substituted with a digital equivalent of fiat money in the form of electronic money developed by a central bank. However, because of the caution with which central banks proceed, as well as the advantage of decentralization that distinguishes at least some of stablecoin initiatives, it seems that stablecoins aren't going to disappear anytime soon.

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