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STABLECOINS GO GLOBAL **What is at stake**

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Executive summary

Stablecoins are “digital units of value that are not a form of currency, but rely on a set of stabilisation tools to minimize fluctuations of their price in such currency”.

They are based on some form of DLT, but they involve also some degree of centralisation, since price stabilisation requires some kind of trusted intermediation or other centralized infrastructure.

Stablecoins involve an intrinsic trade-off: the more they are stable, the less they are coins, in the sense of decentralized digital assets, and vice versa.

Like all cryptocurrencies, starting from bitcoin, stablecoins leverage on the flaws of the official monetary system: the lack of a distinct international currency, the increasing challenge put on the dollar as global currency, on the inefficiency of cross border retail payments, and finally on the lack of access to financial services for a large share of the world population.

However, stablecoins seek to overcome the major obstacle to the use of cryptocurrencies as means of exchange, namely their extreme volatility. Hence the objective of stabilizing their value, usually in terms of an official currency (or of a basket of currencies).

Stabilization may be achieved in a variety of ways: by backing the stablecoin with liquidity in official currency (fiat token), or with other financial assets denominated in the official currency (off-chain collateralized stablecoin), or with other digital assets (on-chain collateralized stablecoin), or even by adjusting its supply automatically (algorithmic stablecoins).

One particular type of stablecoin, regardless of its stabilization mechanism, has gained attention as a credible challenge to the main official currencies, particularly as an international means of payment, due to the sheer size of the potential user base: the global stablecoin (GSC). The first and most prominent example is the stablecoin designed by social network Facebook, originally called Libra and now renamed Diem.

Since most of the existing SCs imply a systematic relationship with official currencies through their backing, SCs have been the object of the attention of the regulators, to the extent that they concern the functioning of money and payments, touch key public policy prerogatives. In particular, SCs have been evaluated in terms of

- *the legal obligation of market makers to ensure liquidity at all times*
- *their relationship with the banking system and with the existing banking regulation*
- *the compliance with the international standards for AML/CFT and countering the financing of the proliferation of weapons of mass destruction (CPF).*
- *the compliance with the Principles for financial market infrastructures (PFMI)*
- *the compliance with the International Organization for Standardization (ISO) and the International Electrotechnical Commission (IEC) to provide standards for information security management.*

The overall result of this regulatory activity has been a tightening of the stability criteria for SCs as a means of payment, in order to ensure effective stability. Nevertheless, the more SCs become

stable, the more they tend to resemble to more traditional monetary instruments, like e-money, bank deposits or even central bank money. Hence, we could speak of a "heterogony of ends": the principal merit of SCs has been that of soliciting monetary authorities to hasten their projects of central bank digital currencies.

This is why, notwithstanding the stability achieved by some of them, SCs have not taken off, and probably will not, take off as a means of payment, and continue to merely represent another instrument in the cryptoasset market.

Looking ahead, however, several scenarios for the future use of SCs in the domestic and international economy can be sketched out.

SCs can remain confined in the cryptoasset market, but they could even substitute, to various degrees, the official monies in the means of exchange or /and in the reserve of value function. In this case, they could lead to an "unbundling of the roles of money", with a weaker incentive to use one currency as both a store of value, medium of exchange, and unit of account, leaving currencies free to specialize in a certain role.

For the same reason, cryptoassets could become a substitute of gold. This scenario is particularly relevant for off-chain collateralized stablecoins backed by gold, as they de facto provide a digital representation of it on the DLT infrastructure.

Indeed, "stability" could be thought, perhaps more significantly, in relationship not to official money, but to goods and services: a path to explore is thus the interpretation of utility tokens as a peculiar type of stablecoin, which is more closely related to the actual exchanges in the real economy.

As for the international scenarios, SCs could play an important role in cross-border payments, or even give birth to "Digital Currency Areas", following the same principle of monetary specialization which is embedded in the concept of utility tokens, and more generally of complementary currencies. Indeed, DCAs could endanger global financial stability and increase fragmentation, but they could also be complementary, by performing different functions and offering different (bundles of) services, and they could express communities linked by different types of economic and social ties.

However, the most critical challenge is the challenge that GSCs could put on the role of the dollar as the dominant international currency, in particular with a multi-currency model. Even in this case, the unwanted outcome of the challenge launched by GSCs would be the acceleration of the reform of the international monetary architecture: the proposal of Mark Carney of a "Synthetic Hegemonic Currency" (SHC), i.e. of a multi-currency global CBDC provided by the public sector through a network of central bank digital currencies, goes in this direction.

Introduction

Bitcoin, the first cryptocurrency launched in 2008 in the aftermath of the financial crisis, was presented as one of the most promising and potentially disruptive challenges to the official monetary system. Twelve years after its launch, we can say that these expectations were largely overrated, and it is now clear that Bitcoin is just a highly speculative asset which has gained a relatively limited diffusion as means of exchange. Since then, the sector has evolved, and many other cryptocurrency projects have been launched on the market, but none of them has, until now, gained a particularly significant success. In particular stablecoins, the second generation of cryptocurrencies, have tried (with a certain success, as we will see) to solve Bitcoin's main problem, namely the great volatility of its value in terms of the official currencies, but without managing to reach a wide diffusion.

The situation seemed liable of changing suddenly with Facebook's announcement of its own cryptocurrency, originally called Libra and later renamed Diem, on 18 June 2019 with the publication of the White Paper. Diem combines the innovation of the distributed ledger technology (DLT, see box below) at the base of cryptocurrencies and the arrangements used by stablecoins to stabilize the value with Facebook's already established global network of users counting more than 2 billion people. It is the latter element that constitutes the real innovation with respect to the previous cryptocurrency projects, so much so that the G7 in an official document has established the new category of "global stablecoin", to define stablecoin initiatives built on an existing cross-border customer base, and therefore having the potential to achieve a global scale or in any case an international relevance. As a result, the debate on digital monies, cryptocurrencies (stablecoins in particular) and their relationship

with the official monetary system, which seemed faded, has risen again.

The most relevant aspect of the Diem project is its very possibility, that sheds light on the absence of a truly international money and on the main weaknesses of the present monetary system both at the global and at the local level, which are the following:

- (i) the lack of a distinct international currency, with the role of global currency which is still performed by the dollar, even though we now live in a multipolar world;
- (ii) the inefficiency of cross border retail payments, which are still very expensive and slow;
- (iii) the lack of access to financial services for a large share of the world population (globally, 1.7 billion people are unbanked or underserved with respect to financial services).

Indeed, as we can read in Diem's White Paper, Diem aspires to be a new "global currency and financial infrastructure" designed to promote easier, cheaper and faster transfers of money and to foster financial inclusion.

The goal of this work is therefore to outline and analyse the main issues related to stablecoins and Diem in the general framework of cryptocurrencies and digital (private) monies, and in the light of the present monetary architecture and its flaws, making order in an increasing debate and presenting the main positions expressed by economists, regulators and opinion makers. The report is structured as follows.

- Section 1 introduces the topic, outlining the definitions and the typologies of the existing stablecoin projects.
- In Section 2 we perform a SWOT analysis, analysing the main strengths, weaknesses, opportunities and threats connected to these projects.

- Section 3 deals with the regulatory issues and the attitudes of the regulators towards private initiatives that, to the extent that they concern the functioning of money and payments, touch key public policy prerogatives.
- Finally, Section 4 analyses the possible scenarios that stablecoins, and above all Diem, open for the monetary and financial system, both at the domestic and at the international level.

1. Definition

1.1. What is a stablecoin?

Definition

As it refers to a phenomenon which is still ongoing, the term “stablecoin” lacks a universally agreed definition. We can start our analysis adopting the definition proposed by Bullmann, Klemm and Pinna (2019): stablecoins are “digital units of value that are not a form of any specific currency (or basket thereof), but rely on a set of stabilisation tools which are supposed to minimize fluctuations of their price

in such currency(ies)”. However, this general definition needs some specifications.

Stablecoins and cryptoassets

Stablecoins are often referred to as the second generation of cryptoassets, the first being the one initiated by the launch of Bitcoin in 2008¹. A cryptoasset can be defined as an asset recorded in digital form with two fundamental characteristics. The first is that “it does not represent either a financial claim on, or a financial liability of, any natural or legal person, and [...] does not embody a proprietary right against an entity” (ECB, 2019).

Box - The Distributed Ledger Technology (DLT)

The DLT is essentially a technology that allows to build ledgers which are managed and updated in a distributed way across a network of users, without the need to rely on a central entity, and that involves the use of cryptography to ensure safeness. We can think of DLT as a new infrastructure in the monetary and financial system, on which cryptoassets transit (Bullmann, Klemm and Pinna 2019). The revolution brought to the fore by Bitcoin in 2008 was the fact that both the issuance and the transfers of the coins are managed through a DLT protocol, in a completely decentralized manner. The intent was precisely to create a money which did not need a responsible third party of any kind, but relied solely on its network of users².

The DLT can be of different typologies, according to four dimensions (G7, 2019):

- It is *permissionless* if the role of **validator** of the operations can be performed by anyone, *permissioned* if only selected entities can be validators;
- it is *public* if can be **used** by anyone, *private* if not;
- it is *non-hierarchical* if the full ledger can be **seen** by anyone, *hierarchical* if the ledger is visible only to some;
- it is *open source* if its code can be **edited** by anyone, *closed source* if only authorized developers can edit the code.

The main distinction is the one between permissionless and permissioned DLT. Permissioned DLT has been developed to address one major flaw of permissionless DLT, namely the inability to process a large number of operations at the same time, which undermines the scalability of the model. It is then clear that to the extent that the DLT is permissioned, the original promise of decentralization made by the founders of cryptoassets is significantly downsized. The most important future applications which are currently under discussion refer to this latter type of DLT (starting from Central Bank Digital Currencies, for obvious reasons). The original utopia (or dystopia) of a peer-to-peer monetary and financial system, without the presence of intermediaries, seems for now to have waned.

¹ As we will see below, this representation is inadequate: stablecoins are, in some key aspects, fundamentally different from the first generation of cryptoassets.

² Nakamoto, S. (2008), “Bitcoin: A Peer-to-Peer Electronic Cash System”, Bitcoin White Paper.

Types of DLT

function	open to anyone	restricted to selected entities
validate transactions	permissionless	permissioned
use coin	public	private
read ledger	non-hierarchical	hierarchical
edit code	open source	closed source

The second is the reliance on the distributed ledger technology (DLT) for both the issuance and transfer of the coins. Moreover, the reliance on cryptography and DLT is part of the perceived or inherent value of cryptoassets (FSB, 2018).

As it is now widely recognized, the main problem of the first generation of cryptoassets is that they have shown too much volatility in their value. This volatility clearly undermines the three roles that economic theory traditionally attributes to money, namely unit of account, means of exchange and store of value. For this reason, a wide consensus has been reached on the fact that such instruments should not be defined as money (see for example David, 2013); this theoretical statement is confirmed by empirical studies showing that Bitcoin is used almost exclusively as a speculative instrument (see for example Baur, Hong and Lee, 2018). For this reason, the ECB considers the terms “cryptocurrency”, “virtual currency” and “digital currency”, which are sometimes used as synonyms of cryptoassets, wrong, since the term “currency” defines a monetary instrument³ (see ECB, 2019).⁴

The differences between stablecoins and cryptoassets

Stablecoins have been developed to correct this main flaw. Indeed, the main difference between stablecoins and the first generation of cryptoassets is the presence of a stabilization mechanism to fix their market value in terms of official currencies. As we will see in more detail below, the majority of existing stablecoins achieve this goal thanks to the fact that they are backed by other assets. A second difference, logically connected to the first, is that stablecoins generally rely on a DLT protocol only for the transfer mechanism, while the issuance is usually performed by a central governance entity, even if all operations (including those connected to the issuance) make use of the so called “smart contracts”⁵ to diminish the relevance of the central party. Indeed, in a recent report produced by the G7 Working Group on stablecoins, we can read that “stablecoins are at the edge of the decentralized crypto world, since the price stabilisation requires some kind of trusted intermediation or other centralized infrastructure” (G7, 2019). This is true for the majority of existing stablecoins; there are, however, some types of stablecoins which, like cryptoassets, do not present a central responsible entity, even if they represent a small minority of the total stablecoin market. We will return on this point

³ Here we use the terms “currency” and “money” as synonyms, even if in legal terms they are generally different concepts: “currency” indicates the official means of payment of a country, denominated in its unit of account, while “money” indicates currency plus certain types of assets or instruments that are convertible or redeemable readily into currency (International Monetary Fund, 2020). We analyse the legal and regulatory issues in Section 3.

⁴ This terminological choice, which we follow, is widely shared among regulators and international organizations.

⁵ A smart contract can be defined as “a computer protocol that can execute, verify, and constrain the performance of an action involving either units or representations of assets recorded in a distributed ledger” (Bullmann, Klemm and Pinna, 2019).

when analysing the different typologies of stablecoins.

A final difference is the presence of a specific combination of multiple functions and activities (FSB, 2020). Indeed, a stablecoin *arrangement*, unlike the most common cryptoassets, includes a combination of multiple functions, each involving many activities and performed by different actors.⁶ The three core functions are:

- (i) issuance, redemption and stabilization of the value of the coins;
- (ii) transfer of coins;
- (iii) interaction with end users.

The issuance, redemption and stabilization involve the *creation* and *destruction* of coins, the *management* of the reserve assets and the *custody* of these assets. The transfer of coins entails the operation of a suitable infrastructure and a mechanism for validating transactions. The interaction with users typically occurs through “wallets”, which store the private keys providing access to stablecoins, and through applications that enable the exchange of coins against fiat currencies or other cryptoassets.

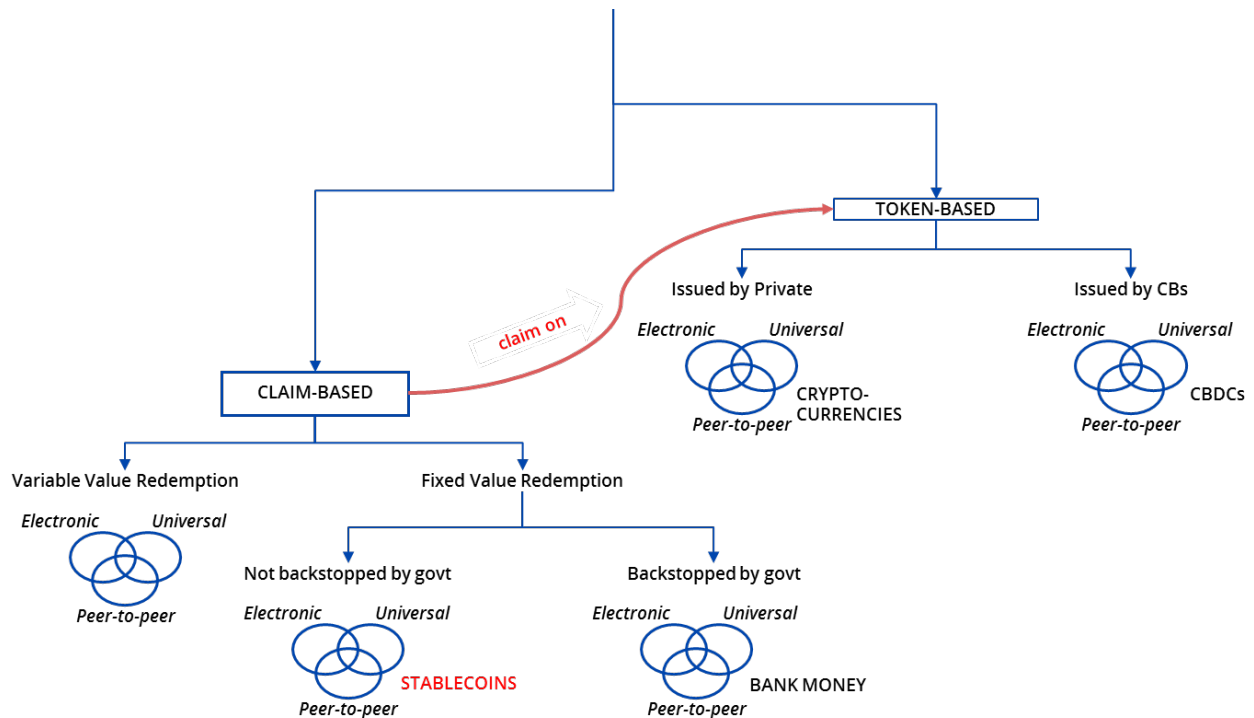
To understand better the nature of stablecoins, and their difference with respect to the first generation of cryptoassets, we need to build a general theoretical framework in which they can be included.

Box – A consideration on the notion of stability

As we said, stablecoins are designed to be stable with respect to a reference currency (which in the majority of cases is the dollar). However, the stability of a monetary instrument is better defined with respect to the goods, i.e. as the stability of its purchasing powers. Currently, stability with respect to the official currency of an advanced economy and stability in real terms coincide, because inflation in advanced economies is very low and stable, but this would be no longer the case if inflation reappears. There are, however, various types of cryptoassets that are not subject to this limitation, since they propose to remain stable not with respect to a monetary reference, expressed in terms of an official currency, but with respect to a real reference, defined in terms of goods and services. For instance, there is a class of stablecoins that are pegged not to a currency, but to a commodity (e.g. Tether gold). Another class of cryptoasset, called “utility tokens”, are instead designed to keep stability with respect to a specific (bundle of) good(s) or service(s): they are issued by a startup as a form of financing, and they give right to buy a fixed amount of the product(s) produced by the startup. We will return on this point in Section 4, where we will outline the possible scenarios for the monetary system.

⁶ Following the Financial Stability Board (FSB, 2020), we use the term “arrangement” to indicate the set of functions and activities performed within a stablecoin project.

The money tree



Source: author's elaboration.

1.2. The taxonomy of money

We propose a taxonomy of money which incorporates both the “money flower” of Bech. The taxonomy divides the features of money in “main features” and “secondary features”. The main features are related to the “economic substance” of the monetary instrument and are the ones that give rise to the branches of the tree. They are the following:

- primary vs claim-based. This is the fundamental distinction. A claim-based monetary instrument is, as the name suggests, a claim on another form of money. In other words, it is a promise to pay a certain amount of another monetary instrument. A primary money, instead, is not a claim on anything else: it is in this sense a “primitive” form of money. This distinction gives rise to a hierarchical scheme. Every claim-based money is,

and Garrett (2017) and the “money tree” of Adrian and Mancini-Griffoli (2019).

ultimately, a claim on a primary money, and, in particular, in the current monetary systems, on the primary money issued by the central bank, which therefore stands at the top of this hierarchy. This hierarchic relationship thus is what connects claims and primary monies. The typical example of claim-based money is bank deposits, which are convertible at par in currency. Brunnermaier, James and Landau (2019) make the same point, when they state that “any payment instrument in the monetary system is ultimately linked to a fixed amount of the anchor”, and that “currently, the anchor in most monetary

systems is a government-issued fiat currency.”⁷

- Primary money can be issued by the central bank or by private entities. The primary monies issued by the CB, namely cash and reserves, are, as we said, the primitive form of money, which constitute the backing against which claim-based money is created by the private financial sector. Primary monies (when they are not commodities, which have value in itself) derive their value solely from their capacity to be exchanged with goods and services or to discharge debts, including those towards the State in the form of taxes due (and from the trust people have in this capacity).⁸
- Claim-based monies can offer convertibility in the reference currency at a fixed value or at a variable value, namely at the current market value of the assets that back the claim.
- For claim-based monies that offer convertibility at a fixed value, this promise can be “backstopped”, i.e. guaranteed, by the government or not.

The secondary features are related to technical or technological options of money design. These are the features that give rise to the “petals” at the end of each tree. They are the following:

- the form can be electronic or physical;

- the access can be universal or restricted. The restriction can be made by typology of users or by geography (as it happens for the local currencies);
- the transfer mechanism can be peer-to-peer (decentralized) or mediated by an intermediary.

Stablecoins and cryptoassets in the taxonomy of money

This classification sheds further light on the nature of stablecoins and on their differences with the first generation of cryptoassets. Cryptoassets like bitcoin are primary monies, and as such they are like digital commodities (Bank of England, 2014), which only have value to the extent that users agree on that. This is the fundamental reason that explains the large volatility of their value. Moreover, this volatility is further amplified for cryptoassets like bitcoin whose total supply is fixed and predetermined, and thus cannot react to the variations of demand.

Stablecoins have tried to solve this problem through two innovations with respect to the first generation of cryptoassets: (i) supply is not fixed, but instead is determined by demand; (ii) they are anchored to an existing fiat currency.

The second point is the crucial one. That is, in the framework of our money taxonomy, most stablecoins are claim-based instruments.⁹ In general, it is this link with government fiat currency that guarantees the stability of a monetary instrument. Government fiat

⁷ Our distinction should not be confused with another popular distinction, introduced by Khan and Roberds (2009), that is the one between token-based and account-based systems. The latter distinction is narrower than the one we adopt, since it refers more specifically to payment systems, and not to different forms of money. According to it, an account-based system requires verifying the identity of the payer, while a token-based system requires verifying the validity of the object used to pay.

⁸ This point needs a clarification. One could argue that currency and reserves, being formally a liability of the central bank, are claim-based monies and not tokens. However, this would be an incorrect conclusion, since the nature of central bank liabilities is very different from the

one of private entities’ liabilities: they do not constitute a claim on the assets of the central bank (De Grauwe, 2013), and indeed in principle a central bank could operate also with negative capital (see for example De Grauwe and Ji, 2012, or Whelan, 2014). Indeed, currency and reserves are not redeemable in anything else (which is what we mean with the expression “fiat money”). The nature of the liability of the central bank is its commitment to maintain the value of the money it issues stable with respect to the goods.

⁹ With the exception of one particular type of stablecoins, named algorithmic stablecoins, which are not redeemable and pursues the link with fiat currency in another way, as we will explain below

currency, in turn, is stable because (better: as long as) central banks act credibly as the guarantors of a stable purchasing power of it: indeed, a low and stable inflation is the primary objective of any modern central bank.¹⁰ Moreover, the state sustains the value of the money it issues by accepting tax payments in it. This is the central tenet of the Fiscal Theory of Price Level (FTPL), according to which “money is valued because the government accepts money for tax payments” (Cochrane, 2021).¹¹ Finally, the money issued by the state is legal tender, meaning that it is the legal means for the payment of debts: this further sustains its value.

Stablecoins and other claim-based monies

However, stablecoins are also different from the traditional forms of claim-based monies, like bank deposits. The main difference is that the link with government fiat currency is weaker. For some stablecoin arrangements, the reason is that they only offer redemption in currency at a variable exchange rate. For stablecoin arrangements that commit to redeem coins at a fixed value, the reason is that this commitment lacks the government backstop. Moreover, some types of stablecoin do not present a central entity that can be held accountable over the claim (as we will see better when analysing the different typologies).

With the term “government backstop” we refer to four different things:

(i) the fact that convertibility at par in fiat currency is legally binding, so that if the issuer defaults on its promise the holder of the coins receive a claim on the issuer’s illiquid assets;

(ii) the fact that the issuer has access to central bank facilities, meaning that central banks can

supply liquidity to them whenever needed, acting as a lender of last resort;

(iii); the fact that the issuer’s activities are subject to strict regulations, which impose strict conditions on its capital and management; and

(iv) a protection scheme for customers’ holdings up to a certain amount.

It is thanks to these “safety nets” that bank deposits are fungible, in the sense that people accept them as payment without caring about the specific bank issuing them (Bailey, 2020).

This feature shows a key property that economic theory recognizes as highly desirable for any means of payment, namely information insensitivity (Dang, Gordon and Holmstrom, 2012). Users of bank deposits are confident that their deposits can be converted in state money at par at any time. Bank deposits are then, in this sense, information insensitive, because they are trusted without the need for obtaining information on the creditworthiness of its specific issuer. This is, to a good extent, true also for digital payment services like Visa and Mastercard, from which follows their attractiveness (Eichengreen, 2019).

This link creates what is typically referred to as the “uniformity of money”. Indeed, following Brunnermaier, James and Landau (2019) we can say that a collection of payment instruments form an independent currency if (i) they are denominated in the same unit of account and (ii) each instrument is convertible into any other, and in particular is convertible in the government fiat currency which establishes the official unit of account. In other words, this uniformity is organized around the anchor constituted by government fiat currency. Economic theory explains this arrangement with its informational efficiency: our modern

¹⁰ However, it must be said that inflation is not only a monetary phenomenon, and as such is not under the direct control of central banks. Moreover, a low inflation is not the only objective of central banks: other objectives, like achieving a low unemployment or stimulate the economy

in a recession, can even enter in contradictions with it, at least in the short run.

¹¹ The origins of this theory date back to the so called Chartalism, developed by the German economist Knapp in his “The State Theory of Money” (1905).

monetary system minimizes the cost of information, and especially of information asymmetries between debtors and creditors, centralizing the ultimate issuance responsibility in the hands of a public third party: this implies that it is not necessary to have information about the creditworthiness of every issuer (Eichengreen, 2019).

History provides good examples that support these theoretical insights. In principle, anyone could issue their own IOU (“I Owe You”) with the purpose of making it circulate as money. This indeed has happened for the largest part of the monetary history. Without going back too much, it is enough to consider the so called “free banking era” in the US. Before the foundation of the Federal Reserve System in 1913, each bank issued their own notes, and there were literally exchange rates between dollars issued by different banks. That is, the system was made by multiple private currencies, traded at different prices (Eichengreen, 2019). This arrangement resulted in a series of defaults, bankruptcies, and financial crises. The Federal Reserve System was created precisely in response to these crises.

1.3. What are stablecoins used for?

The discussion we made portrays stablecoins as a hybrid instrument, in the middle between cryptoassets and traditional claim-based money. According to what we said above, one would then predict that they are dominated in the monetary functions by traditional claim-based monies. This insight is confirmed by the empirical evidence on the stablecoins projects that have been launched so far. As reported by Bullman, Klemm and Pinna (2019) in a Working Paper published by the ECB, stablecoins have so far been used as a way “to provide safety in relation to the major currencies [...] on the market for crypto-asset”, that is “to protect the revenues from crypto-asset investments from volatility”, providing these revenues with a store of value without leaving the DLT. More specifically, Calle and Zalles (2019) report that

the main usages of stablecoins have been so far the following:

- lock in profits: “cryptocurrency speculators and traders convert cryptocurrencies into stablecoins to temporarily “lock in” profits, shifting their exposure to relatively stable assets”;
- vehicle currency: the same speculators also use stablecoins as “vehicle currencies” to rebalance their portfolios in the cryptoassets market. Indeed, stablecoins provide advantages in this function with respect to the dollar, in the form of lower intermediation costs and a usability across a greater cross-section of crypto-exchanges (Lyons and Viswanath-Natraj, 2020);
- tax haven: stablecoins allow speculators in the cryptocurrencies market to avoid reintroducing money into the regulated financial system, where taxes on gains may apply;
- payments outside the banking system: “Some miners, speculators, or users may not have commercial bank accounts in a certain jurisdiction. Stablecoins allow greater global digital access to currencies that have similar properties to a desired fiat currency, beyond the borders of that fiat currency’s issuing country. Some use stablecoins to avoid potential frictions from having funds blocked or temporarily held caused by KYC procedures or flags that may occur when introducing money back into the traditional financial system.” This amounts to what we might call a “democratization of shadow banking”.

Main uses of stablecoins



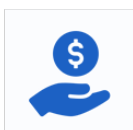
profit lock-in: to shift exposure into relatively stable assets



vehicle currency: to rebalance portfolios in the cryptoassets market, with low intermediation costs and high usability across many exchanges

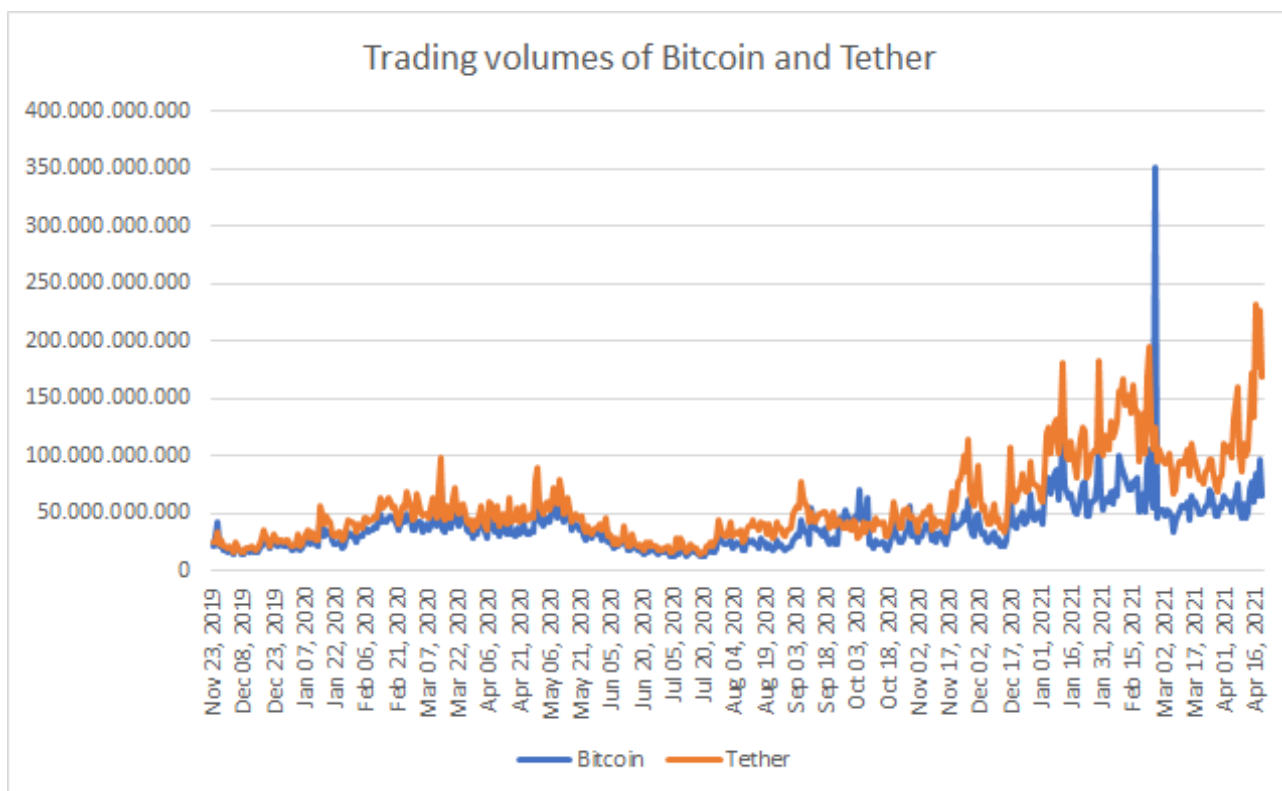


tax haven: to avoid reintroducing money into the regulated financial system, where taxes on gains may apply



payments outside the banking system: to access a currency beyond the borders of the issuing country, avoiding KYC, AML, sanctions

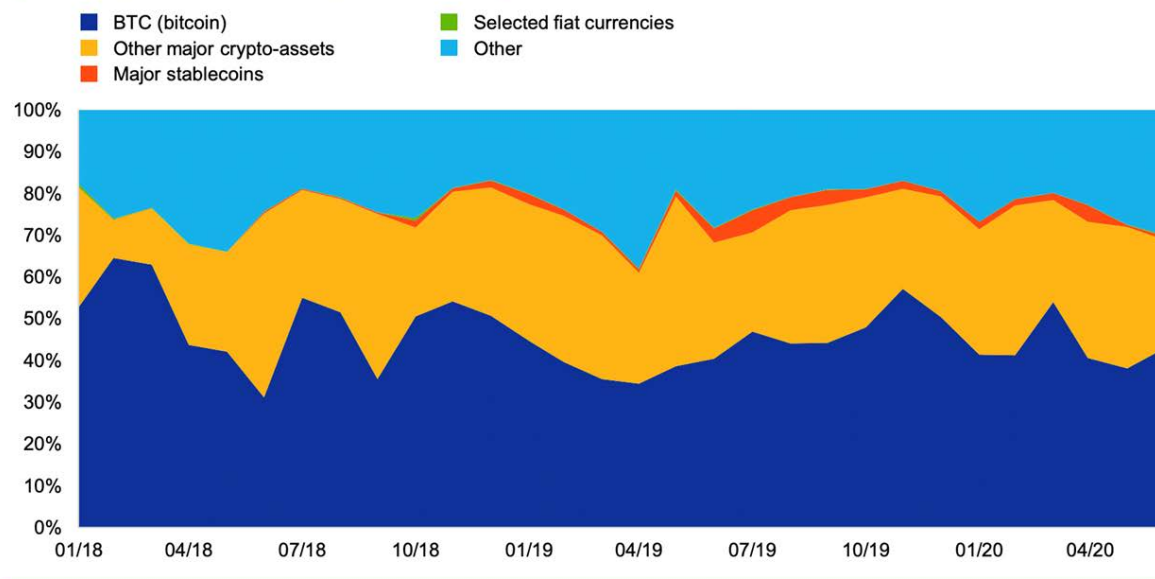
These statements are confirmed by the empirical data. The following graph shows the trading volumes of Bitcoin and Tether, the largest stablecoin in the market.



The two series exhibit a high correlation: the correlation index is 0,78. This strongly supports the thesis for which stablecoins are used as means to store the gains obtained in the cryptocurrency market. This is further demonstrated by the fact that the large majority of trades in the stablecoin market is made by trades of Tether versus Bitcoin and other cryptoassets, as the following figure shows:

Trading volumes of Tether vis-à-vis crypto-assets and fiat currencies

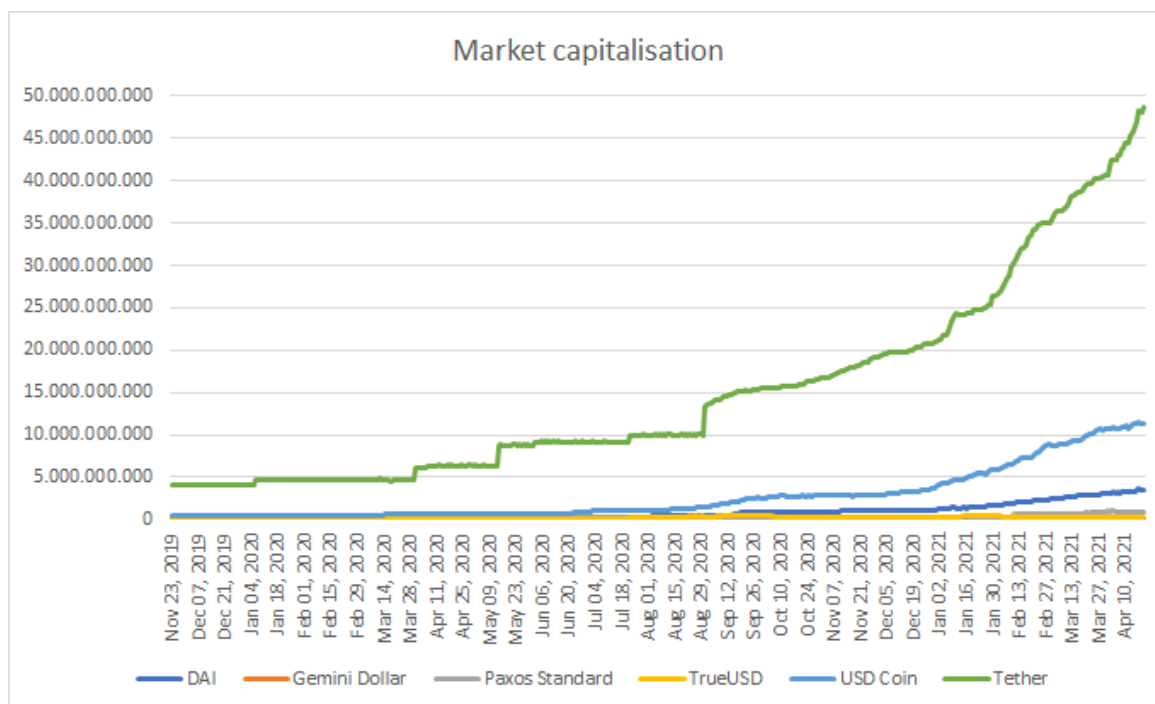
(percentages, Jan. 2018 – June 2020, end-of-month data)



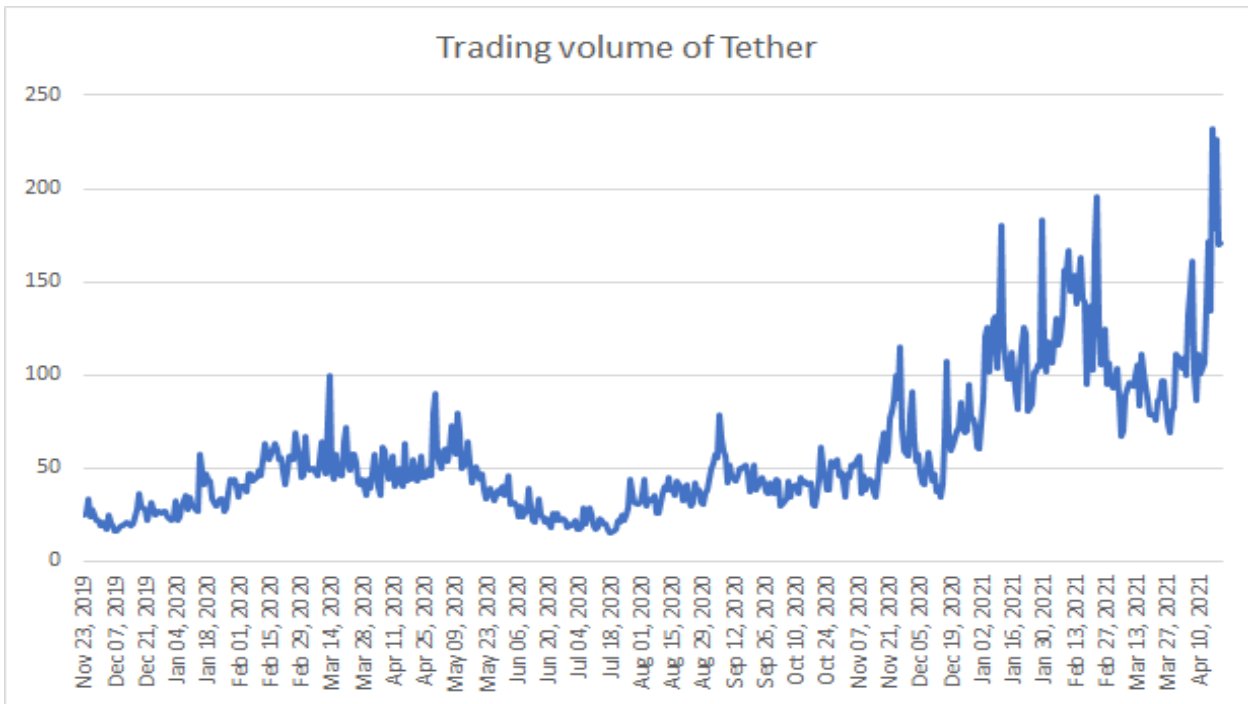
Source: ECB Occasional Paper Series (2020)

Baur and Hoang (2020) make the same point by performing an econometric analysis. They study how the price of Tether reacts when Bitcoin experiences extreme negative returns and they find that Tether reacts inversely to extreme negative Bitcoin returns. This finding is consistent with the hypothesis that stablecoins provide a “safe haven” for Bitcoin investors, a view shared also by other empirical studies, like Wei (2018) and Wang et al. (2020).

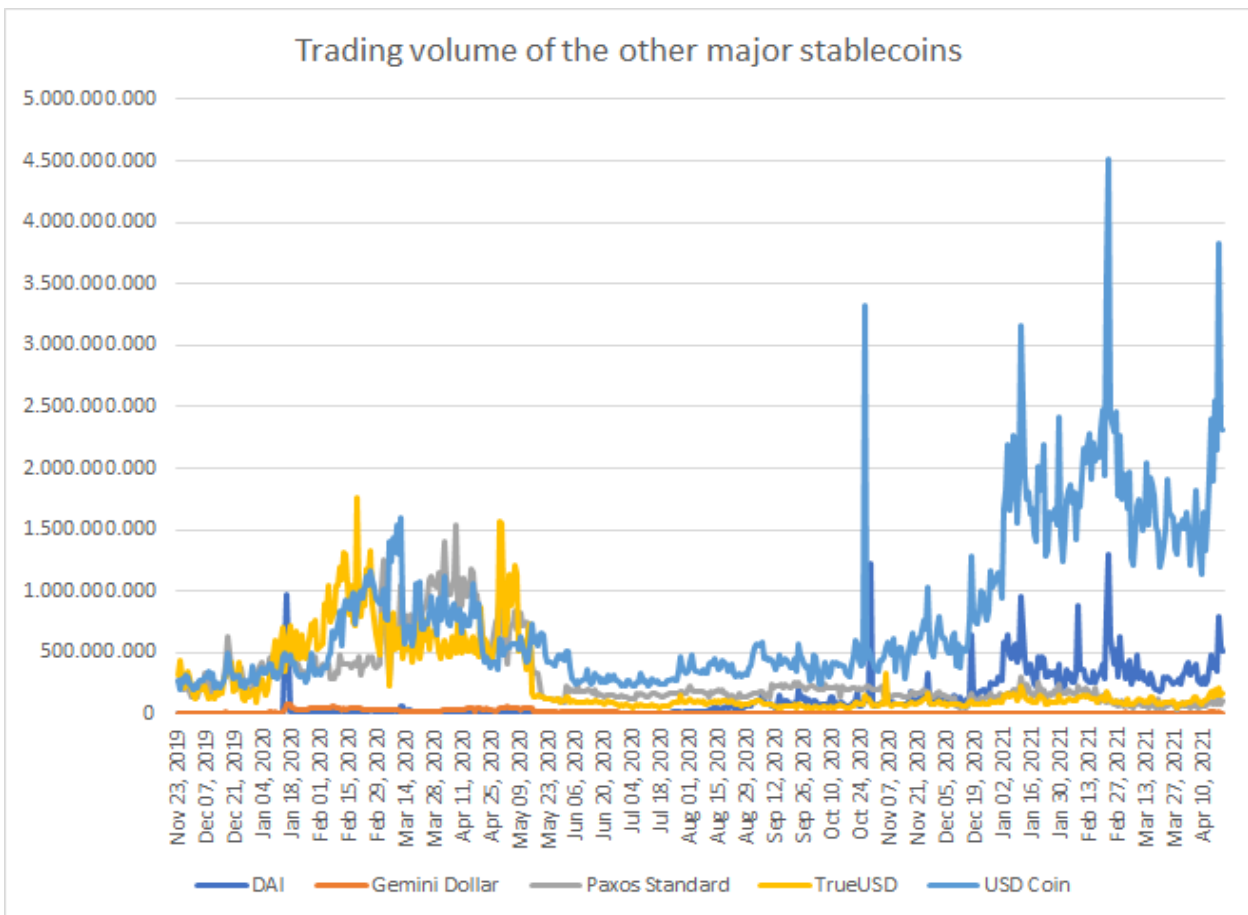
Further insights on the usages of stablecoins can be found in the time series of market capitalisation and trading volumes of the six main stablecoins, which are shown in the following graphs.



Source: authors' elaboration on data retrieved from Coinmarketcap. Data are in billions of dollars.



Source: authors' elaboration on data retrieved from Coinmarketcap. Data are in billions of dollars and are daily.



Source: authors' elaboration on data retrieved from Coinmarketcap. Data are in dollars and are daily.

Notably, both the market capitalisation and the trading volume have experienced a stark rise from the second half of 2020.

2. The typologies of stablecoins

According to our analysis, the main criterion to classify the different types of stablecoins is what underpins the stability of the stablecoin in the reference currency (which in most of the cases is the US dollar). Following Bullmann, Klemm and Pinna (2019), three typologies can be identified:

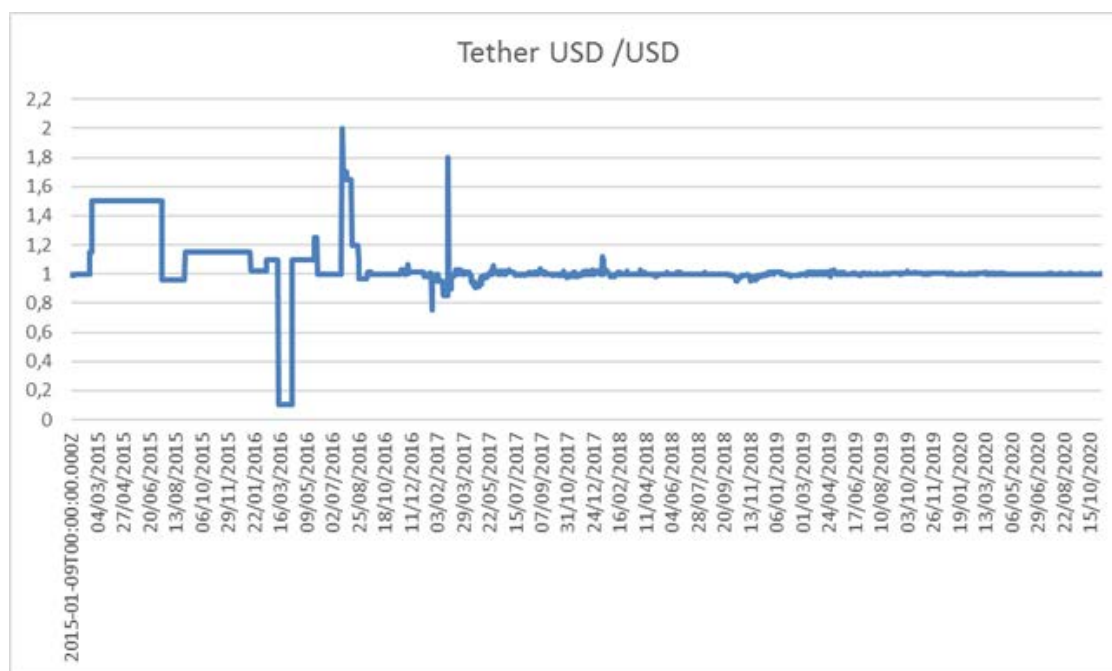
- Fiat tokens (or tokenised funds). This type of stablecoin achieves stability with respect to a reference currency thanks to the fact that it is fully (100%) backed by a collateral made of funds of the official currency, in the form of cash, electronic money or bank deposits. In other words, they are a “tokenisation” of the official currency. To get the tokens, a user must buy them with an equivalent amount of funds, and he can always convert back the tokens at par value redeeming them at the issuer. This mechanism in turn requires an issuer and a custodian for the safekeeping of the funds. For this reason, this case is the most centralized one in the stablecoins ecosystem. The most prominent examples are USD Coin and Paxos Standard, which both tokenize the dollar.
- Collateralised stablecoins. Even this type pursues stability thanks to backing by a collateral. The difference with fiat tokens is that the reserve is constituted by assets other than funds, whose price in the reference currency can fluctuate. These assets can be financial or real (like gold), and each stablecoin arrangement defines the set of collateral eligible to be part of the reserves. This type of stablecoins may either offer redemption at par value or at the variable market value of the collateral at the time of redemption (like for example Tether gold, which offers

redemption at the market value of the amount of gold represented by a unit of the coin). Moreover, the stablecoin arrangements which are part of the former class generally require that the collateral is adjusted by users every time the collateralization ratio falls below a pre-specified threshold, through the so called “margin calls”: the users are requested to post enough collateral until the value is restored. In some cases, if the collateralization ratio falls below the threshold and users do not respond to a margin call, compulsory redemption occurs: the issuer asks the custodian of the reserve assets to liquidate them and buy back from the market and burn the appropriate amount of stablecoins (a penalty fee is generally deducted for the default of the collateral position). Collateralised stablecoins can be further divided in two types:

- (i) off-chain collateralised stablecoins: the assets forming the collateral are traditional assets that are not recorded on the blockchain underlying the tokens, which means that, similarly to fiat tokens, the intervention of a responsible party is needed for the custody and the management of the assets. Therefore, also this case exhibits a certain degree of centralization, maybe even more than fiat tokens, since the goal of stability depends crucially on how the collateral is managed. To get the tokens, users must post eligible collateral. However, in many cases, they can also send funds or non-eligible assets, which are transformed by the custodian (or by the smart contract) into eligible assets on the market.

Box – Tether

The large majority of the volume of stablecoins exchanged are of the second type. In particular, the market leader is Tether, with a market capitalization of over \$48 billion and a daily trading volume of over \$200 billion.¹² Notably, these numbers have exploded during 2020, with the market capitalisation which has increased fourfold. These numbers account respectively for 81% and 95% of the total stablecoin market, which means that Tether is a quasi-monopoly.¹³ The graph below shows that Tether has succeeded in keeping its market price stable with respect to the dollar, particularly since Q2 2017:



Source: Cryptocompare

As we can see, after the first year, volatility has been very low, almost inexistent. However, Tether's market capitalisation is only a small fraction of the one of Bitcoin, which is over 1 trillion.¹⁴ Moreover, the issuer company has recently undergone a lawsuit which has shown that the dollars backing the coins were only in part in the form of bank deposits, while the other part was in the form of a loan to an affiliate company.¹⁵ The lawsuit followed a public debate on whether Tether actually had reserves in dollars for at least the total volume of coins in circulation. The doubts were alimented by the fact that Tether has never provided a fully verifiable audit. The lawsuit has recently ended with a plea bargain between New York 's Attorney General and Tether, which has agreed to pay 18,5 million of dollars in penalties.¹⁶ However, as the graph above shows, this episode has not influenced Tether's stability.

¹² Source : Coinmarketcap

¹³ Source : Bullman et al. (2019)

¹⁴ Source: Coinmarketcap

¹⁵ "Things got weird for stablecoin Tether", Matt Levine, Bloomberg, 26/4/2019

¹⁶ "Provate le accuse sul Tether: stop alle attività di Bitfinex (ma solo nello stato di New York)", Gianfranco Ursino, Il Sole24Ore, 24/02/2021)

(i) On-chain collateralised stablecoins; the assets forming the collateral are cryptoassets, recorded on the same underlying DLT protocol, without the need for an issuer or a custodian. This feature implies therefore a higher degree of decentralization. Generally, end users are responsible for the maintenance of the smart contract governing the arrangement, and can, for example, change the minimum required collateralization or the set of eligible collateral. Given the high volatility of the collateral, these stablecoins are generally overcollateralized (that is, their collateralization ratio is above 100%) to keep stability. To get the tokens, users must post the eligible cryptoassets, according to the minimum collateralization ratio requested. Some projects also rely on so-called secondary units to contract the supply of stablecoins in the process of compulsory redemption (secondary units are described in the following paragraph, as they apply more often to algorithmic stablecoins). One example of on-chain collateralized stablecoin is Dai, which can be purchased in exchange for the cryptoasset Ether with a minimum collateralization of 150%.

- Algorithmic stablecoins. This type markedly distinguishes itself from the other three, since the stabilisation mechanism does not rely upon the presence of a collateral. Instead,

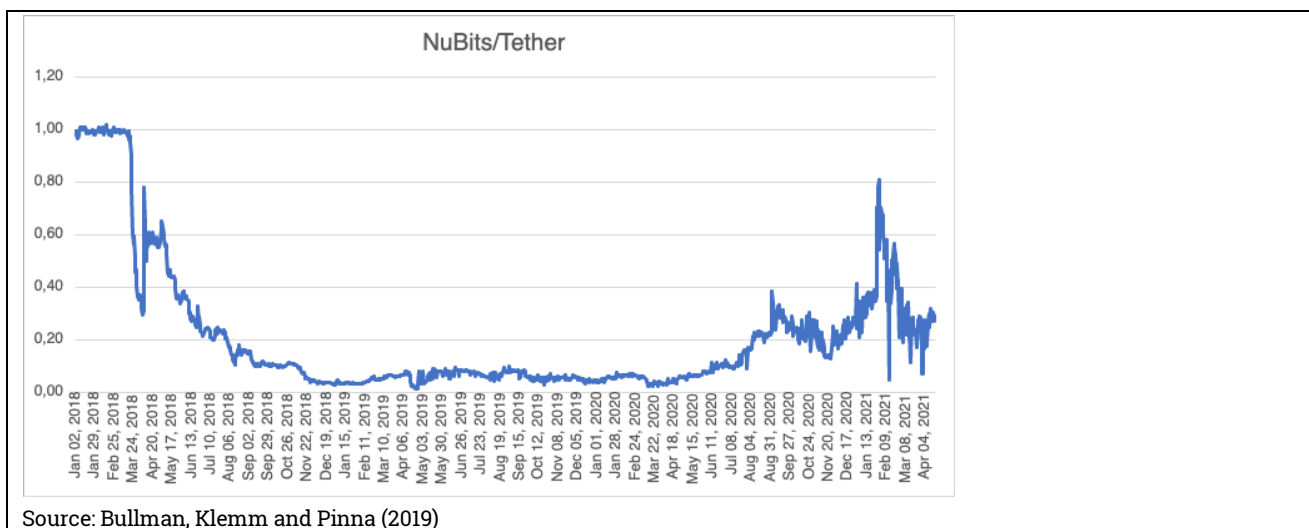
stability is striven for by an algorithm coded in the blockchain, which adjusts automatically the supply of tokens in response to the movements of demand. In theory, then, the system is self-sufficient. When demand for the coins increases, the algorithm creates additional coins and sells them in the market. When demand decreases, instead, the algorithm issues so called “secondary units”, which it sells against coins, to withdraw the latter from circulation. These units are a promise for additional future coins: the holders will gain a certain number of coins when the algorithm increases again the supply. Sometimes, they also allocate governance rights and/or rights on the revenues generated by the arrangement. Then, secondary units exhibit some features that resemble the ones of equity or of bonds (Bullman et al., 2019). Alternatively, the algorithm can use eventual reserves accumulated over time (for example through fees) to withdraw stablecoins from circulation. This system has so far failed to achieve stability. A paradigmatic case is the one of the stablecoin NuBits.

Box – NuBits

NuBits is the most famous example of algorithmic stablecoin. After having reached a peak capitalisation of €12.9 million in January 2018, its market capitalisation now is only €1.46 million.¹⁷ The time series of its market price in terms of dollars is shown in the following graph.

After a first phase in which the system has achieved the goal of parity with respect to the dollar, NuBits has incurred in a first confidence crisis in 2016. After the second crisis in 2018, however, its market price has declined constantly without recovering, and is currently near to 0. This shows clearly the fragilities of its stabilization mechanism, which relies on the “dual token” system we have described above. This system essentially relies only on users’ confidence in the ability of the smart contract to keep the par value, and as such it is easily subject to confidence crises. The weakness of this arrangement is discussed more widely in Section 2.

¹⁷ Source: coinmarketcap.com



Box- the case of Basis

Another interesting case of algorithmic stablecoin is Basis. Depicted as the most promising example of algorithmic stablecoin, the project has been recently shut down and capital has been returned to the investors. The official motivation¹⁸ is the following: bond and share tokens would have been covered by the juridical status of “securities”, implying transfer limits; this implies that the system would have a smaller liquidity in the on-chain auctions, undermining Basis’ stability; moreover, while in general transfer limits last for 1 year, in this case they would be permanent, since the auction of bond and share tokens governed by the monetary policy of Basis would be continuous. These two examples show clearly that currently algorithmic stablecoins are not, at least in their present versions, a viable alternative in the stablecoin ecosystem.

The following table summarizes the main features of the different typologies.

Type	Collateral	Redemption in currency	Centralization (presence of responsible entity)	Analogy with traditional instruments	Examples
Fiat tokens	Funds (cash, electronic money, central bank money)	At par	Centralized	E-money	USD Coin, Paxos Standard
Off- chain collateralised	Assets other than funds (financial or real)	At par or at the collateral price	Centralized	Eurodollars	Tether
On- chain collateralised	Cryptoassets	At par or at the collateral price	Decentralized		Dai
Algorithmic	None	Not redeemable	Decentralized	Algorithmic trading	NuBits
Global stablecoins	Any (in fact, the network)	Any	Centralized		Diem

¹⁸ <https://www.basis.io/>

The typologies of stablecoins in the taxonomy of money

The differences between the typologies can be analysed in the light of the taxonomy of money. If the first three types are claim-based monies, algorithmic stablecoins, being not redeemable, are instead a form of private primary money. This feature markedly distinguishes algorithmic stablecoins from the other typologies. The other typologies can be both fixed value claims and variable value claims, and the former are not backstopped by the government. With respect to the “secondary features” of the taxonomy, all the types are of course digital; they can be wholesale (with restricted access) or retail (accessible to anyone), and they can be transferred peer-to-peer (if the permissionless blockchain is used) or not (if the permissioned blockchain is used).

This discussion also sheds light on the relationship between stablecoins and other forms of private money or financial instrument. Algorithmic stablecoins are very similar to cryptoassets: the only difference is that their algorithm tries to stabilize their market value. The other three types instead resemble other (more traditional) claim based instruments, as a function of the strength of the claim that links them to the reference currency. Fiat tokens, being fully backed by funds, resemble electronic money. Off-chain collateralised stablecoins resemble shares of funds, if they offer redemption at the market value of the collateral (G7, 2019; ECB, 2020; Somoza and Terracciano, 2019); if they offer redemption at par, they resemble forms of quasi-money created by the shadow banking system (Fantacci and Gobbi, 2020). On-chain collateralised stablecoins are instead more distant from traditional claim-based instruments, for two reasons: (i) their backing is formed by cryptoassets and not by traditional assets, and (ii) there is no central entity that is responsible for satisfying the claim and that can be held accountable over the

initiative (indeed, they share this feature with cryptoassets).

2.1. How does the stabilization mechanism work?

The main stabilization mechanism underlying the stablecoins projects, except for algorithmic stablecoins, relies on the presence of the collateral and exploit the arbitrage mechanism. For stablecoins arrangements that offer convertibility at par in currency, the arbitrage mechanism works as follows: if the stablecoin price falls below parity with respect to the reference currency, an arbitrageur can buy stablecoin units in the secondary market and convert them into currency, realizing a profit. Similarly, if the stablecoin price rises above parity, an arbitrageur can buy new coins from the issuer and sell them in the market, again realizing a profit.

To the extent that there exists a sufficiently deep and liquid secondary market, and to the extent that the issuer can credibly commit to maintain the parity, these forces push the value of the stablecoin to parity. Lyons and Viswanath-Natraj (2020) have tested empirically this mechanism for Tether. To identify the causal effect of arbitrage on price, the authors exploit a quasi-natural experiment: the introduction of Tether on the Ethereum blockchain, in April 2019. Since the Ethereum blockchain has lower transaction costs than the previous trading platform, this resulted in an increase in investors. Consistently with the arbitrage hypothesis, this change has been followed by a statistically significant and large decline in the size of price deviations of the peg and in a decline in the half-life of deviations from 6 days to 3 days.

This mechanism works best for fiat tokens, since the price of the collateral in terms of the reference currency does not fluctuate. For collateralised stablecoins redeemable at variable value, arbitrageurs must also take into account the risk of a fall in the collateral price

(and then the risk to incur in losses), and then may be less incentivized to exploit the arbitrage opportunity deriving from a market price of the stablecoin below par value, if they expect the collateral price to fall. This explains why collateralised stablecoins are generally more volatile than fiat tokens. In general, the safer and more liquid are the collateral assets, the less volatile is the stablecoin. To reduce this problem, some collateralised stablecoins also rely on other “secondary” stabilisation tools. One of them, used for example by the stablecoin Dai, is the so called “stability fee”, which is an interest on the amount of coins held by the users, that must be paid by the users at the moment of redemption: in a period when DAI is trading at a discount, a rise in the stability fee induces an increase in DAI redemptions, shrinking supply and pushing DAI’s price towards parity. Other secondary stabilisation tools involve active interventions of the issuer or the smart contract in the stablecoin secondary market, to shrink supply when needed (stablecoins are purchased in the market using reserves accumulated over time in various forms, for example charging fees or selling secondary units to the users), or the establishment of redemption limits to avoid runs.¹⁹

For stablecoins that offer redemption at the going market value of the assets that back the coins, the arbitrage mechanism is still at work, but can only stabilize the price of the stablecoin around the price of the collateral: when the price of the coin is lower than the collateral price, an arbitrageur can buy stablecoin units in the secondary market and convert them into currency, realising a profit. Therefore, the price of the stablecoin will be stable with respect to the reference currency only to the extent that

the price of the collateral is stable with respect to the reference currency.

Algorithmic stablecoins, instead, have pursued (without success, as we have seen) another way, relying on the simple relationship between supply and demand and on the “dual token” system.

2.2. Diem: a global stablecoin

The most important example of stablecoin, the one that has provoked the current great public interest on stablecoins, is surely Diem, the stablecoin officially announced by Facebook on 18 June 2019. The G7 Working Group on stablecoins classifies Diem under another distinct typology: the “global stablecoins”. Global stablecoins are defined as “stablecoin initiatives built on an existing – large and/or cross-border – customer base”, and therefore having “the potential to scale rapidly to achieve a global or other substantial footprint” (G7, 2019).²⁰

Details on how this new stablecoin will work have been outlined in the White Paper.²¹ A first version of the White Paper was published in June 2019. It provided for the introduction of a single stablecoin, previously named Libra, backed by assets denominated in a basket of official currencies. The project immediately raised several regulatory concerns by regulators and policy makers. The most common one was the danger that a widespread use of Libra in substitution of national currencies would have undermined monetary policy and sovereignty of countries experiencing the substitution. In response to this concern, the White Paper has been amended: the 2.0 version of it has been published in April 2020.

First of all, Diem will be governed by the Diem Association, which is a nonprofit organization

¹⁹ These and other secondary stabilisation tools are described more in detail by Bullmann, Klemm and Pinna (2019) and by Elendner et al. (2020).

²⁰ A substantially equivalent definition is provided by the Financial Stability Board, according to which a global stablecoin is “a stablecoin with a potential reach and adoption across multiple jurisdictions and the potential to

achieve substantial volume” (FSB, 2020), and by the International Monetary Fund, according to which a global stablecoin is “a type of private digital money, issued by Big Techs with the potential for widespread adoption” (IMF, 2020, p. 9)

²¹ “White Paper 2.0”, Diem Association Members

whose members, in addition to Facebook, are important companies in the fields of payment services, telecommunications, and fintech among others, like Uber, Spotify and Iliad. Notably, some important initial members, like eBay, Mastercard, Visa, Paypal and Vodafone have abandoned the project, because of the fear that Diem won't be able to satisfy all the regulatory requirements.

The governance of the association is on a peer-to-peer basis, with all the members having equal power in electing the board of directors and in voting on the policies. In addition, all major policy decisions need a supermajority of 2/3 of the votes to be approved. This setting clearly reveals the attempt to preserve the Diem project from the bad reputation Facebook has gained in the last years, particularly due to the Cambridge Analytica scandal on the use of personal data. The Association is based in Geneva, Switzerland.

Similarly, to the majority of existing stablecoins, Diem is built to achieve stability thanks to a backing formed by a reserve of "risk-free assets". In the new version of the project, in addition to the multi-currency version of Diem, there are also single currency versions of it, each backed by assets denominated in an official currency, like DiemUSD backed by the dollar or DiemEUR backed by the euro. This change is meant, according to the White Paper, to address the concerns about the damages to monetary policy and sovereignty for countries in which the project has success: indeed, the single-currency versions of Diem would be more directly linked to the respective official currencies. However, as we will see in detail in the next section, these concerns remain even in the new version of the project. At the moment, the project is to tokenise only the major currencies, like dollar, euro and sterling, but the Paper envisages the possibility of augmenting their number.

Each single currency Diem coin is backed 1:1 by cash and highly liquid and safe assets, like

short-term government securities, denominated in the currency of reference. The creation and withdrawal of the coins are entirely determined by market demand: coins are created when a customer converts an equivalent amount of currency in it, and it is destroyed whenever the customer withdraws currency. However, end users are not allowed to interact directly with the Diem Association. Only Designated Dealers (DDs) interact with the Association and will be responsible for the transfer of the Diem coins and of the currency. On the consumer side, DDs interact with the Virtual Asset Service Providers (VASPs), which are responsible to provide financial services to end users, like the management of the digital wallets and of the exchanges with other users. The proceedings of the sale of the coins are partly held in cash or cash equivalent form (20%) and partly invested in very liquid and safe assets denominated in the same currency of reference (80%). The interests gained from the holding of the assets (which, given the type of assets in the reserve, will presumably be very low or maybe even negative, according to the current situation) will be reinvested in the project, users receiving no interest. The multi-currency version of Diem is then simply made by aggregating the single-currency stablecoins, using fixed nominal weights, similarly to the Special Drawing Rights (SDR) issued by the IMF. This means that the price of multi-currency Diem with respect to each of the currencies of the basket is free to fluctuate. In addition to the assets backing the coins, the Association also holds a capital buffer to further protect customers from losses. This capital is generated through retained earnings or through raising capital from investors.

Despite the 100% backing and the capital buffer, it is recognized the possibility of stress scenarios (like runs) in which the high demand for redemption of the coins could force the Association to incur losses due to fire sales; in extreme cases, the Association could even be unable to satisfy all the redemption requests. In

these cases, two mechanisms have been planned: (i) redemption stays: the redemptions are delayed, to allow the Association to get the necessary liquidity by the sale of the assets; (ii) early redemption haircuts: instant redemptions are penalized by a small loss. The effectiveness of such mechanisms is doubtful: both of them would seriously undermine the credibility of the stablecoin, triggering further redemptions. Indeed, these appear to be much weaker protections against “runs” compared to those that apply to existing forms of electronic money and that we discussed above (p. 12). It is highly questionable that the technical advantages of Diem in terms of usability can compensate its fragility as a reliable and stable means of exchange.

Finally, the blockchain infrastructure underlying the coins is of a permissioned type. The reason is that, as we have explained above, permissionless blockchain projects are not scalable given the present technology, and so they are not viable to support a high volume of transactions. While the first version of the White Paper expressed the desire to move on a permissionless blockchain when technology would have made it possible, in the White Paper 2.0 this possibility has been discarded, confirming that the blockchain will be of a permissioned type. The degree of centralization that this implies further weakens Diem in the comparison with traditional forms of electronic money.

The crucial novelty that the Diem project brings to the fore, with respect to the already existing stablecoins, does not lie then on technological or technical aspects but is instead related to its global dimension and relevance. The project can “leverage” on the 2,45 billion of Facebook users all around the world, which implies that it has the potential to exit the cryptoasset niche and affect the international monetary system. According to Benigno, Schilling and Uhlig (2019), even if global currencies (in the sense of currencies used outside the borders of their

countries) are not a new phenomenon, the novelty lies in the fact that Diem “seeks to become a means of payment, thus directly competing with national currencies for transaction purposes.” This is reflected in the goals expressed in the White Paper, which are essentially two: to improve cross border payments, making them faster and cheaper, and to foster financial inclusion, addressing the 1,7 billion of people around the globe who do not have a bank account.

The publication of the White Paper has opened a debate on the nature of the Diem project. While the single-currency Diem coins are simply a new type of off-chain fully collateralized stablecoin, the multi-currency version of Diem, backed by assets denominated in a basket of currencies and not in a single one, differentiates itself from existing stablecoins. Another distinctive feature of Diem is the explicit role given to the Designated Dealer as intermediaries between the Association and the final users. This role is akin to the one played by the “Authorised Participants” in Exchange Traded Funds; for this reason, some have compared Diem to ETFs (Somoza and Terracciano, 2019; IOSCO, 2020).

3. Swot Analysis

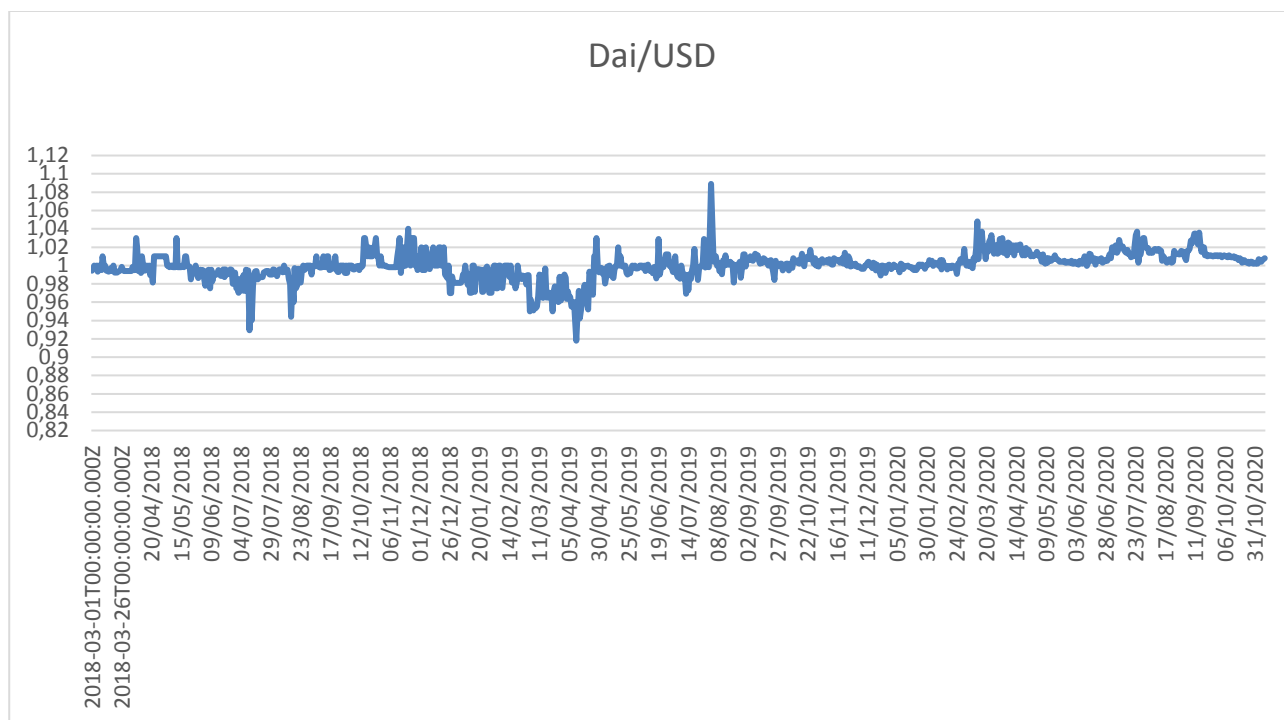
Let's now move to the analysis of the main strengths/weaknesses, and opportunities/threats of stablecoins in general and of Diem in particular.

3.1. Strengths

General strengths

Stability

The first thing to notice is that, except for algorithmic stablecoins, stablecoins have generally succeeded in stabilising their market price: that is, the stabilisation mechanisms have worked. Stablecoins then overcame the main problem of the first generation of cryptoassets. This is true not only for fiat tokens, but to a certain extent also for off-chain collateralised stablecoins and even for on-chain collateralised stablecoins (which, besides algorithmic stablecoins, are the ones that are likely to display the greater volatility). The following graph shows the time series of the market price in dollars for the on chain collateralised stablecoin Dai:



Source: Cryptocompare

The graph clearly shows that Dai has generally been stable with respect to the dollar, with an historical volatility of 28%. This result is even more remarkable if we consider that at the same time the collateral, the cryptocurrency Ether, has lost more than the 90% of its value from its highest quotation.²²The following figure shows that volatility has been low for all the major existing stablecoins.

²² Source: Berentsen and Schär (2019)

(1 Jan. 2019 – 30 June 2020)

■ Minimum ■ 3rd quartile
■ 1st quartile ■ Maximum
■ Median



Source: ECB (2020). Volatility is computed as the standard deviation of daily percentage changes of rolling seven days windows.

This strength relates to information insensitivity as a desirable feature of a means of payment, as we have explained in Section 1. The more stablecoins are able to maintain a peg on an official numeraire, the more they are information insensitive.

Customer preferences

As underlined by Dirk Niepelt on the CEPR Policy Portal Vox²³, there are some reasons related to the nature of the tokens that make the latter a potentially efficient medium of exchange. The primary reason is low transaction costs, due to the fact that the DLT infrastructure allows peer-to-peer transactions,

²³ Dirk Niepelt, "Libra paves the way for central bank digital currency", VOX, CEPR Policy Portal, 12/9/2019

without the involvement of an intermediary. However, this applies only to permissionless DLTs.

A more general point is made by Adrian and Mancini-Griffoli (2019). The point is related to the customers' preferences as users of services, and is related more generally to electronic money, as opposed to physical money or bank money. As the authors write, "payments are not just the act of extinguishing a debt: they are an interaction, a fundamentally social experience. Payments can be more fun in e-money²⁴ than in paper bills. This is where the world's big tech companies and fintech start-ups come in: they are experts at delivering convenient, attractive, low-cost, and trusted services to a large network of customers", and also at designing user-friendly and user-centred services. A related consideration is that "e-money is better integrated into our digital lives relative to bank money or central bank money." For these reasons, "e-money adoption could take off for its relative attractiveness as a means of payment."

Specific strengths

On-chain collateralised stablecoins

There are then some strengths which are peculiar to on-chain collateralised stablecoins, and are thus advantages over the other three types. The first advantage is transparency: since the assets backing the coins are recorded on the DLT protocol, their presence can be verified by each user at any time. The second advantage is a higher degree of decentralization, given that no third responsible party is needed for the system to operate.

Diem

As for Diem, its main strength is surely the possibility of exploiting network effects, thanks

to the already existing user base made by more than 2 billion people all over the world. Network effects can be defined as the effect for which "the utility that a user derives from consumption of a good increases with the number of other agents consuming the (same) good" (Katz et al., 1985). Network effects are enhanced when customers have access, in addition to the monetary services, to other complementary services offered inside the network, like the ones related to social media in the case of Facebook.²⁵ Mancini Griffoli and Tobias (2019) underline that these effects are of paramount importance, because they can amplify small objective differences in features between alternative instruments. Network externalities are indeed one of the most important reasons why, according to the literature, an international currency, when it becomes dominant in the international monetary system, is so difficult to displace, so that the IMS shows a high degree of inertia.²⁶ As explained by Monacelli (2019)²⁷, Diem has the potential to succeed from the demand side, because trust in the project can be fostered by the network effect. This potential is particularly strong in areas where the access to bank accounts is rare and difficult while the access to internet is widespread and easy, since the availability of Diem wallets would bypass the banking system as such. This is a classic case of "advantage of backwardness": countries with less developed banking and financial systems can more easily experiment the success of some stablecoins projects.

²⁴ The term "e-money" is used by the authors in a wide sense, also encompassing stablecoins.

²⁵ In other words, monetary services can be bundled to other services. We will return to this point in Section 4,

when we will address the possible "unbundling" and "rebundling" of the roles of money.

²⁶ See, among the others, Eichengreen, Mehl and Chitu (2018).

²⁷ Op. cit.

3.2. Weaknesses

General weaknesses

The DLT

The first general weakness of stablecoins is the weakness of their underlying infrastructure, that is the DLT. In general, central validation systems are at the current state more efficient than decentralized ones based on the blockchain technology. More specifically, an important result has been achieved by Brunnermaier (2019), who has proved a “blockchain trilemma”: a digital ledger cannot be simultaneously (i) self-sufficient, (ii) rent-free, and (iii) resource efficient. The intuition behind this result is simple and is based on the fact that “the central problem in (decentralized) digital record-keeping is how to ensure agents come to a consensus on the true history of events.” This requires a system of incentives for record keepers not to behave dishonestly. Incentives can be provided in 3 ways: (i) external punishment (which makes the ledger not self-sufficient, since it requires an external entity to decide and implement the punishment), (ii) loss of rents caused by users abandoning the network following a fraud (which requires the presence of a rent), or (iii) a physical resource cost to write on the ledger, which makes frauds not profitable *ex ante* (which implies resource inefficiency). The way depends on the “consensus algorithm” of the blockchain, that is on the rule through which the agents can reach a consensus on the true state of the world. The fully decentralized Bitcoin blockchain uses the so called “proof of work” algorithm²⁸, which applies the resource cost system. Consequently, it is not resource efficient. This poses a fundamental limit to the scalability of such a model, and it explains why permissioned/private blockchains have been developed.

²⁸ In a proof-of-work blockchain, voting power on the true state of the ledger is allocated in proportion to the

The nature of stablecoins

The main specific weakness of stablecoins is nevertheless related to what we have said in Section 1 about their nature: notwithstanding the stability achieved, they have not taken off as a means of payment, but they merely represent another instrument in the cryptoasset market. In other words, stablecoins have solved the “stable” part, but not yet the “coin” part. Bullmann et al. (2019) argue that “a number of obstacles related to the lack of accountable institutions hinder the usability of stablecoins beyond a core user base motivated by a strong preference for privacy and an aversion to the scrutiny of trusted institutions.” Interestingly, as reported by the authors, the only retail market in which stablecoins have been used so far is the market of the “distributed applications” or “d’Apps”, which are applications running on the DLT infrastructure and offering services connecting users and providers without the need for intermediaries. This market too is characterized by participants “often motivated by an ideological aversion to standard payment channels and/or by an interest in hiding their identities” (Bullmann et al., 2019). Calle and Zalles (2019) argue that the current limited usage of stablecoins is due to three main reasons:

(i) immature regulatory approach: “cryptocurrencies or stablecoins not built with regulatory regimes or structure in mind will not be adopted by regulated businesses as settlement mechanisms”;

(ii) reluctance of auditors: “major auditing firms may find current stablecoin issuers too risky to assess, and so the task has fallen on less reputable entities. Methods to ensure collateralization and proof of reserves remain uncertain, and the audit reports covering this information may not hold the legitimacy to

processing power that each user provides to solve computational problems.

provide guarantees. Moreover, collateral is often held by multiple fragmented entities”;

(iii) lack of institutional focus: “issuers must understand how the stablecoins will be used in order to optimize design for, say, institutional vs. retail transactions.”

In more general terms, as we have explained in Section 1, the stablecoins’ failure in taking off as a payment instrument lie in the weaknesses of private monies. The classic reference in monetary economics on the controversy between private vs public money is Hayek (1990), who advocates free competition in the issuance of money, since competitive pressures would force issuers to provide “better” monies, in terms of stable purchasing power. As we have explained in Section 1, this view has been challenged by both theory and history. The surge in private digital currencies of the last years has renewed the interest about this topic in the scientific literature. Recent works study the same issue through microfounded general equilibrium models, where the issuers are profit-maximizing firms. Villaverde and Sanches (2019) study competition among private fiat currencies. They find that, for some properties of the cost function related to the money issuance, there are equilibria consistent with price stability, partially confirming Hayek’s view. However, these equilibria arise only under restrictive conditions on the cost function. Moreover, they also find that, when considering social welfare, the market is unable to provide the socially optimal quantity of money. This result arises because of the inability of private entrepreneurs to internalize the externalities associated with the issuance of the tokens: the tokens have welfare effects, given by their ability to facilitate trade between agents, that are not reflected in the profit maximization problem of the issuer, and then that the issuer does not take into account when deciding how many tokens to issue. This last result fits well in the general and well-known economic theory on market failures in providing public goods.

Moreover, as clarified by Fantacci (2019), even before considering its plausibility, the Hayekian argument can only be invoked if a necessary condition for competition is present: the freedom of enterprise, in the form of the management of a discretionary and accountable entity governing the arrangement. This condition is not satisfied by algorithmic stablecoins and by the forms of on-chain collateralised stablecoins which are totally governed by the smart contract.

The risks

Stablecoins reflect the risks of the reserve assets backing them, of the custodian holding the reserve assets and of the entity issuing the coins. These risks can be of four types:

(i) liquidity risk: it is the risk that the collateral assets cannot be quickly liquidated to satisfy a redemption request. It depends on the liquidity of the market of the collateral asset;

(ii) default risk: it is the risk that the reserve assets are insufficient to satisfy the redemption requests;

(iii) market risk: it is the risk to suffer losses on the reserve assets;

(iv) exchange rate risk: it can arise in two forms. First of all, it arises when the reserve assets are denominated in a currency (or currencies) different from the one in which the coins are redeemable. Secondly, a further exchange rate risk is suffered by the stablecoins user located in a country in which the domestic unit of account is different from the one of the currency in which the coins are redeemable.

To minimize these risks, the most common assets chosen to form the collateral are bank deposits, due to their safety and liquidity; however, these are not, of course, completely risk-free assets, as banks can fail, and above all are not generally protected by deposit insurance schemes, since the issuers of the coins are treated as wholesale creditors.

Moreover, given that the interests gained on the collateral assets are retained by the issuer, and given that the current level of interest rates in safe assets is very low, sometimes even negative (and this question the same profitability of stablecoins' business model), the issuer could have the incentives to invest in riskier assets²⁹ to increase profits.

As noted by the report of the ECB on stablecoins (ECB, 2020), a crucial issue is who ultimately bears the investment risk. If the stablecoin arrangement does not guarantee redemption at a fixed value, then the stablecoin's value fluctuates with the value of the collateral, and therefore it is the end users who bear all the risks. In this case, as we said in Section 1, the stablecoin arrangement would be more similar to a fund. If the issuer commits to offer redemption at a fixed value, as it happens in the majority of existing cases, then he suffers from eventual losses, and then end users' confidence depends on their assessment of the issuer's loss absorption capacity.

The working of the arbitrage mechanism

For the arbitrage mechanism to work smoothly, a sufficiently deep and liquid secondary market is needed. But this necessary condition is far from granted. As we have seen in the financial crisis of 2007-2008, liquidity in financial markets can suddenly "dry up", and this phenomenon can be driven by rapid changes in agents' expectations. This calls for a role of the central bank as lender of last resort. Indeed, during the financial crisis of 2007-2008, the markets for some assets literally vanished in a matter of few days. In the US, the Fed was obliged to open several new lending facilities to sustain these markets. However, it is unclear whether central banks would be willing to backstop the stablecoin market. Indeed, it does not seem plausible, unless stablecoin issuers are prepared to accept the same regulation and

oversight that applies to institutions that already benefit from access to central bank emergency funds.

Specific weaknesses

Fiat tokens and off chain collateralised stablecoins

According to Berentsen and Schär (2019), the main issues related to fiat tokens and off-chain collateralised stablecoins are transparency, censorship resistance and profitability. From what we said about Tether in Section 1, transparency is not always a feature of the stablecoin projects. The lack of transparency can undermine trust, which in turn can impair stability. As to the second point, "holding reserves off-chain in a bank account is a central point of attack" (Berentsen and Schär, 2019), and governments can simply shut down the project by freezing the reserves. This issue is not present in on-chain collateralised stablecoins, because the assets are recorded on the DLT protocol. Finally, stability requires that the assets forming the collateral must be very liquid and safe, but this means that they pay low or zero interests: hence, profitability becomes an issue.

Another problem is that, for both fiat tokens and off-chain collateralised stablecoins, the system is expensive to operate, given that a substantial amount of safe and liquid assets must be committed to stabilize the price, and this raises doubts on the scalability of the model (Eichengreen, 2019).

Fiat tokens are stable to the extent that users trust both the issuing company and the custodian of the collateral. This condition is all but granted, as we have seen. Moreover, trust is further undermined by the lack of a clearly applicable regulation. Off-chain collateralised stablecoins require as well trust in the issuer and the custodian. Since the backing is formed

²⁹ This issue could be solved through a regulatory requirement forcing the Association to invest only in

certain types of assets. The regulatory issues are discussed in Section 3.

by assets whose value in terms of the currency of reference fluctuates, this type is more likely to display volatility than fiat tokens. There is therefore a higher possibility of confidence crises and runs, especially if the collateralization ratio falls below 100%. Indeed, in this case, if some coin holders start to doubt about the credibility of the peg, they will start to sell their coins. The issuer, to prevent their price from falling, will have to purchase them using its reserves. But, since the reserves are limited, they could not be sufficient to stop the run, with the result that the peg could collapse. This problem is familiar to any monetary policymaker whose central bank has sought to peg an exchange rate while holding reserves that are only a fraction of its liabilities³⁰).

On-chain collateralised stablecoins

On-chain collateralised stablecoins are by construction, given the nature of the collateral formed by cryptoassets, which are highly volatile, more likely to exhibit volatility than the previous types, and then are even more likely to foster confidence crises and runs. This aspect is emphasized by the fact that the prices of cryptocurrencies are generally highly correlated, also limiting the benefits of the diversification of the coins in the collateral (Calle and Zalles, 2019). Moreover, to reduce this risk, these coins must then be overcollateralized, which means that they are less efficient than the other two.

Algorithmic stablecoins

Algorithmic stablecoins, as explained in Section 1, are at present more a theoretical possibility than a concrete alternative in the stablecoins ecosystem. They have not proved to keep their market price stable. In principle, the idea of adjusting the supply of coins in response to variations of demand is correct. One of the reasons why Bitcoin has proven to be largely

unstable is that its supply schedule is fixed and cannot react to demand shocks. However, the problems lie in the mechanism used to make these adjustments. When demand decreases, the smart contract issues bonds (the “secondary units”) and sells them in exchange for coins, to withdraw the latter from circulation. The bonds are claims on additional future coins, made available when the system will increase supply. This mechanism can therefore display a divergent equilibrium driven by self-fulfilling expectations, in which these claims become non-credible and hence there is no incentive to buy the bonds. This problem is very well known in monetary economics by the study of speculative attacks on pegged exchange rates, particularly in emerging markets. And even without considering this possibility, the system depends on success at continuously enlarging the network of users, since otherwise there would be no resources to pay bondholders (Eichengreen, 2019). This characteristic is a distinctive feature of Ponzi schemes. Moreover, even if the approach of adjusting supply to meet demand resembles, in theory, the one followed by central banks, relying on a completely fixed rule encoded in the smart contract might not be the right response to all the various shocks hitting the economy. Central banks, while adopting over time a stricter commitment regime, have always maintained a certain degree of flexibility in their monetary policy, to be able to react rapidly to unexpected situations.

Diem

Diem of course presents the same weaknesses we have outlined so far, and in particular the weaknesses related to off-chain collateralised stablecoins. More specifically, the architecture delineated in the (revised) White Paper leaves some open issues.

Firstly, the sources of the capital buffer are unclear.³¹ In theory, the capital buffer should be

³⁰ iEichengreen (2018): “The stablecoin myth”, Project Syndicate, 11 September 2018

³¹ Eichengreen, Viswanath-Natraj (2020): “Libra still needs more baking”, VoxEU CEPR Policy Portal

partly subscribed by the members of the Diem Association, in return for a share of the gains generated by the business, and partly supplemented by the interests earned on the reserve assets. However, on the one hand it is unclear whether the fees will provide an adequate remuneration, since, to be competitive, they should be set at very low levels (indeed, competition in the sector is tough), and they should also be shared between Designated Dealers and Virtual Assets Service Providers. On the other hand, interest rates on safe assets are currently very low (sometimes negative).

Secondly, as we have explained before, the key mechanism that guarantees the stability of a stablecoin's market price is arbitrage. In the first place, arbitrage can be conducted by the Designated Dealers, in their interaction with both the Diem Association and the market. But this activity is limited by the amount of liquidity in the pockets of the Designated Dealers. To overcome this problem, a forward market in Diem is needed. But as we said above, such a forward market calls for a role of the central bank as lender of last resort, and it is unclear whether the Fed or the ECB would be willing to provide emergency liquidity in such a market whenever needed. In the case of Diem, moreover, there are two additional problems: (i) given the size of the project, the capitalization that such a market would need to work smoothly is very big; (ii) the international dimension of the project could pose the problem of which central bank is deemed to intervene, for example if the intervention is needed in the market for the multi-currency version of Diem.

The doubts on the possibility to enjoy the central bank backstop seem to be shared by the Diem Association. Indeed, in case of a run on the Diem Reserve, as we have seen in Section 1, the White Paper outlines the possibility of using emergency devices like *redemption stays*

(delays in redemption) and *early redemption haircuts* (additional fees for redemption). But these devices recall the ones used by American banks during the free banking era that we have described earlier.³²As we said in Section 1, the free banking era was characterized by a series of bankruptcies and financial crises which have led to the creation of the Federal Reserve System.

Further risks depend on the specificity of the architecture of a global stablecoin arrangement, which, as we have seen, can be very complex. Specific weaknesses are located in the interlinkages existing between the various functions and activities in a GSC arrangement, which can be very complex. Additionally, some of the functions of a GSC may be shared with other existing GSCs or cryptoassets (for example, the infrastructures used to transfer coins or interact with users), resulting in vulnerabilities potentially triggering spillover effects (FSB, 2020).

3.3. Opportunities

General opportunities

The domestic monetary systems

There is little role for private digital currencies in the domestic dimension (apart their use for investment purposes). First of all, other digital, cheap and fast means of payment are already present, like bank deposits, debit and credit cards, and other digital payment service providers. From a macroeconomic point of view, the Hayekian argument of competition among different monies driving an equilibrium with lower inflation seems not very relevant, since independent central banks in advanced economies have succeeded in keeping inflation low and stable in the last 40 years, and since one of the biggest macroeconomic problems of the last 10 years (at least in advanced countries) has been at the opposite the threat of deflation. Moreover, most stablecoins are pegged to

³² Ibidem.

official currencies and are not therefore in the position of offering a better hedge against the loss of purchasing power.

The International Monetary System

The main opportunities that stablecoins open derive instead from the weaknesses of the present *international* monetary system. In particular, there are two main problems undermining current payment systems: (i) the lack of access to financial services for a consistent percentage of the world population, and (ii) the inefficiency of cross border payments, especially the retail ones, which are still very expensive and slow.

Regarding the first point, globally, 1.7 billion people are unbanked or underserved with respect to financial services, and the percentage of them in developing countries is above 50% (CPMI, 2020).

Regarding the second point, the World Bank has estimated that, on average, the cost of remittances of the immigrant workers, which represent the largest part of person-to-person cross-border retail payments (CPMI, 2018) absorbs the 6,82% of the amount sent³³.

A global stablecoin can flatten the multi-layered banking structure and shorten the payment chain associated with cross-border transfers. It could allow peer-to-peer instant cross-border payments, bypassing the banking system and making an international payment exactly the same as a domestic one. For these reasons, the G7 Working Group on stablecoins argues that stablecoins can “enable a wide range of payments and serve as a gateway to other financial services, replicating the role of transaction accounts, which are a stepping stone to broader financial inclusion”, and also “have the potential to increase competition by challenging the market dominance of

incumbent financial institutions” (G7, 2019). In sum, stablecoins could foster financial inclusion and cheaper and faster cross-border (retail) transfers.

However, four considerations must be made.

Firstly, a non-negligible portion of the costs related to cross-border payments are represented by legal, regulatory and compliance costs, like compliance to Anti-Money Laundering and Counter Terrorism Financing (AML/CTF) regulations (FSB, 2020a). These regulations are necessary to maintain financial integrity and to protect the global financial system from abuses.

Secondly, these costs are amplified by the presence of differences across the jurisdictions involved, something that of course has nothing to do with the availability of more efficient payment systems.

Thirdly, the international organizations are currently addressing the issue of cross-border payments in order to make them more efficient and cheaper. The Financial Stability Board has recently published a document presenting the stage 3 of its roadmap to enhance cross-border payments, developed in collaboration with the Committee on Payments and Market Infrastructures.³⁴

Fourthly, concerning financial inclusion, it must be said that this goal can be achieved in many other ways. An important example is the Indian case: in the last 5 years, 350 million people in India have obtained a bank account, following the government efforts to lower the costs of knowing your customer through the Aadhar project³⁵ (which is a 12-digit unique identity number that can be obtained voluntarily, based on their biometric and demographic data).

³³ Source: <https://remittanceprices.worldbank.org/en>

³⁴ FSB, “Enhancing Cross-border Payments, Stage 3 roadmap”, October 2020

³⁵ <https://uidai.gov.in/>

Diem

Diem presents some peculiar opportunities deriving from its global relevance. Antonio Fatás and Beatrice Weder di Mauro³⁶, reasoning in the same framework of the previous argument, argue that “if adopted widely, a global currency might mitigate some of the weaknesses in the international monetary system, for example the dominance of the US dollar and the difficulties in external adjustments that this causes.” More specifically, if used for invoicing international trade, “it could create more stable trade receipts and payments”, while if used for pricing financial assets it would provide diversification against capital flow volatility and balance-sheet risks.

The general point raised by this article is very important. As recognized by the Governor of the Bank of England Mark Carney during his last speech at Jackson Hole³⁷, “while the world economy is being reordered, the US dollar remains as important as when Bretton Woods collapsed.” This means that “US developments have significant spillovers onto both the trade performance and the financial conditions of countries even with relatively limited direct exposure to the US economy. These dynamics are now increasing the risks of a global liquidity trap.” In simple words, the problem lies in the lack of a global currency, distinct from the national ones, in a globalized economy. The dominance of the dollar as international means of settlement and international reserve currency can be synthesized by two figures:

(i) A large share of the world trade is invoiced and settled in dollar. Gopinath (2015) estimates that this share is near to the 40% of the world trade. Moreover, the dollar share in invoicing is much higher than the share of US export and import on the world export and import: Gopinath (2015) estimates that the dollar’s share

as an invoicing currency for imported goods is approximately 4.7 times the share of U.S. goods in imports, while the same multiple for the euro is only 1.2.

(ii) As documented by Gourinchas and Rey (2007) and Gourinchas, Rey and Gavillot (2017), the gross liability position of the US is mainly composed by safe assets, like government debt, and is mainly denominated in dollars. Moreover, the dollars account for 64% of worldwide official foreign exchange reserves, with the euro in second place at 20% (Gopinath and Stein, 2020).

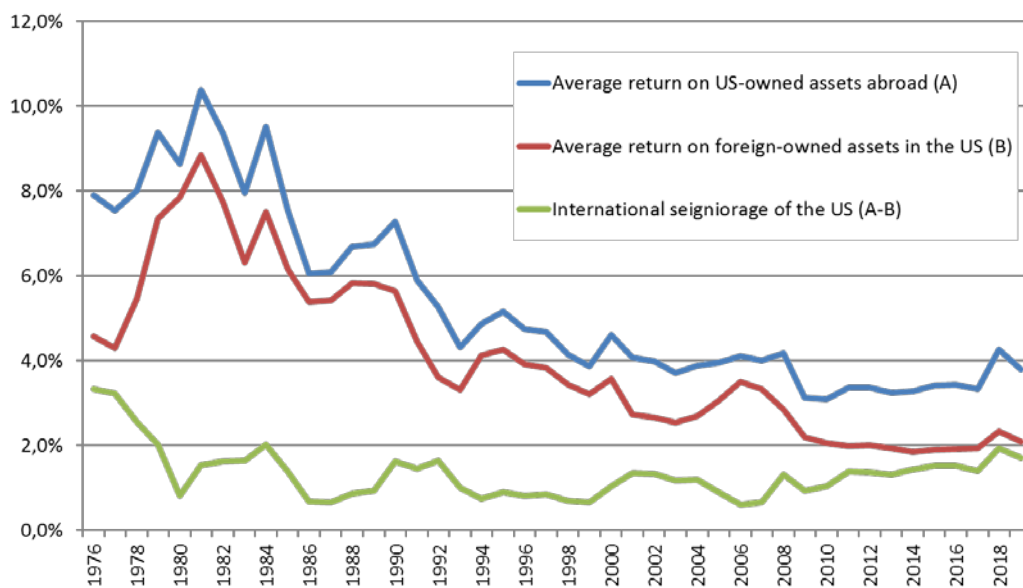
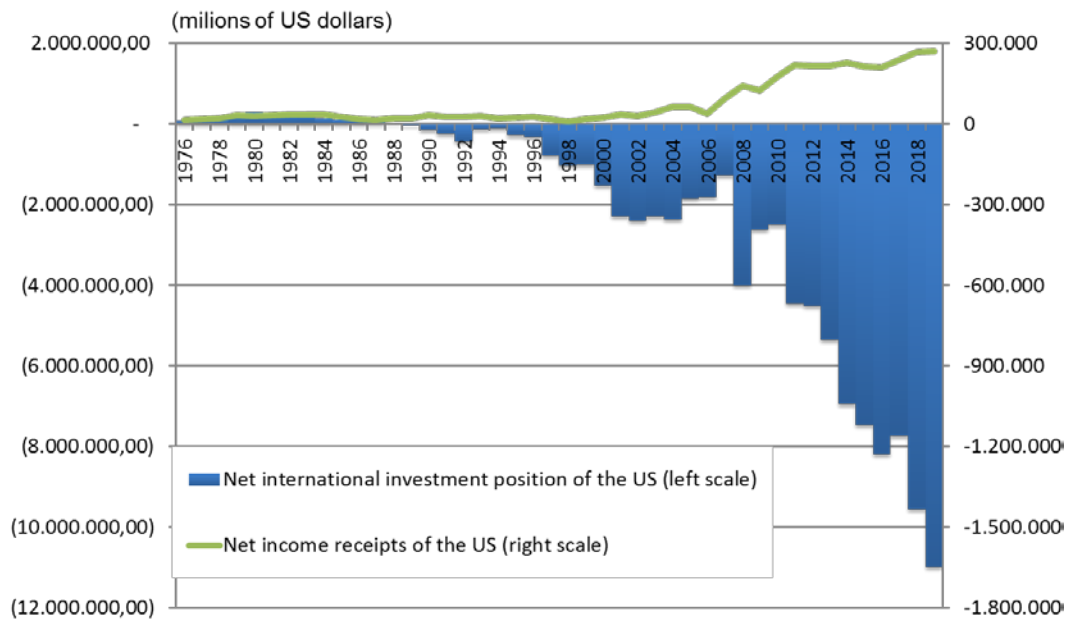
The relevant issue that the Facebook’s proposal puts on the ground, then, concerns the architecture of the International Monetary System (IMS). After the financial crisis of 2007-2008, the debate on the flaws of the present IMS and on how to reform it, which seemed outdated, has risen again. In particular, a number of authors, like Obstfeld (2011) and Farhi, Gourinchas and Rey (2011), have argued that the IMS suffers from the presence of a new form of Triffin dilemma in a “fiscal” form, arising from the role of the dollar as the international reserve currency. In the new formulation of the dilemma, emerging market economies (EMEs) demand dollar denominated assets as a store of value, and in particular US government debt, as the safest store of value; supply of these assets thus relies on the capacity of United States to sustain large public deficits, and thus on its fiscal capacity, which is certainly large but not unlimited. As demand grows with the growth of EMEs and the size of the US economy shrinks relative to the world’s economy, United States faces a dilemma: either to accommodate demand, at the cost of undermining the safeness of its debt, or to not to do it, with the risk of causing a world’s recession.

³⁶ Antonio Fatás and Beatrice Weder di Mauro, “The benefits of a global digital currency”, VOX, CEPR Policy Portal, 30/8/2019

³⁷ Mark Carney (2019), “The Growing Challenges for Monetary Policy in the current International Monetary and Financial System”, speech given at the Jackson Hole meeting.

The dilemma was originally formulated by Triffin (1961) about the instability of the Bretton Woods system: in particular, he predicted that the commitment of the US to provide dollars to the rest of the world was not compatible with the dollar's parity with gold. Few years later, this theory was criticized by Despres, Kindleberger and Salant (1966), who provided what they called a "minority view", according to which there was no instability in the system: the US

was simply acting as a "world banker", holding risky foreign assets on the asset side and safe dollar assets on the liability side, hence doing maturity transformation exactly like a common bank. And earning seigniorage on the difference between the return that they earn on their foreign investments and the interest that they pay, on average, on their more liquid foreign liabilities (as shown in the two graphs below).



As we said before, this view is confirmed by the recent empirical works: the US indeed acts as a bank, issuing liquid, short term safe assets and

holding long term, illiquid foreign assets, thus providing both liquidity and insurance to the rest of the world. Farhi and Maggiori (2018) have

shown that the Triffin view and the minority view are not incompatible: the Triffin dilemma in their model arises precisely from this banking activity, and manifests itself as the possibility of a self-fulfilling confidence crisis hitting the US external debt.

This interpretation of the Triffin dilemma, then, emphasizing the working of the dollar as a safe asset, is naturally connected with the recent literature on the safe asset shortage: see for example Caballero, Farhi and Gourinchas (2016) and Caballero and Farhi (2017). According to this strand of literature, there is a global shortage of safe assets which results in a decrease in the world natural real interest rate. As the nominal rate hits the zero lower bound, the safe asset market may be unable to clear ("safety trap"), and then adjustment takes place through a reduction of the aggregate demand, meaning that the world economy is trapped in an equilibrium below its potential. This is exactly the global liquidity trap cited by Carney in his speech at Jackson Hole. Moreover, this chronic shortage of safe assets drives potentially destabilizing phenomena, as the one we have seen in place before the financial crisis of 2007: the US financial system has been incentivized to manufacture and issue a large amount of "private label" pseudo-safe assets, like ABS and MBS, until the financial market crashed (Caballero, Farhi and Gourinchas, 2017). This sequence of events can thus be read through the lenses of the Triffin dilemma: the growing demand triggered an overissuance of assets, relative to repaying capacity of the debtor country, which in turn undermined the assets' safeness.

Summing up, these phenomena had the effect of pushing down interest rates, with the result of an increasing risk of a global liquidity trap. The announcement of Diem can be the occasion to think about the reform of the international monetary system, to solve this less and less sustainable asymmetry. We will return to this point in Section 4.

Raskin, Saleh and Yermack (2019) argue that a private digital currency can have a positive impact on countries with weak and unreliable monetary institutions and a highly volatile currency. The intuition is the following: private digital currencies discipline monetary policy, resulting in a lower level of inflation, and encouraging investments. Higher investments, in turn, generate higher tax revenues, so that even a "selfish" government is incentivized not to forbid the usage of the digital currency. In equilibrium, the country displays higher investments and lower inflation, and thus a higher social welfare. Also, this argument is based on the same idea that, as it happens for any market, also the monetary market benefits from some form of competition. An important thing to note is that in this model the benefits of a global cryptocurrency derive from its being an *alternative asset*, and not an alternative *means of payment*.

The line of reasoning followed by this article, and dating back to the work of Hayek, is the idea that in the monetary field the optimum can be reached through competition between alternative currencies. However, it can be argued that, when (crypto)currencies are regarded not only as means of exchange but also (and perhaps primarily) as investment assets, competition will favour not those who have a stable value, but those who have an increasing value and hence offer higher returns to the investors. Far from yielding a "stable coin", currency competition will thus be exposed to self-fulfilling expectations and divergent equilibria.

Moreover, monetary history shows that a better outcome can be reached through the articulation of *complementary* currencies, rather than through the competition between alternative currencies. Complementarity among currencies has to be intended in functional terms: different functions can (and, it can be argued, should) be performed by different monies. In the light of what we have said about

the Triffin dilemma, the most relevant distinction is the one between national and international currencies. Historical examples of international monies not being a national money are Charlemagne's Libra and the "ecu de marc" at the Lyon fairs in the Renaissance. At the local level, the same principle is applied by local complementary currencies, like the Wir in Switzerland, which support and supplement the official currencies by easing the circulation of goods in local networks of firms.³⁸

3.4. Threats

General threats

Since stablecoins are a new financial instrument, the possible threats that must be considered are in general related to monetary and financial stability. The assessment of the specific risks depends of course on the different hypotheses that can be made regarding their use. At the current state, in which the trading volumes are relatively low and stablecoins are mainly used to store gains made in the cryptoasset market, these projects do not pose particular threats to monetary and financial stability. The judgement changes in scenarios where stablecoins provide attractive means of payment or store of value alternatives (maybe through attractive remuneration rates). In these cases, the possibility of liquidity runs, which we have discussed when presenting the weaknesses of stablecoins, could become a threat to financial stability.

A recent paper published by the ECB (ECB, 2020) examines the main risks connected to the two possibilities.

Threats connected to stablecoins' use as means of payment

³⁸ These arguments have been widely developed in Amato, M., Fantacci, L., (2011), "The end of finance", Polity Press, Cambridge, in Amato, M., Fantacci, L. (2014), "Saving the market from capitalism", Polity Press, Cambridge, and in Amato, M., Fantacci, L. (2020), "Complementary currencies",

(i) A significant use of stablecoins as a new payment method could reduce banks' income derived from the charge of fee and commissions for payments and transfers and may also erode revenues that banks currently obtain from the payment card business. Bank profitability, in an economy characterized by very low (sometimes negative) interest rates, could be severely affected,³⁹ with possible negative effects on lending and then on economic growth.

(ii) Moreover, like any payment system, stablecoin arrangements can be a source of large-scale disruption and even systemic risk. The safety, efficiency and integrity of payment systems are crucial not only from a microeconomic point of view, but also from a macroeconomic perspective, since their disruption could adversely impact the real economy and amplify financial shocks.

(iii) Finally, possible threats to financial integrity must be considered: the decentralization of transaction verification, brought by the usage of DLT as transfer platform, may undermine the enforcement of anti-money laundering and counter-terrorism financing obligations (Adrian and Mancini-Griffoli, 2019).

Threats connected to stablecoins' use as store of value

But the most serious consequences arise under the possibility of stablecoins being used as an alternative store of value. In this case, indeed, monetary policy and its transmission mechanisms could be significantly impaired, essentially for four reasons:

(i) first of all, a non-interest-bearing stablecoin could set a zero effective lower bound on policy

Handbook of the History of Money and Currency, Springer, Singapore.

³⁹ The majority of economists share the forecast that interest rates in advanced economies will remain low for a long time, perhaps years.

rates:⁴⁰widespread investment into stablecoins could induce substitution out of assets yielding negative interest, up to the point where further cuts in policy rates no longer transmit to other interest rates in the economy (this is the interest rate channel of monetary policy transmission). If instead the stablecoin pays an interest, this interest would probably reflect the interest earned on the reserve assets. If the reserve backing the coins is only formed by assets denominated in the domestic currency, this return is probably close to the interest rates on domestic currency deposits, meaning that monetary policy is virtually unaffected; but if the reserve basket is composed by multiple currencies, this makes the link between

monetary policy and the interest rates on stablecoins' holdings weaker.

(ii) Secondly, deposit funding for banks could be affected, with the possibility of hitting banks' intermediation capacity: this clearly affects the channels of monetary policy passing through bank lending, especially in bank-centred countries (like the European ones). However, it must be noted that, on the other hand, if banks become increasingly dependent on wholesale funding, this could amplify the transmission, since wholesale deposits are generally more responsive to interest rate movements than retail deposits.

Box – Is bank disintermediation really a threat?

The possible consequences on bank deposits need some specific considerations. Apart from their effects on monetary policy, the possibility that stablecoin initiatives trigger a substitution of consumers and firms away from bank deposits is often mentioned as one of the most important threats of these projects. Indeed, the argument goes, even if the proceeds from the issuance of stablecoins were mostly reinvested in bank deposits, sterilizing the substitution, this would result in generally stable retail deposits being replaced with (much more fluid) institutional deposits, and hence in a much more volatile source of funding for banks. There are two considerations to be made about this argument. The first is that the loss of deposits does not undermine the ability of banks to provide lending. Indeed, the process of lending is not that banks collect deposits and then lend them out, but exactly the other way round: banks make loans and in doing this they create deposits.⁴¹ Of course, if deposits, once created, are immediately and entirely transformed into stablecoins, this would leave the banking system with the liabilities without the corresponding assets, weakening their balance sheet. The second consideration is that, as argued by Brunnermeier and Niepelt (2019), the central bank can (if it wants) always insulate the economy from the risk of bank runs by providing funding to banks, in various forms (refinancing operations, standing facilities and so on), substituting the deposits with their reserves.

(iii) Thirdly, stablecoins might affect the demand for central bank liquidity (i.e. reserves) and thereby the central bank's control of money market rates.⁴²

(iv) Fourthly, the collateralization of stablecoins would imply a large increase in safe asset demand. This "might affect the risk-free yield curve, asset prices generally and collateral valuation, with potential

⁴⁰ Before the financial crisis of 2007, the common thought was that the zero lower bound was an impassable limit for monetary policy. This has been proved wrong, as after the crisis the interest rates of some safe assets (like short term government securities) have become negative, and this situation persists even today.

⁴¹ For a more detailed explanation of the process, see McLeay, Radia and Thomas (2014).

⁴² Instead, the possible decrease in demand for central bank liquidity arising from the "payment scenario" would not necessarily affect the ability of central bank to move money market rates, as long as stablecoin reserves are invested in assets denominated in the same currency, which then respond to policy rates.

implications for rate volatility in repo markets and the pass through of monetary policy to prices” (ECB, 2020). Moreover, monetary policy space could be reduced, as the set of eligible assets for some kinds of monetary policy operations (like quantitative easing programs, or refinancing operations, which need collateral) shrinks.

Another consequence of a widespread stablecoin usage as store of value is the wealth effect: even small variations in the stablecoin value might cause significant fluctuations in users’ wealth, with possible impacts on economic activity (FSB, 2020). Indeed, as we have seen, even the most stable stablecoins have displayed some volatility.

Other threats

A further possibility is that besides being used as a store of value, the stablecoin starts to be used also in financial intermediation: new financial intermediaries could emerge, borrowing and lending stablecoin tokens, and thus “creating” money. This would further weaken the interest channel of monetary policy, since the interest charged in stablecoin units would be less responsive to the policy rates (G7, 2019).

Another important risk to consider is the possibility of (digital) dollarization. In countries with weak monetary institutions and with a tendency to experiment high inflation, households and firms may completely substitute the domestic currency with stablecoins in all the three functions of money. Of course, the possibility of dollarization is not created by the existence of stablecoins, and some countries have already experienced it in the past. But the digital nature of cryptocurrencies clearly makes the switch much easier from the operational point of view. Moreover, the probability of dollarization is higher if stablecoins imply the growth of

remittances, since there is a link between the domestic availability of a foreign currency and substitution into that currency (IMF, 2020).⁴³ Some could argue that the higher possibility of (digital) dollarization is actually a strength, and not a risk, of stablecoins, in the sense that stablecoins could provide an additional, and easier to access, store of value for people in high-inflation and financially unstable countries to avoid the cost of inflation. However, from a macroeconomic point of view, dollarization can be very costly. At the level of long-term growth, dollarization can undermine the financial development of the country involved and therefore can have adverse effect on economic growth.⁴⁴ At the business cycle level, on the one hand it can make the financial system more exposed to exchange rate shocks, while on the other hand it can impair macroeconomic stabilization policies needed to react to economic shocks:^{45 46} monetary policy transmission would be clearly undermined if the usage of stablecoins takes off in substitution to the official domestic currency of a country. Moreover, this would also result in the loss of seignorage for the public monetary authority and its shift into private hands. If in advanced countries seignorage is very small, in some developing countries it still accounts for a non-negligible share of public resources, and therefore its loss would be a substantial cost for public finances. Seignorage revenues for stablecoin issuers derive from the possibility to invest the money forming the collateral in assets with positive return, while coin holders are not in general paid interests. David Lipton,

⁴³ Historical examples are the ones of Cambodia, in which dollar usage increased rapidly following large foreign aid flows in dollar during the country’s transition to democracy (Kubo, 2017), and of El Salvador and Tajikistan, where partial dollarization phenomena have been observed after a growth in remittances.

⁴⁴ See, for example, Edwards and Magendzo (2001).

⁴⁵ See, for example, Schmitt-Grohè and Uribe (2001).

⁴⁶ The counter argument is the Hayekian view that we have outlined above, according to which this possibility would impose discipline on the central banks of these countries, resulting in a lower inflation in equilibrium.

managing director at the IMF, proposes then⁴⁷ to address this issue by promoting competition among coin issuers, so that the latter are eventually forced to pay interests.

Another challenge for financial stability is determined by the possibility that banks and other financial institutions enter the stablecoins' ecosystem, by providing services related to stablecoins' core functions (stabilization, transfer and interaction with customers). Such services could range from custody and management of collateral assets, to brokerage, hedging and market making in the secondary market, to providing wallets to users. This would clearly expose these institutions to a range of risks connected to the ones present in the stablecoin's ecosystem, meaning that the latter could have (possibly negative) spillover effects on the whole financial market.

Other challenges and risks that the uptake of stablecoins may pose are the following (G7, 2019):

- cyber and operational risks;
- market integrity. This point relates on the fairness and the transparency of price formation. Some stablecoin designs give designated market-makers (like the Designated Dealers in the Diem case) a significant power in the determination of the price, and this can result in abuses. By the same token, businesses operating in the stablecoin system can face incentives to misbehave, for example to provide false information to influence the market;
- data protection;
- customers/investors protection: "concerns over information and consumer understanding could be exacerbated by misleading marketing and the potential for misselling, as has

been observed in the wider cryptoasset market";

- tax compliance. Concerning this point, there are two main challenges. The first is the uncertainty about the legal status of stablecoins, and therefore about the tax treatment on transactions in stablecoins. The second is that stablecoins can facilitate tax avoidance. These problems are obviously amplified by anonymity (which is a key feature of the cryptoasset world).

Diem

The challenges and risks that we have outlined clearly apply to global stablecoins like Diem as well. However, for global stablecoins, some of the risks that at the current state are only theoretical can become concrete. In particular, the scenarios in which a GSC expands outside the cryptoasset market, becoming a widely used alternative means of payment and /or store of value, are more likely and the volumes involved are much bigger, which of course enhances the financial stability concerns. Moreover, the risks are amplified by the international dimension. The peculiar threats of a GSC concern then the international macro-finance.

These threats have been exposed by the Financial Stability Board (FSB, 2020), the International Monetary Fund (IMF, 2020) the G7 Working Group on stablecoins (G7, 2019) and the work of Adachi, Cominetta, Kaufmann, and van der Kraaij (2020). Let's synthetize the main issues that these reports have underlined.

First of all, the dimension of a GSC's reserve implies that a run on it would trigger a large-scale fire sale of assets by the issuer with the potential to have a negative contagion effect on the whole financial market. As a large part of the reserve would be invested in deposits and short-term government securities, the two most

⁴⁷ David Lipton, "Digital upstarts need to play by the same rules as everyone else", Financial Times, 15/07/2019

affected sectors would be banks and the short-term government debt (the latter would experience a sudden spike in interest rates). The contagion effect could also internationalize, as a run on a GSC is likely to imply large cross border capital flows. A key role is played by the market-makers (in the case of Diem, the Designated Dealers), since the stabilization mechanism is fragile if those market makers can exit the market. A run can be triggered not only by economic factors, but also by bad expectations and hence also by any event that actually or supposedly damages the reputation of the issuer (and as we have said, Facebook's reputation is one of the weak points of the Diem project). Moreover, negative spillovers on the financial market are possible even in the absence of a run, simply as a result of changes in the composition of the GSC reserve.

Adachi, Cominetta, Kaufmann, and van der Kraaij (2020) have tried to quantify the relevance of these effects for the euro area. In the extreme-case scenario of a widespread use of Diem as means of payment and store of value, the global size of the Diem Reserve could reach almost €3 trillion of assets⁴⁸, with about 10% of these stemming from users in the euro area (on the basis of users of Facebook in the eurozone). This means that Diem could become one of Europe's largest money market funds.⁴⁹ Also, the Diem Reserve holding of the total value of general government debt of euro area countries rated A+ or above with a maturity of less than three months could reach 30%, which means that a sudden process of fire sales could exercise a relevant pressure on the stability of euro countries' debt.

In this case, too, the possible international macro-financial threats depend on the scenario

about the usage of the GSC. Four different scenarios can be considered:

- (i) niche use of the GSC as vehicle currency for cross-border payments;
- (ii) the GSC becomes more used inside countries as means of payment, store of value and/ or unit of account; that is, some countries suffer partial or total digital dollarization phenomena;
- (iii) global adoption: a single GSC becomes commonly adopted in many countries and replaces the local currencies, and is also widely used for international transactions;
- (iv) global adoption with multipolarity: a few major GSCs compete internationally.

There are different channels through which a GSC could affect macro-financial stability. Moreover, these channels can interact in a complex manner.

A first channel is represented by the international influences on domestic monetary policy of countries. In the third scenario, if a global stablecoin were to be used as an invoicing currency in international trade, relative prices would be less affected by domestic monetary policy, undermining the exchange rate channel of monetary policy.⁵⁰ At the same time, domestic prices could be affected by foreign monetary policy or exchange rate shocks. Another problem is that GSCs could affect the transmission of monetary policy by reshaping patterns of business cycle synchronization (they could facilitate economic activities and trade links organized around Big Techs), which may reduce the ability of monetary policy to respond to shocks. In general, for a country in which a foreign currency is used, its ability to address shocks is

⁴⁸ This simulation has been done taking as a reference the reserve asset's size of Yu'E Bao, which is the money market fund operated by Chinese company Ant Financial, part of the Alibaba Group.

⁴⁹ To have an idea, euro area MMFs held euro-denominated assets were valued around €600 billion in the third quarter of 2019 (source: Adachi et al., 2019)

⁵⁰ Single currency stablecoins, instead, do not present this problem.

linked to its degree of business cycle synchronisation with the currency issuer, as it has to rely on the monetary policy of the latter. This means that, in a case of global adoption, countries would be subject to the monetary stance of a private firm, whose objectives are different to the public policy objectives of central banks. Apart from the well-known challenge represented by the fact that a common monetary policy could be unfit for the different business cycle the countries involved, this situation would be unacceptable for monetary authorities. Even without considering this extreme possibility, a global adoption of a GSC could make international capital flows easier, something which sharpens the well-known Mundell trilemma, according to which it is impossible to have monetary policy autonomy, free exchange rates and freedom of capital movements together, making the conduct of monetary policy harder. In case of the fourth scenario, multipolarity can be characterized by country currency blocs or currency competition within each country. In the first case, the consequences are the same as the one explained above. In the second case, there is a further challenge: multiple currencies could complicate exchange rate anchoring, if the domestic currency is still in use. Indeed, historically, countries who have experienced forms of currency substitution have reacted by trying to manage the bilateral exchange rate, to stabilize domestic balance sheets exposed to the foreign currency. This policy could be harder or even impossible in presence of multiple currency substitution.

Another channel is the impact on the structure of international credit and financial intermediation. First of all, currency substitution may result in funding and solvency risks arising from currency mismatch. We have seen this challenge at work both in the financial crisis of 2007-2008 and in the current coronavirus crisis, when the Federal Reserve has enhanced its Swap Lines with multiple central banks to provide liquidity to foreign

institutions exposed in dollars. But this safety net would not be at disposal in case the role of the dollar is performed by a GSC. Secondly, GSCs could affect credit intermediation for two reasons: (i) currency substitution in the banking system. However, this does not necessarily reduce credit provision, as matching the denominations of their assets with that of their liabilities, in the GSC, allows local banks to hedge currency risk (even if it may transform itself into credit risk, if local borrowers lack revenue denominated in the foreign currency); (ii) higher integration in the international capital markets, due to lower cross border frictions: this could reduce the role of banks in international lending and borrowing. If these effects would be negligible under the first scenario, funding and solvency risks could be relevant under the second scenario. Under the third scenario, domestic financial conditions would become more influenced by global factors, something that would reinforce the trend towards global financial cycles (Agrippino and Rey, 2020). More interconnectedness could result in higher probability of systemic crises. Under the fourth scenario, currency competition within countries could make local financial conditions more unstable, also because of the lower switching costs that stablecoins have.

A third channel is represented by cross border capital flows. The presence of GSCs can reduce transaction costs and frictions in international capital markets and allow people to bypass the traditional channels through which capital movement restrictions are implemented, amplifying volumes and volatility of cross border flows. Under the third scenario, in particular, the adoption of a common GSC would remove exchange and redenomination risks. Moreover, a GSC bundled with a social media platform (like Facebook) could amplify herd behaviour, which is a powerful source of instability in financial markets. A GSC having a high number of users in countries other than the one issuing the currencies backing it, would

as well result in significant flows into and out of the backing currencies. The same flows could be experimented by emerging market economies, if under periods of stress its citizens come to view the GSC arrangement as a reliable store of value, moving away from investments denominated in local currency. This point is very important and it relates to the more general issue of the dangers of capital flows, which has gained a prominent position in the public debate after the financial crisis of 2007-2008. The crisis has indeed shown that too much freedom allowed to capital movements can be a source of risk for the global financial system, both as a cause of shocks and as a facilitator of their international contagion.

A fourth channel is represented by the effects of GSCs on international reserves. In particular, a GSC requires, as we have seen, to be backed by a large amount of safe assets. The resulting higher demand of safe assets would aggravate the global safe asset scarcity, and therefore the global liquidity trap. Under the scenario of global adoption, economic agents (people, firms and central banks) could start to ask assets denominated in the GSC unit of account. Gopinath and Stein (2020) and Chahrour and

Valchev (2018) have indeed shown that there is a close link between the unit of account and means of payment functions of an international money and the demand of assets denominated in that money. In this case, the GSC issuer may have a conflict of interest in deciding the supply of reserves: the supply that meets the demand may differ from the supply that would maximize the issuer's profits. This point is related to inability of the market to provide the socially optimal quantity of a public good which we have explained above, when analysing the weaknesses of stablecoins as private monies.

A final challenge posed by global stablecoins is the one of market contestability: global stablecoin issuers have the potential to become natural monopolies, due to high fixed costs, the network effect and the benefits of access to customers' data, in addition to the ability to create barriers to entry (Adrian and Mancini-Griffoli, 2019).

The following table summarizes the main strengths, weaknesses, opportunities and threats related to stablecoins in general and to the different typologies of stablecoins in particular.

	Strengths	Weaknesses	Opportunities	Threats
General	<ul style="list-style-type: none"> -stability -low transaction costs -customer preferences 	<ul style="list-style-type: none"> -inefficiency of DLT -limited usage as means of payment -liquidity, default, market and exchange rate risks -the smooth functioning of the arbitrage mechanism requires a liquid and deep secondary market and the backstop of the central bank 	<ul style="list-style-type: none"> -lack of financial services for large part of the world population -inefficiency of cross border payments 	<ul style="list-style-type: none"> -negative effects on bank profitability, and then on lending and growth; -risk of payment system disruption; -decentralization of transactions can undermine financial integrity; -monetary policy transmission can be impaired -wealth effects due to variations in stablecoins value -digital dollarization - possibility of negative spillover effects on the financial market; -cyber and operational risks; -market integrity; -data protection; - customers/investors protection
Fiat tokens		<ul style="list-style-type: none"> -transparency -censorship resistance -profitability -the arrangement requires trust on the central party -scalability 		
Off-chain collateralised		<ul style="list-style-type: none"> -transparency -censorship resistance -profitability 		

		<ul style="list-style-type: none"> -the arrangement requires trust on the central party -possibility of confidence crises and runs 		
On-chain collateralised	<ul style="list-style-type: none"> -transparency -decentralization 	<ul style="list-style-type: none"> -due to the high volatility of the collateral assets, the risk of confidence crises and runs is high -capital inefficiency (overcollateralization is required) 		
Algorithmic		<ul style="list-style-type: none"> --weakness of the "dual token" system - the algorithm cannot react to unexpected situations 		
Diem (GSC)	Network effect	<ul style="list-style-type: none"> -the sources of the capital buffer are unclear; -possibility of redemption stays and early redemption haircuts; -Facebook's bad reputation; -weaknesses located in the interlinkages between the various functions and activities; -possible negative spillover effects to or from other GSCs or cryptoassets 	<ul style="list-style-type: none"> -mitigate the dollar dominance as the main international currency and the problems with this dominance 	<p>The threats are connected to the possible negative effects on macro-financial stability, due to different channels:</p> <ul style="list-style-type: none"> -a run on the GSC would results in a fire sale of assets and then in a contagion effect on the international financial markets; -impact on monetary policy of the countries, which could lose the ability to respond to external shocks and could be subject to the monetary stance of a private firm; -impact on international credit and

				<p>financial intermediation; -impact on cross-border capital flows: the GSC could enhance capital flows volatility; -impact on international reserves: the GSC would aggravate the global safe asset scarcity. If the GSC become the global supplier of reserves, the global demand of reserves could be different from the amount of reserves that maximise the issuer's profit.</p>
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4. Regulation

In this section we consider the main regulatory issues regarding stablecoins in general and Diem in particular. Legal certainty is a prerequisite for every successful stablecoin project, since ambiguities can lead to a loss of confidence. As a starting point, we may consider, following the G7 Working Group on stablecoins, some of the consequences deriving from the challenges analysed above. In particular:

- A crucial part of the legal certainty passes through the regulation of market makers, since the latter are the actors responsible for the success of the value stabilization through the arbitrage mechanism. Moreover, “the legal obligations of market makers must be defined to ensure liquidity at all times.”
- To ensure financial integrity, stablecoins must comply with the international standards for AML/CFT and countering the financing of the proliferation of weapons of mass destruction (CPF). The international standard-setting body for AML/CFT/CPF is the Financial Action Task Force (FATF), which in 2019 has clarified that its recommendations apply also to financial activities involving virtual assets and virtual asset service providers.⁵¹
- To protect the safety, efficiency and integrity of the payment system, the references are the *Principles for financial market infrastructures* (PFMI) developed by the Committee on Payments and Market Infrastructures (CPMI) and the International Organization of Securities Commissions (IOSCO).⁵²

- Concerning cyber and operational risks, the International Organization for Standardization (ISO) and the International Electrotechnical Commission (IEC) provide standards for information security management.

Another major challenge, as we have seen, is the possibility of runs. To protect customers from this risk, David Lipton, managing director of the IMF⁵³, proposes two alternative solutions. One is to “regulate stablecoins like money market funds that guarantee fixed nominal returns, requiring providers to maintain sufficient liquidity and capital.” The other is to allow stablecoin issuers to hold central bank reserves. This second solution leads, as we will explain in Section 4, to a form of indirect CBDC.

There is a wide consensus on the idea that regulations on stablecoins must follow from the definition of their nature and the functions and activities in which they are involved, according to the principle “same business, same risks, same rules”. As we have seen in Section 1, there are still uncertainty and disagreement about this point. The G7 Working Group on stablecoins has stated that, in general, “for the legal characterisation of stablecoins, the most relevant determinative factors are whether or not they are considered as a money equivalent; categorised as contractual claims or property rights; or entail a right against an issuer or against underlying assets.” (G7, 2019). In particular, what is crucial is the *economic function* of stablecoins, and then above all the first factor cited, that is whether or not they can be considered money. This of course depends on how they are structured. At the current state, as we have seen in Section 1, stablecoins are closer to cryptoassets than to monetary instruments. The most common approach of cryptoasset classification based on economic

⁵¹ See Financial Action Task Force (2019), “Guidance for a risk-based approach to virtual assets and virtual asset service providers”, and Financial Action Task Force (2019), “International Standards on Combating Money Laundering and the Financing of Terrorism & Proliferation”

⁵² Committee on Payments and Market Infrastructures and the International Organization of Securities Commissions (2012), “Principles for financial market infrastructures”, CPMI Papers, no 101

⁵³ Art. cit.

function, inspired by the one adopted by the Swiss authorities and followed by many other authorities in their guidance, is to identify three categories (which are not mutually exclusive): “securities assets”, which are cryptoassets analogous to securities and therefore fall within the jurisdiction on securities; “payment assets”, which are meant to be used in payments and therefore fall within the regulation on payments institutions; and “utility assets”, which are intended to provide digital access to an application or service.⁵⁴

More specifically, the Financial Stability Board (FSB, 2020) has recently conducted a survey among the jurisdictions of its member countries, in order to collect the existing regulatory approaches on the stablecoin phenomenon. This survey highlighted some interesting facts. First of all, most jurisdictions do not have regulatory regimes specific to stablecoins, or even to cryptoassets in general. Some of them have chosen to prohibit all cryptoasset initiatives.⁵⁵ In most of the advanced countries the functions and activities (and the corresponding risks) included in a stablecoin arrangement are, at least partly, covered by existing regulations; in most emerging markets, instead, some of them are not covered by any existing regulation. The functions and activities which are least covered are the ones connected with the governance of the arrangement, the operation of the infrastructure and the validation of transactions. Secondly, in advanced countries stablecoins have mostly been classified as e-money and a collective investment scheme (CIS), while in emerging countries the most common classification is e-money and payment instrument. Thirdly, two main sources of regulatory gaps in existing regimes have emerged: (i) an unanticipated bundling of attributes (that is, in a context in which multiple

regulatory classifications are not allowed, some activities may be left uncovered); (ii) the unbundling of activities in a stablecoin arrangement. More in detail, the survey has underlined the following gaps:

- incomplete or non-existent implementation of the revised FATF standards on virtual assets and lack of inclusion of all activities of stablecoins in the revised FATF standards;
- incomplete coverage of functions and activities that are similar to the ones covered in existing regulations, but do not fall under the latter because of their particular design or structure;
- insufficient risk mitigation tools (concerning for example capital and liquidity requirements, cyber security, or operational risks regarding the DLT infrastructure on which the transactions happen);
- lack of adequate competition policies, like interoperability protocols (this issue is mostly relevant for global stablecoins).

Regulation in Europe

Focusing on Europe, the ECB has clarified in two recent reports (ECB (2020) and Adachi, Cominetta, Kaufmann, and van der Kraaij (2020)) the guidelines characterizing the EU’s approach to stablecoins. Stablecoins may fall under different regulatory, oversight and supervisory regimes because they involve different functions. As we have seen, two core stablecoins’ functions are the asset management function and the transfer function.

Starting from the former, the function can be qualified either as e-money issuer or as investment fund. If the issuer of the coin

⁵⁴ See Cuervo, C., Morozova, A., Sugimoto, N. (2019) “Regulation on cryptoassets”, IMF Fintech Note

⁵⁵ These includes Algeria, Bahrain, Bangladesh, Bolivia, China, Colombia, the Dominican Republic, Indonesia, Iran,

Iraq, Morocco, Nepal, Kuwait, Kyrgyzstan, Macao SAR, Maldives, and Qatar.

guarantees redeemability at par, and end users have a claim on the issuer, the coin will fall within the definition of e-money, regulated by the Electronic Money Directive (EMD). The function can be qualified as an investment fund if, instead, (i) coin holders have a claim on the assets of the issuer, (ii) proceeds are invested in non-zero risk financial assets, and (iii) coin holders are entitled to a share of the value of the issuer's assets. In this case, the relevant regulatory framework is the one established by the UCITS Directive⁵⁶ or the AIFMD⁵⁷. Moreover, if the reserve is composed only by assets with a residual maturity of less than 2 years, the initiative will qualify as a Money Market Fund (MMF) and as such it will be subject, on top on the two directives we have mentioned, also to the MMF Regulation⁵⁸ (which specifies precise liquidity and capital requirements). The key issue is the presence of a claim on the issuer or on the assets backing the stablecoin arrangement. The EMD says that, to qualify an instrument as e-money, the holder must have a claim on the issuer for the funds that were exchanged for the e-money. Under the regulations governing investment funds, the holder must have a claim on the fund's assets. The absence of one of these two claims implies that a stablecoin initiative cannot be qualified neither as e-money nor as investment fund, falling outside the existing EU's regulatory framework.

Turning to the transfer function, there are two layers to be distinguished. The first is the function that caters for the execution of transfer orders. This function can be qualified as a "payment system" under the Eurosystem oversight. The ECB Regulation for systemically important payment systems⁵⁹ (SIPS Regulation)

defines a payment system as "a formal arrangement between three or more participants, [...] with common rules and standardised arrangements for the execution of transfer orders between the participants". In this case, the Eurosystem payment system oversight framework would apply. Importantly, the SIPS might not apply to stablecoins handling payments denominated in currencies different from the euro, yet the general payment system oversight framework could apply. The second layer is the function that sets standardised rules for payment transactions between end users. This function could be qualified as "payment scheme". In this case, the consolidated Eurosystem oversight framework for payment instruments and schemes, which is currently under development, would apply.⁶⁰

However, given the complexity of stablecoin arrangements, some functions or activities may fall outside the existing regulatory regimes. Moreover, the existing regulatory regimes may prove insufficient to cope with some of the specific risks and threats that we have outlined in the previous Section. For these reasons, the European Commission has released in September 2020 a proposal for a specific regulation of cryptoassets⁶¹, which includes also stablecoins. In particular, stablecoins are classified under two typologies: the "asset reference tokens" and the "e-money tokens". The former are defined as "a type of crypto-asset that purports to maintain a stable value by referring to the value of several fiat currencies that are legal tender, one or several commodities or one or several crypto-assets, or a combination of such assets"; the latter are defined as " a type of crypto-asset the main purpose of which is to be used as a means of

⁵⁶ See Directive 2009/65/EC of the European Parliament and of the Council of 13 July 2009.

⁵⁷ See Directive 2011/61/EU of the European Parliament and of the Council of 8 June 2011.

⁵⁸ See Regulation (EU) 2017/1131 of the European Parliament and of the Council of 14 June 2017 on money market funds

⁵⁹ Regulation of the European Central Bank (EU) No 795/2014 of 3 July 2014 on oversight requirements for

systemically important payment systems (ECB/2014/28)

⁶⁰ Importantly, it would apply irrespective of the qualification of the asset as funds under the Revised Payment Services Directive (PSD2).

⁶¹ European Commission, "Proposal for a Regulation of the European Parliament and of the Council on Markets in Crypto-assets, and amending Directive (EU) 2019/1937", 24/09/2020

exchange and that purports to maintain a stable value by referring to the value of a fiat currency that is legal tender". Moreover, asset reference tokens and e-money tokens can be further classified as "significant", if they meet specific criteria on the size of the customer base of the promoter of the initiative, the market capitalisation, the number and value of transactions, the size of the reserve of assets and the significance of cross-border activities and interconnectedness with the financial system. The regulation proposal specifies a set of obligations for the issuers, concerning, among other things, the governance arrangement, the requirements on the own funds and the composition, management and custody of the reserve assets.

Regulation for global stablecoins

For global stablecoins like Diem, the main issue is, of course, the fact that its components may fall under different jurisdictions and/or regulatory bodies. This, as noted by the G7 Working Group, poses a risk of cross-border regulatory arbitrage, which calls for an appropriate international collaboration and coordination. This is particularly important for regulations on payment systems, since, as remembered by Stephen Cecchetti and Kim Schoenholtz (2019), "payments systems are set up to handle domestic institutions, regulated using primarily domestic laws, with voluntary cooperation across borders." Considering the global stablecoin ecosystem as a whole and its relevance for the global financial system, the G7 Working Group suggests that it should be subject to the requirements laid down in the PFMI, hosted or custodial wallet service providers should be bound by FATF standards and that for the trading of the tokens useful guidance are the IOSCO Principles and Methodology.

Concerning the Diem projects, one major challenge, underlined by the member of the Federal Reserve Board Lael Brainard, is consumer protection. In particular, "it will be important to get clarity on what legal entity can be held responsible for the security of personally identifiable information and transaction data and how personal data will be stored, accessed, and used." This is a crucial issue, given Facebook's recent history in data protection breaches. To address this issue, Facebook has created a subsidiary, Calibra, that will operate on its behalf in the Diem network, to ensure separation between social and financial data. However, it is clear that one of the major advantages that Facebook could gain from the Diem project is exactly the access to customers financial data, especially data on payments, since this type of information would be a great added value to Facebook's core business.

Finally, it is important to quote a statement from the official document of the G7 Working Group: "regulatory and policy frameworks are expected to remain technology-neutral and not hinder innovation as long as it does not conflict with public policy goals, including monetary sovereignty." This offers an insight on the attitude of regulators towards the Diem project, and in general towards private initiatives, and the associated trade-off between the will not to be too intrusive with respect to market initiatives, which can foster competition and innovation and hence efficiency, and the necessity to protect the public interest and the State's prerogatives as long as these initiatives deal with money.

Box – the Swiss Financial Market Supervisory Authority

The Diem Association, the governing body of the Diem project, has been established in Switzerland and reported to be subject to the Swiss Financial Market Supervisory Authority (FINMA). The FINMA has released a supplement to the initial coin offering guidelines,⁶² in which it has provided indications on the regulatory regime applicable to different types of stablecoins, and then on how Diem would be potentially regulated. First of all, the document states that, in general, most stablecoin projects may require either a licence as a bank or a licence as a collective investment scheme; if the project foresees also the launch of a payment system, a specific licence as payment system is also required. Moreover, four categories are distinguished, according to what the stablecoin is linked to. For stablecoins linked to a currency, classification as a bank deposit is indicated. If the stablecoin is linked to a basket of currencies (like the multi-currency Diem), it can either be classified as a bank deposit, if the reserve assets are managed for the account and risk of the issuer (and in this case all the risks must be borne by the issuer), or as a collective investment scheme, if the reserve assets are managed for the account and risk of the token holder.

⁶² FINMA, "Supplement to the guidelines for enquiries regarding the regulatory framework for initial coin offerings (ICOs)", September 2019

5. Scenarios

The possible scenarios that the rise of stablecoins open can be divided in two macro-categories: the ones related to the domestic monetary systems, and the ones related to the international monetary system (IMS).

5.1. Scenarios connected to the domestic monetary systems

Stablecoins and the functions of money

As we have explained in Section 1, stablecoins have not proved, at the current state, to be able to take off as monetary instruments. Many therefore conclude, like Calle and Zalles (2019), that the most likely scenario is the one in which stablecoins remain confined in the cryptoasset market, which in turn is relatively limited and does not present particular concerns from a macroeconomic point of view. Indeed, stablecoins are currently the only “bridge” between the cryptoasset market (and the DLT infrastructure) and fiat currencies. As long as the financial system does not provide an interface between the financial market and the cryptoasset market, stablecoins are expected to continue to play this role (Bullmann et al., 2019).

An alternative scenario is the one in which stablecoins substitute, to various degrees, the official monies in the means of exchange or /and in the reserve of value function. However, as we said when analysing the opportunities opened by stablecoins, efficient and low-cost payment systems are already present at the domestic level, and central banks have succeeded in keeping a low and stable inflation, at least in advanced economies. Moreover, many central banks in the world are considering launching their own Central Bank Digital Currency (CBDC),⁶³ exactly to counteract the possible competition of private digital currencies. CBDCs clearly have competitive advantages with respect to stablecoins, as they are, by definition, perfectly stable in the official unit of account. The “currency substitution” scenario is more likely in developing countries where trust in the currency and in the payment system is low. Moreover, this possibility is realistic only for fiat tokens and off-chain collateralised stablecoins; the volatility displayed by on-chain collateralised stablecoins makes them unsuitable as store of value, while algorithmic stablecoins, as we have seen, have proven to be largely unstable. In particular, the most natural candidate is clearly Diem, thanks to the possible network effect arising from its large existing customer base. Indeed, the movement towards the development of CBDC projects has exhibited a strong acceleration after the announcement that Facebook would have launched its own stablecoin.

A further consideration arises if one considers the possibility of the return of (high) inflation. Even if inflation in developed countries has been low and stable for at least 30 years (in the US, the last year with a two-digits inflation rate has been the 1981⁶⁴), some economists argue that the massive fiscal and monetary stimulus programs implemented in many countries to counteract the Covid 19 crisis, coupled with the possible lasting negative effects on the supply side, could result in a resurgence of the inflation

⁶³ According to the third survey conducted by the Bank of International Settlement, 86% of central banks surveyed are conducting research activities on this possibility, and “central banks collectively representing a fifth of the world’s population are likely to issue a general purpose CBDC in the next three years” (BIS, 2021).

⁶⁴ Source: Federal Reserve Economic Data database

rate.⁶⁵ One could then argue that stablecoins would in this case provide an appealing alternative to official currencies. However, as we explained in Section 1, stablecoins are generally designed to keep stability *with respect to a reference currency*, meaning that they would inherit any devaluation of that currency *with respect to its purchasing power*. This is not true, however, for off-chain stablecoins collateralised by commodities, that are stable with respect to the commodity by which are backed and could then provide an interesting store of value/means of exchange alternative in a high inflation environment. The same consideration holds for utility tokens, which are stable with respect to a specific (bundle of) good(s) or service(s).

The issue of bank disintermediation

For these reasons, also the scenario related to bank disintermediation – namely, the situation in which consumers and firms substitute their bank deposits with stablecoin accounts – seems not very plausible, at least in advanced economies. Moreover, as argued by Adrian and Mancini-Griffoli (2019), another possibility is the coexistence between e-money providers and banks. Indeed, even if people replaced bank deposits with stablecoins, stablecoin issuers are likely to invest, as we have explained in Section 1, a substantial amount of their customers' funds back in bank deposits (even if these investments might be concentrated in few large banks, putting small banks in difficulty). The possibility of coexistence is enhanced by the fact that banks and e-money providers can be complementary: “in emerging countries, e-money can draw poorer households and small businesses into the formal economy. In advanced countries, e-money providers could leverage their data to estimate customers' creditworthiness and sell their findings to banks for a more efficient allocation of credit” (Adrian and Mancini-Griffoli, 2019).

The transmission of monetary policy, the unbundling of the roles of money, and the new public-private partnership

Even if domestic monetary systems are generally efficient, one inefficiency has emerged in the last ten years, especially in advanced countries, and it relates to the transmission of monetary policy. To illustrate this point, we start from a simple observation: our present monetary systems are based on a peculiar form of public-private partnership (PPP) between the central bank and private banks. Private banks issue bank money in the form of deposits, which are backed by central bank money. The link between the central bank and private banks is one of the key mechanisms through which the transmission of monetary policy (that is the process through which monetary policy decisions affect the economy) happens. The problem is that, as widely recognized, since the financial crisis of 2007-2008 this transmission mechanism has stopped working properly. In advanced countries, despite massive injections of liquidity in the banking system through unconventional monetary policies, banks have contracted lending activity, slowing down the liquidity creation in the real economy. As a result, also the payment system has been hit, since bank deposits are one of the main payment instruments. This is another rationale behind the emergence of new payment services providers.

Given this flaw, two additional scenarios are worth considering at the domestic level.

1. The unbundling of the roles of money

The first scenario is the one outlined by Brunnermeier, James and Landau (2019). According to the authors, the broad movement towards the “digitalization of money” and the consequent reduction in

⁶⁵ See, for example, “Are inflation fears justified?”, Kenneth Rogoff, Project Syndicate, 01/0/2021

switching costs between different monetary instruments has the potential to lead to a new phenomenon: the unbundling of the functions of money. Namely, there is a weaker incentive to use one currency as both a store of value, medium of exchange, and unit of account, and “currencies are free to specialize to a certain role.” This scenario is very relevant for the inefficiency of the transmission of monetary policy, since one of its profound reasons lies in excessive precautionary saving, i.e., in the fact that the reserve of value function of money has prevailed over the means of exchange function. The unbundling of the roles of money would in turn enhance competition between currencies, as complementarities among the different roles has always limited currency competition.

However, this effect may be offset by the network externalities, which could result in big barriers to entry for potential competitors of an established network and then in a lower competition. Moreover, competition could be further reduced by what the authors call the “re-bundling” of the roles of money with different functionalities and services inside “digital platforms”. In other words, the traditional functions of money would be bundled with other services offered by the issuer (like the ones of messaging and social networking, in the case of Facebook). Competitors could then differentiate their “money product” offering different bundles and thus gaining market power; they could also create exit costs that make it expensive to switch to another platform.

2. *The new PPP*

The second additional scenario to consider is the possibility to build a new PPP between the central bank and private actors. As proposed by Adrian and Mancini-Griffoli (2019), stablecoin issuers can be allowed to hold central bank reserves (something that at the current state is allowed only to banks). In other words, the stablecoin tokens would be backed by central bank reserves. This would be isomorphic to the introduction of an “indirect CBDC”, in the terminology of Auer and Bohme (2020). This solution would have many benefits, like the elimination of market and liquidity risk (and thus attenuate default risk) with respect to other forms of stablecoin. The new PPP stands in the fact that “the central bank would merely offer settlement services to e-money providers, including access to central bank reserves. All other functions would be the responsibility of private e-money providers” (Adrian and Mancini-Griffoli, 2019). In this way, the private sector could retain its function of designing services in line with consumers’ preferences, while the public sector could ensure trust and respect of public policy priorities. A major consequence of this model would then be also another form of unbundling, namely the disentanglement of the banking activity (that is, the provision of credit) from the management of the payment system, which would be managed by the PPP between the central bank and the stablecoin providers. This solution is explicitly considered in the Diem White Paper, where we can read that “our hope is that as central banks develop central bank digital currencies (CBDCs), these CBDCs could be directly integrated with the Libra network” (Diem Association, 2020, p. 11). This type of CBDC could have beneficial effects for the transmission of monetary policy, through various channels: for example, the possibility of setting an interest rate on the reserves held by stablecoin providers could transmit more directly monetary policy rates to consumers.⁶⁶

In the light of these considerations, we can look from a different perspective what we have said in Section 2 about the historical tendency that views money being increasingly concentrated in the hands of sovereign governments. Eichengreen (2019) writes that “the broad tendency has been in the direction of one currency for each political jurisdiction and common economic space, where in practice those

⁶⁶ For a detailed explanation of the different typologies of CBDC and their possible effects on monetary policy tools and transmission, see “Central Bank Digital Currency: a systemic challenge”, MINTS Research Report 01, December 2020

political and economic spheres coincide. The question is whether digital currencies will now reverse this trend." Under the scenario that we have envisaged, the trend would not be reversed, because the state would retain its public control and guarantee over money, in line with money's nature as public good; at the same time, however, this development could foster a rearticulation of the functions performed by the different actors of the monetary system (banks, payment services providers, central bank) and of the relationships among them.

5.2. Scenarios connected to the international monetary system

Global stablecoins have the potential to reshape the international monetary system. Four different scenarios can be considered, ordered on the basis of the relevance of GSCs in the new IMS.

Stablecoins as substitutes for gold

The chair of the Federal Reserve Jerome Powell has recently declared⁶⁷ that cryptoassets are likely to become a substitute of gold. This scenario is particularly relevant for off-chain collateralized stablecoins backed by gold, as they *de facto* provide a digital representation of it on the DLT infrastructure.

Cross-border payments

As we explained in Section 2, the competitive advantage of stablecoins lies in the making of cross-border payments, given the relative inefficiency of the present system. Therefore, a global stablecoin like Diem could take off as one of the main instruments to make international transfers, especially remittances. However, this advantage could be reduced by (i) the development of a more efficient system, sponsored by the Financial Stability Board and the Committee on Payments and Market Infrastructure, along the lines of their roadmap to enhance cross-border payments and (ii) by the fact that, as outlined in the previous section, if a stablecoin gets a systemically important role in international payments, it is likely to be subject to the regulations concerning Anti-Money Laundering and Counter Terrorism Financing, which would raise the costs of the transactions.

Digital Currency Areas

The possibility to enhance cross-border interactions could lead to what Brunnermaier, James and Landau (2019) call "digital currency areas" (DCA). A DCA is defined by the authors as "a network where payments and transactions are made digitally by using a currency that is specific to that network" (p. 19). Economic literature traditionally defines, following the seminal work of Mundell (1961), as "optimal currency area" (OCA) an area which can optimally sustain a unique currency. Important characteristics for an area to be an OCA have been identified in a sufficient degree of factors mobility (labour in particular) and of business cycle synchronisation (as these features compensate for the lack of the exchange rate movement as external adjustment tool within the region).⁶⁸ As a result of digitalisation, these traditional barriers defining OCA's may break down, favouring in contrast the emergence of DCAs,

⁶⁷ "Stablecoins in the Hot Seat: Powell Calls Bitcoin a Substitute for Gold While Fed Says Digital Dollar Prototype Coming in July", Nathaniel Whittemore, CoinDesk, 23/03/2021

⁶⁸ However, it must be said that the traditional literature on OCA's has been criticized by the subsequent development of the field, and that the issue is still controversial. For a full account of the literature on the topic, see Dellas and Tavlas (2009).

“held together by digital interconnectedness” and by the mutually complementary activities and functions offered inside the digital network.

A regime of international competition between such DCAs could be harmful for global financial stability, for the reasons we have discussed when analysing the threats connected to the take-off of global stablecoins. However, the DCAs could also be complementary, in two senses: (i) they could perform different functions, offering different (bundles of) services, and (ii) they could express communities linked by different types of economic and social ties.

Replacing the dollar: a new international digital currency?

Two final scenarios to consider are connected to the broader discussion we made in Section 2 about the role of the dollar as the dominant international currency and the problems generated by this arrangement.

A central question is whether Diem, or a similar global stablecoin, may be a contender of the dollar in the role of reference international currency. This question has been discussed by the Head of the Innovation Hub of the Bank for International Settlements Benoit Cœuré.⁶⁹ His thesis is that private digital currencies can challenge the dollar’s dominance more easily than the existing official currencies, for two reasons. The first is that, while in the past international payments were mainly wholesale transactions made by large players, and for them switching from one currency to another had significant costs, today globalisation has fostered consumers’ demand for payment services, and for consumers switching costs are much lower. The second is the network effect, which as we said is the main competitive advantage of Diem.

However, under this scenario, the issuer of the GSC would *de facto* perform the role of central banker of the world (which is now performed by the United States). If, at the domestic level, the central bank can always, at least in principle, keep its monetary sovereignty by deciding what must be considered money inside its jurisdiction, at the international level this scenario would imply that a private entity would decide what is the international currency and how the international monetary system is shaped.

The solution proposed by the former governor of the Bank of England Mark Carney to reform the IMS is the creation of a “Synthetic Hegemonic Currency” (SHC), inspired by the model of (multi-currency) Diem but provided by the public sector through a network of central bank digital currencies. The SHC would therefore be the counterpart of the CBDC at the international level. As Carney explains, “if the share of trade invoiced in SHC were to rise, shocks in the US would have less potent spillovers through exchange rates, and trade would become less synchronised across countries.” Of course, spillovers would be possible from shock to the other currencies underlying the SHC, but to the extent that countries face idiosyncratic shocks, diversification could dampen those spillovers (Brunnermaier, James and Landau, 2019). Similarly, “the dollar’s influence on global financial conditions could [...] decline if a financial architecture developed around the new SHC and it displaced the dollar’s dominance in credit markets.” The combination of these forces would leverage the role of the currencies composing the basket of the SHC as reserve assets, encouraging emerging countries to diversify their holdings of safe assets away from the dollar. This in turn would “lessen the downward pressure on equilibrium interest rates and help alleviate the global liquidity trap.”

⁶⁹ Benoît Cœuré, “Digital challenges to the international monetary and financial system”, panel remarks at the Banque Centrale du Luxembourg-Toulouse School of Economics conference on “The Future of the International Monetary System”, 17/09/2019

Carney's proposal evokes the proposal made by Keynes at the Bretton Woods conference, where for the first time the delegates of 44 countries meet to design a new monetary and financial global order. In short, Keynes' proposal involved the creation of a global clearing house in which the international trade would have taken place. The compensation of credits and debits would have resulted in balances denominated in a new global unit of account, called Bancor, distinct from the national currencies. As is well known, Keynes' proposal was rejected in favour of the American one, the dollar exchange standard, in which the dollar, with its convertibility with gold, was the centre of the system. The Bretton Woods architecture ended in 1971 with Nixon's decision to suspend convertibility, but the dollar continues to be the reference international currency. This arrangement is however increasingly judged as unsatisfactory, for the reasons we have explained in Section 2.

Indeed, Carney's proposal is far from being isolated. Martin Chorzempa reports on the blog of the Peterson Institute for International Economics⁷⁰ that Wang Xin, research bureau director at People Bank of China (China's central bank), has suggested that the IMF could issue its own digital currency based on the basket of currencies in the Special Drawing Rights (SDR) (which includes the Chinese yuan since 2016). This is not a novelty: it is since 2009 that China calls for a new reserve currency, based on the IMF SDR, to replace the dollar. In 2009 the governor of PBOC Zhou Xiaochuan posted an essay on the PBOC website calling for an international reserve currency "that is disconnected from individual nations and is able to remain stable in the long run, thus removing the inherent deficiencies caused by using credit-based national currencies".⁷¹ And this suggestion has been recently taken up by the IMF itself, through the words of Tobias Adrian, who in a speech given at the IMF-Swiss National Bank Conference⁷² said that the IMF could create a new e-money with 1-to-1 backing by a basket of fiat currencies, to settle transactions between central banks, and that in general "the IMF's convening power may be needed more than ever, to bolster the international payments system." Chinese are increasingly unhappy about the dollar's dominance in the global financial system, but at the same time they are reluctant to make the yuan the new reference international currency. At the same time, as Chorzempa writes, they are "frightened by the prospect of an American company dominating the future world of digital money", and they see Diem as "an economic and geopolitical threat" (also because China is the current undisputed leader in the fintech sector). For all these reasons, Diem is a real opportunity to think anew to the structure that the global monetary system should have in a multipolar world. This is the idea condensed in the words of the former governor of PBOC Zhou Xiaochuan who, as Chorzempa reports, framed Diem as indicative of a larger movement to create a "currency that's more conducive to globalization."

⁷⁰ Art. cit.

⁷¹ See Jamil Anderlini, "China calls for new reserve currency", *Financial Times*, 24/03/2009

⁷² Adrian, T., "Stablecoins, Central Bank Digital Currencies, and Cross-Border Payments: A New Look at the International Monetary System", remarks at the IMF-Swiss National Bank Conference, Zurich, May 2019

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