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Public or Private? The Future of Money



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Public or Private?

The Future of Money

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Abstract

Stablecoins issued by large tech companies pose a significant challenge for traditional fiat money. In this study, we highlight the importance of a public-private-cooperation in dealing with this topic, where central banks closely work with stablecoin issuers in issuing synthetic central bank digital currency (sCBDC). This framework minimizes the risks of private money and utilises the technological advantages of stablecoin issuers.

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LIST OF ABBREVIATIONS

CBDC	Central Bank Digital Currency
EUR	Euro
USD	US dollars
sCBDC	Synthetic Central Bank Digital Currency

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EXECUTIVE SUMMARY

- In 2009, an anonymous programmer introduced Bitcoin, a cryptocurrency that is fully decentralised and usable without the need for intermediaries. Despite its technological advances and global reach, high price volatility makes Bitcoin unattractive as a mean of payment. 10 years later, a new generation of cryptocurrencies – stablecoins – has caught the attention of crypto market, becoming potential competition for central bank money. The ultimate wake-up call for monetary- and regulatory authorities was the June 2019 announcement by Facebook that it would issue its own stablecoin, Libra.
- Stablecoins of large tech firms have distinct advantages over alternative digital forms of money *and* traditional fiat money. First, compared to the first generation of cryptocurrencies, such as Bitcoin, stablecoin issuers guarantee the price stability of their coins by backing them with safe assets (or a basket of assets). Second, compared to central bank fiat money, stablecoin issuers provide their users a platform where they can easily access their coins, where regional borders do not play a role.
- Nevertheless, the global spread of such stablecoins can bring risks to international financial systems and challenge the monetary authority of central banks. Unfortunately, there is not a global legal system that provides a sound regulatory framework for stablecoin issuers. This can lead to an abuse of private user data and a lack in transparency in their risk management.
- If private digital currency substitutes for fiat money, the efficacy of monetary policy could also be in danger. First, a decrease of central bank reserves in households and businesses' balance sheets can weaken the interest rate channel of the monetary policy transmission mechanism. Second, central banks may lose seigniorage revenue. Third, stablecoins may lead to a high interdependency between domestic monetary policies.
- How should monetary- and regulatory authorities react to the rise of private stablecoins? One option for central banks is to issue central bank digital currency (CBDC). However, this option can be very costly as it requires complex management of customers, which can jeopardise the hard-earned trust of the public regarding the ability of central banks to maintain price stability, their primary mandate. Therefore, we suggest that public-private-cooperation can be an answer. Central banks should cooperate with stablecoin providers by providing them access to central bank reserves, a concept that is known as synthetic central bank digital currency (sCBDC).

1. INTRODUCTION

In the age of digitalisation, global cash usage is rapidly decreasing and large tech companies are developing digital currencies that enable fast and easy transactions without using fiat money, thereby challenging the central bank's monopoly to issue money. In June 18, 2019, Facebook officially announced the introduction of a "New Global Digital Payment Coin" called *Libra* in the near future. Unlike other crypto-assets, such as Bitcoin, with high price volatility, Libra belongs to the category "stablecoins," which are crypto-assets that have a stable value since they are backed by a basket of safe assets. In addition, as the world's biggest social network, Libra brings additional advantages that their public competitor cannot (yet) deliver: global connectedness and financial inclusion in countries without a well-developed financial system. Therefore, a scenario where Libra overtakes domestic fiat currencies, thus depriving central banks of their monopolistic monetary authority, is not completely unrealistic.

However, it is not yet clear whether stablecoins, like Libra, will be able to become a widely used medium of exchange. For instance, how do we know what these digital currencies are worth? The history of money shows that the most important ingredient for a well-functioning currency is the people's trust that they can use this currency for any transaction, at any time. The value of money is exactly this bubble of *trust*; after all, the banknotes that we use for transactions are literally made of a piece of paper that does not have any intrinsic value. Therefore, the credibility of the institution that backs the value of these banknotes is essential: people must believe that this institution is able to redeem the face value of the banknote. Since the 19th century, central banks have taken responsibility for this important task. Learning from their mistakes over time, many central banks of developed countries have earned public trust and thus their banknotes are used as a stable medium of exchange. Compared to this, large tech firms may not have enough public trust to have the level of credibility that central banks have.

So what does the future of money look like, public or private? In this paper, we show that it need not be one or the other. Rather, we suggest to focus on a public-private-cooperation in digital money issuance, where large tech firms provide digital currencies to households and businesses, but the stablecoin issuers keep accounts at the central bank. This concept – also known as "synthetic central bank digital currency (sCBDC)" – was introduced by Adrian and Mancini-Graffoli (2019). We provide evidence that this option minimizes the risk of private stablecoins and utilizes the advantages of large tech firms in issuing and managing digital currencies. As Christine Lagarde emphasized in her speech for the Bank of England regarding regulatory frameworks for crypto-assets, "Cooperation is key."¹

Our study begins in Section 2 with an overview of the advantages of such privately issued money compared to other digital- and analogue alternatives (such as other crypto-assets and/or fiat money). In the next step, in Section 3 we discuss their potential risks. Based on the findings in Sections 2 and 3, in Section 4 we suggest a solution for central banks that can help them to minimize the risks of stablecoins and benefit from the advantages of large tech companies at the same time: to issue the so-called "synthetic central bank digital currency" (sCBDC). Simply speaking, sCBDC is an option where central banks provide private stablecoin issuers access to central bank reserves. We provide detailed evidence on why this option is better than central banks solely issuing central bank digital currency (CBDC). Section 5 concludes.

¹ Lagarde, C. (2017): "Central banking and Fintech – A brave new world?," Speech at the Bank of England conference. September 29, 2017. London.

2. ADVANTAGES OF GLOBAL STABLECOINS

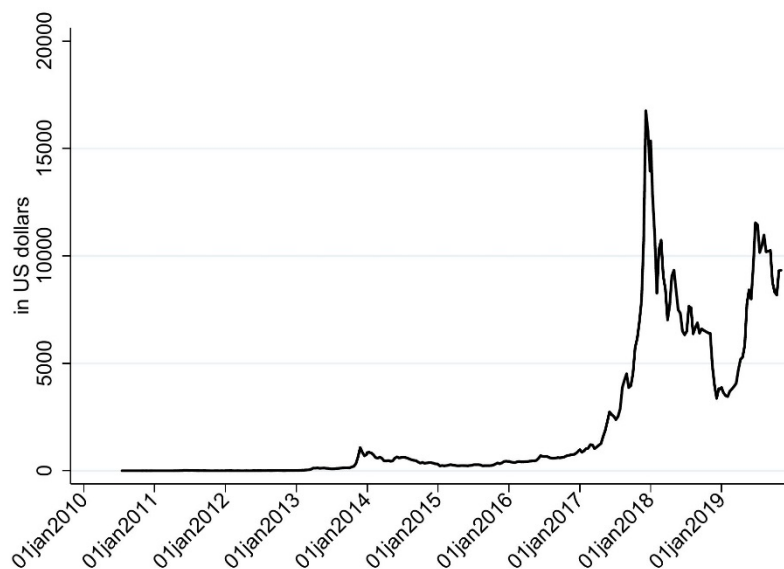
Historically, successful currencies have (i) a stable value and (ii) a sufficiently large network of users that trade. In this section, we discuss how stablecoins can dominate other digital and analogue alternatives (such as Bitcoin and/or fiat money) in these two aspects.

2.1. Price stability

Until now, it has been impossible to use the first generation of cryptocurrencies, such as Bitcoin, as a stable medium of exchange due to their extreme price volatility. In Figure 1, we plot the price development of Bitcoin since its 2009 founding. On May 22, 2010, the first Bitcoin transaction happened as the programmer Laszlo Hanyecz paid 10 000 Bitcoins to a British man for two delivery pizzas, also known as the “Bitcoin Pizza Day.”² At that time, 10 000 Bitcoins were worth about USD 41. Now, in 2019, one bitcoin is worth more than USD 8000.³ As this high volatility has made cryptocurrencies unattractive as a valid means of payment, they have rather served as a highly speculative asset class for investment.

Stablecoins are cryptocurrencies designed to overcome this weakness. The aim is to develop a digital currency that mimics traditional stable currencies such that they can be used for daily exchange. In general, a stablecoin is collateralized to the value of an underlying stable asset (or a basket of assets). Many are pegged at a 1:1 ratio with stable fiat currencies such as the USD or the EUR, but there are also stablecoins that are linked to other kinds of assets, such as precious metals or even to other cryptocurrencies (see Box 1).

Figure 1: Price development of Bitcoin



Data source: www.CryptoDataDownload.com

² Laszlo Hanyecz from Florida, USA, reached out for help and wrote on a bitcointalk forum: “I’ll pay 10,000 bitcoins for a couple of pizzas like maybe two large ones so I have some left over for the next day.”

³ Situation on November 13, 2019.

Box 1: Types of stablecoins

Classifying stablecoins on the basis of what underpins their value allows us to understand the stability mechanism stablecoin issuers use to minimize the volatility of their price. According to Bullmann et al. (2019), we can divide stablecoins into four distinct categories.

1. Fiat-collateralized stablecoins

This type of stablecoins, most common in the market, represents units of monetary value that represent a claim on the issuer. They are collateralized by (stable) fiat money like USD and EUR at a 1:1 ratio, meaning one stablecoin is equal to one unit of the reference currency. In the optimal case, for each stablecoin that exists in the market, there is real fiat money held in the reserve by the stablecoin issuer.

Tether (launched in 2014), **TrueUSD**, and **Gemini Dollar** (both launched in 2018) are examples of fiat-collateralized stablecoins.

2. Stablecoins backed by other asset classes

The price of these stablecoins is supported by units of an asset or multiple assets, against which users can redeem their holdings. This can be a basket of stable currencies, but can also be other kinds of interchangeable assets such as precious metals, oil, and real estate. The significant difference to fiat-collateralized stablecoins is that the value of these stablecoins are collateralized by assets, whose price can fluctuate over time.

The original concept of **Libra** would fit in this category. Existing commodity-backed stablecoins include **Digix Gold** (backed by physical gold, launched in 2018) and **SwissRealCoin** (backed by a portfolio of Swiss real estate, launched in 2018).

3. Crypto-collateralized stablecoins

This type of stablecoins is backed by other cryptocurrencies and thus conducted exclusively on the blockchain. Therefore, crypto-collateralized stablecoins are more decentralized than are their fiat-backed counterparts. However, the downside of this type of stablecoins is the high price volatility of the collateral. This can put the value of the stablecoins at risk. Therefore, these stablecoins are mostly over-collateralized in order to buffer against the price fluctuations in the collateral.

The most popular example of this category is **Dai**, which was launched in 2017.

4. Non-collateralized stablecoins

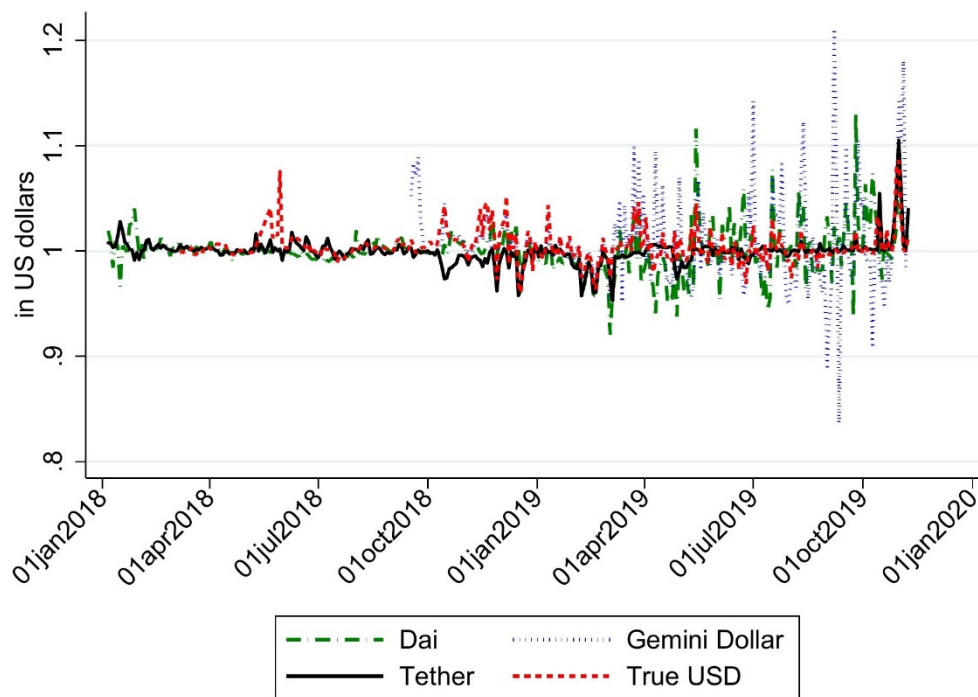
There are also stablecoins that are not backed by anything. These types of coins use an algorithmically governed approach to control the stablecoin supply. Therefore, they represent the most decentralized and independent form of stablecoins.

One example of such non-collateralized stablecoins is **Basis**, which was launched in the third quarter of 2018.

In Figure 2, we plot the prices of four stablecoins that are traded on the market: Dai, Gemini Dollar, Tether, and TrueUSD. All four are backed by USD, but differ in their way of collateralizing the value of their currencies. Dai is a crypto-collateralized stablecoin, while the others are fiat-collateralized. Despite some volatility, the prices of these stablecoins are quite stable and fluctuate around the face value,

which is one USD. Compared to the price development of Bitcoin in Figure 1, stablecoins seem to provide a relatively stable medium of exchange.

Figure 2: Price development of Stablecoins



Data source: www.cryptocurrencychart.com

2.2. Global network of users

The main advantage of cryptocurrencies and digital payment systems is that they are easily accessible by the public. This is not always the case with traditional banks, since many developing countries lack a well-functioning banking system and people do not have access to bank accounts. In addition, overseas payments are especially expensive under the traditional banking system with very high transaction fees and long processing time. Stablecoin issuers aim to address these exact weaknesses in the traditional banking system by lowering the cost of remittances and breaking down the barriers to financial inclusion.

On a national level, there are already real-life examples of how digital payment systems have successfully dominated the traditional banking systems in emerging markets. For instance, Safaricom, Kenya’s largest mobile-network operator, launched *M-Pesa* in 2007, a mobile-phone-based money transfer service that people can use to transfer cash using their phones. Around the launch period, only 14 percent of the Kenyan population had accounts.⁴ In 2019, over 17 million Kenyans use M-Pesa, which is equivalent to more than 66 percent of the adult population.⁵

Another success story of digital payment systems comes from China with WeChat Pay and Alipay. While WeChat Pay started in 2014 as a payment system on China’s most popular messaging app WeChat,

⁴ Source: Reuters (2019).

⁵ M-Pesa has now expanded to Afghanistan, South Africa, India, and to Eastern Europe.

Alipay was created in 2004 for customers on the Alibaba website to simplify transactions for both buyers and sellers on the website. Now, both have become a regular payment facility, where users can pay for other things as well such as bills and groceries. According to a 2019 survey by Statista regarding China's most popular digital payment systems, Alipay and WeChat Pay dominate the market, with 87 percent of survey respondents using Alipay and 76 percent WeChat Pay. In addition, 60 percent of survey respondents said that they use digital payment services daily.⁶

Compared to these national digital payment systems, the new generation of stablecoins issued by large tech companies have the potential to dominate the digital payment systems at the *global* level. These companies fundamentally understand user-centred design and seek to integrate the usage of stablecoins into their globally used social media platforms. Therefore, anyone with a smart phone and a social media account can easily integrate stablecoins into their daily life without any transaction costs. The higher the number of users of such a platform, the higher are the benefits of using this digital currency. Particularly in countries without a well-functioning financial system, the benefits of stablecoins can be huge.⁷

Facebook is an excellent example. In June 2019, Facebook introduced a "New Global Digital Payment Coin" called Libra that would enable payment services in "WhatsApp" and "Facebook Messenger" starting in the first half of 2020. Given the number of active users, Facebook's goal to establish Libra as a network for worldwide digital private money is not unrealistic. According to Figure 3, over 2 billion users are able to pay using Libra within the platform. In countries where citizens have little trust in the domestic banking systems and/or government, it may be that people prefer to use Libra over the domestic currency.

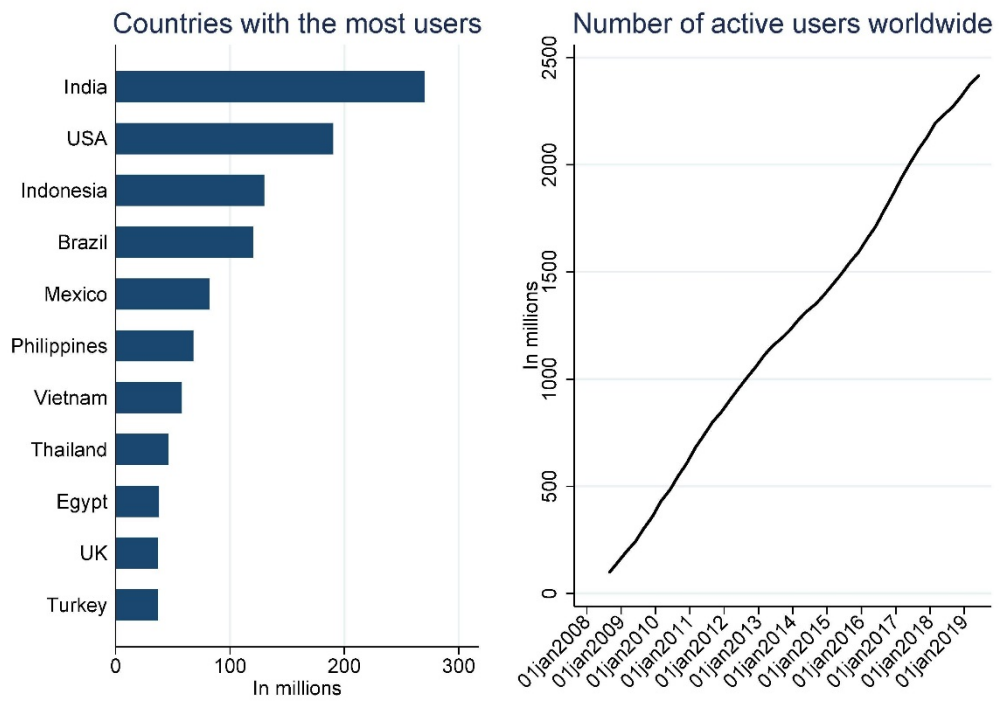
Due to its global nature, stablecoins also have distinct cross-border advantages. Although domestic payments are increasingly convenient, cross-border payments remain slow and expensive. The use of stablecoins (especially in the retail sector) could help address these shortcomings in cross-border payments, since digital networks are particularly well suited to address the complicated nature of sending money across geographic regions. While geographic constraints limit the spread of physical currencies, digital currencies are free to circulate within networks that cross borders.

In summary, global stablecoins have the potential to serve as a stable and widely accepted medium of exchange that can bring huge network effects to the global financial markets. Therefore, stablecoins are a promising venue for future payment systems worldwide.

⁶ Source: Tech Giants in Mainland China 2019, Statista.

⁷ According to Demirgüç-Kunt et al. (2018), 1,7 billion adults still do not have access to a transaction account. Nevertheless, 1.1 billion of them have access to a mobile phone and, thus, to the internet (and social media platforms).

Figure 3: Global reach of Facebook



Source: Statista.de, Status of July 2019.

3. RISKS ASSOCIATED WITH PRIVATELY-ISSUED MONEY

Despite the significant advantages that stablecoins can bring, there are potential risks related to the global adoption of such new payment systems. In particular, stablecoins are issued by private tech companies, which may have different incentives in conducting business compared to public entities such as central banks. For instance, the profit-maximising nature of private companies can support possible misbehaviour of stablecoin issuers, such as abusing their information advantage towards their customers to make profit and/or hide operational weaknesses. In the worst case, stablecoin issuers can completely lose the trust of their customers, which will lead to a very illiquid market of their stablecoins, if not bankruptcy.

Depending on size and market power, these risks become increasingly larger. Indeed, stablecoin providers are very likely to become natural monopolies due to their strong network effects, high entry costs for start-ups, and data advantage. The global nature of stablecoins makes the problem even more complicated, since their misbehaviour (or failure) will affect cross-border financial systems and the efficacy of monetary policy.

In this section, we address two major risk factors of privately issued stablecoins. First, we address the consequences of the absence of a (supranational) legal basis to regulate global stablecoin issuers, such as the abuse of private data and opaqueness of risk management. These can result in disrupted financial markets and, in the worst case, the bankruptcy of stablecoin issuers. In the second part, we analyse the potentially negative impact of such privately issued monies on the transmission of monetary policy.

3.1. Absence of a legal basis for stablecoin regulations

In order for stablecoins to become a safe means of payment, it is crucial that regulatory authorities develop a legal basis that underlies proper monitoring and regulation of stablecoins and their issuers. However, developing such a legal framework is extremely complex due to the global nature of stablecoins: authorities must take into account the heterogeneous laws across jurisdictions as well as differing cultural views on certain legal aspects. Since the launch announcement of Facebook's Libra, policy makers worldwide have been conducting extensive research on how to overcome these difficulties (see G7 Working Group on Stablecoins, 2019). However, it is clear that many countries even lack a clear legal basis for stablecoins on a *national level*. For instance, many countries do not recognize different types of crypto-assets as fiat money due to its unstable value (European Banking Authority, 2019), nor as property since the law does not recognize possession of such intangible items (Bacon et al., 2018; Omlor, 2019). Therefore, holders of stablecoins are, in the worst case, not protected by any legal framework.

A sound legal basis for stablecoin *issuers* is also very important. This can have important implications for how stablecoin issuers design their business models and deal with their customers. The first crucial point is how stablecoin issuers deal with the *personal transaction data* of users, especially because big tech companies are very likely to become the leading market powers of stablecoin issuers. Even today, tech companies are important data intermediaries and there is concern that these companies have excessive power over user's data, even without having issuing stablecoins. In case of an economy dominated by digital platforms, where consumers hold digital currency exclusively, stablecoin issuers will have exclusive access to all transactions, thus becoming information oligopolists. It is well established that data policies of tech companies are not very transparent. Therefore, stablecoin users may also not have clear information about how their personal data will be used, thus giving rise to additional privacy considerations.

So what are the potential problems with big tech companies owning the transaction data of users? First, these firms may have different incentives with respect to how they use the data compared to the existing transaction data owners, such as banks and credit companies that are regulated. Existing financial institutions primarily use transaction data to monitor the creditworthiness of consumers, thus determining the lending rates for each individual. Compared to this, tech companies have diverse usage for this kind of data. For instance, monitoring consumers' tastes and tendencies may help tech companies to optimise their social media platform management. In the short run, this can improve consumer's convenience due to tailored products and services based on their preferences. However, this does not only endanger privacy rights of the users, but can also have long-term consequences for market efficiency. For example, if platform owners successfully obtain market power, such that consumers use the platform for all their economic activities, they will have an incentive to create "exit costs" that make interoperability across networks complicated (Brunnermeier et al. 2019). These high exit costs to transfer from one platform to another will hinder market competition and make big tech firms "too big to fail", thus incentivising abuse of power and strong dependency of the financial system with private entities.

Another problem may arise from the *complexity of risk management* of stablecoins. In order for a stablecoin to be stable, stablecoin issuers must ensure that they have enough reserves to back the value of their coins. In order to achieve this, high standards of financial risk management are required to address market, credit, and liquidity risk. If risks are not addressed adequately, this could undermine the confidence of stablecoin users, triggering a run, where users attempt to redeem their stablecoins.

To assure the credibility of a stablecoin, it is crucial that the issuer maintains transparent risk management. However, it is questionable whether stablecoin issuers will be transparent about this. Stablecoin issuers may have an incentive to disclose untruthful information about their activities, such as the number of customers and trading volume for advertising and other purposes. These types of untruthful information could cause mispricing and market dysfunction due to credit, maturity, and liquidity risks. Depending on the size of the stablecoin issuer, a "run" can have severe consequences for global financial markets.

Such weaknesses in transparency are a real issue, as demonstrated by the scandal surrounding Tether, one of the most popular and widely used stablecoins. Tether launched in 2014, promising the price stability that Bitcoin lacked with a peg to the US dollar at a 1:1 ratio. Behind this was the promise that for each Tether issued, there was a dollar to match it in its bank reserve. Based on this stable character, Tether became one of the most popular cryptocurrencies on the market.⁸ However, despite the promises about its reserve policy to Tether holders, on 30 April 2019, court papers filed by company lawyers confirmed that Tether only had 74 percent of cash reserves of its current token supply. Consequently, in October 2019, a New York-based legal firm filed a lawsuit against them for manipulating crypto market and harming traders.

3.2. Disruptive monetary policy transmission

The broad and global utilisation of stablecoins can also have negative implications for the transmission of monetary policy. In particular, given that a stablecoin is widely used in an economy, the magnitude and channels of monetary policy transmission will depend on which assets (and currencies) are included in the stablecoin reserve to stabilise the value of the stablecoins. In this section, we discuss

⁸ The market capitalization of Tether amounts to 4,12b USD, which makes it the fifth largest cryptocurrency after Bitcoin, Ethereum, XRP, and Bitcoin Cash. Source: <https://coincap.io>, access time: November 14, 2019.

how global stablecoins can affect (i) the interest rate channel of monetary policy transmission mechanism; (ii) seigniorage; and (iii) the global interdependency of monetary authorities.

Central banks use their policy rates to control short-term nominal interest rates of the economy. By doing so, they are able to influence the borrowing conditions of the private sector, which finally affects real economic activity. Thus, the efficacy of this “interest rate channel” of monetary policy transmission mechanism depends on the composition of the private sector’s balance sheets.

Now assume that stablecoins are widely accepted as a means of payment and, thus, have a stable store of value in a certain country. In this case, stablecoins will enter the balance sheets of corporations and households, thereby affecting the size of the central bank’s balance sheet. Then, the efficacy of the interest rate channel will depend on the role of a specific currency in the stability mechanism of stablecoins. If the commonly used stablecoin is exclusively backed with the domestic currency (fiat-collateralized stablecoin, see Box 1), returns on the stablecoin would be the same to the interest rates on domestic currency deposits, therefore hardly affecting the monetary policy transmission.

However, the problem arises if the stablecoin is collateralized by a basket of multiple currencies, which was the original concept behind Facebook’s stablecoin Libra. In this case, the return on the stablecoin would be, for example, a weighted average of the interest rates on the stablecoin reserve currencies, thus dampening the link between domestic monetary policy and interest rates on stablecoin-denominated deposits. In the extreme case, where the domestic currency is not included in the asset basket of the reserves, the interest rate channel of domestic monetary policy can totally shut down for the portion of assets held in stablecoins of the balance sheets of firms and households.

These effects are likely to be more significant for small economies or those with weak monetary institutions, because the currencies of such countries will not be part of the basket of reserves. At the same time, these countries are most likely to have a fast adoption of stablecoins because they lack a well-functioning financial system and a stable currency. Therefore, the fast migration away from the sovereign currency to a global stablecoin will weaken the transmission of independent monetary policy, a “digital analogy” to dollarization. Especially in periods of turmoil, people could quickly “run” to global stablecoins, such that authorities do not have the time needed to intervene efficiently to stop the disruptive process.

Another problem for central banks arises from the fact that the introduction of digital currencies reduce the amount of paper currency that is circulating in the economy. In this case, the government would no longer receive any substantial seigniorage, which is essentially the revenue made by the difference between the value of money and the cost to produce and distribute it. In general, seigniorage of monetary authorities are transferred to the fiscal authority, who spends the seigniorage to stabilise the economy (consistent with the preferences of voters and their elected representatives).

The magnitude of loss in seigniorage depends on the change in demand for bank reserves and the degree of financial interconnection between the users of sovereign currency and the users of stablecoins. If the substitution to stablecoins is large (and the demand for bank reserves decrease), but the interconnection between the two currencies is weak, then monetary policy may lose efficacy.

While central banks lose seigniorage, the basket of reserves held by stablecoin issuers will earn interest, thus seigniorage. The larger the market share of stablecoins, the higher is the seigniorage income. However, compared to central banks, it is not clear how private companies will use the seigniorage. For instance, the Libra association stated that seigniorage profits “will first go to support the operating expenses of the association – to fund investments in the growth and development of the ecosystem,

grants to non-profit and multilateral organisations, engineering research etc.”⁹ Unfortunately, transparency is not yet given in order to monitor their behaviour in a consistent manner.

Finally, the fact (i) that stablecoins can be used in a global manner; and (ii) the basket of reserves can consist of multiple currencies may result in global monetary authorities being interdependent. Stablecoins can increase cross-border capital mobility and thus the substitutability of domestic and foreign assets, thereby amplifying the responsiveness of domestic interest rates to foreign rates and decreasing domestic monetary control. This, in turn, makes the implementation of independent monetary policy impossible, which is important for the credibility of central banks.

A recent study by Uhlig et al (2019) analyses how the introduction of a globally used currency can affect the domestic monetary policy of countries using this currency. They introduce a simple two-country economy model with complete markets, featuring two national currencies as well as a global (crypto) currency. Their results show that if agents of both countries have the option to use the global currency besides their own domestic currencies, the national nominal interest rates become equal – a phenomenon they define as “Crypto-Enforced Monetary Policy Synchronization.” They show the consequences for a country, if it deviates from this interest rate equality by increasing and/or decreasing its domestic interest rate. In case a country decreases its interest rates compared to the other country, it will very likely reach the zero lower bound. In the case of a higher interest rate, the domestic currency will be abandoned by the agents, since it is much cheaper to use the global (crypto) currency than the domestic one. In addition, they show that in the case when the global currency is backed by interest-bearing assets, additional restrictions arise for the monetary authority of both countries.

In summary, the establishment of global stablecoins may not just disrupt the transmission of central bank’s monetary policy, but also raises concerns that private entities may tend to act in its own favour, rather than to serve the public. This behaviour can be equated with the “original sin” faced by emerging countries, where “the domestic currency is not used to borrow abroad or to borrow long-term even domestically”, due to bad domestic policy decisions of the government (Eichengreen et al., 2005a, b). The global interconnection of the financial markets will make this problem even worse, where a stablecoin issuer may have incentives to change the composition of their basket of reserves in order to harm or benefit certain countries.

⁹ Source: https://libra.org/en-US/about-currency-reserve/?noredirect=de-DE#the_reserve, access time: November 15, 2019.

4. PUBLIC-PRIVATE-COOPERATION: SYNTHETIC CENTRAL BANK DIGITAL CURRENCY

In the wake of growing public interest in digital payment systems and privately-issued stablecoins, the idea of central banks issuing their own digital currencies – the so-called Central Bank Digital Currency (CBDC) – has become centre of the policy debate. Many central banks already provide money digitally in the form of central bank deposits in traditional reserve or settlement accounts. Compared to this, CBDC is a new form of digital central bank money that can be held *directly* by households and businesses without the involvement of a commercial bank intermediary.

In this section, we focus on one specific option central banks have in issuing CBDC, namely to cooperate with private issuers and issue “synthetic CBDC (sCBDC)”. After a detailed description of this CBDC design, we provide evidence on why a public-private-cooperation in issuing CBDC may be a better option than to issue “pure” CBDC by enabling central banks to achieve three policy goals in one fell swoop: using the advanced technologies of large tech firms, establishing a sound regulatory framework for stablecoins, and maintaining trust.

4.1. What is sCBDC?

CBDC is the digital form of fiat money that is issued and regulated by the monetary authority of a country. Just like paper currency and coins, CBDC would be fixed in nominal terms, universally accessible, and valid as a legal tender for all public and private transactions. As with any public currency, the objective of the central bank would be that CBDC fulfil its efficiency as a medium of exchange, its security as a store of value, and its stability as the unit of account for economic and financial transactions. Indeed, many central banks are interested in issuing CBDC (see Box 2).

CBDC has some clear advantages over privately-issued stablecoins. First, people may have greater trust in the government than in private stablecoin issuers, which are open to information ambiguity, fraud, and bankruptcy. Therefore, people can rely on CBDC to be a stable store of value and unit of account. An additional advantage of CBDC is that it enables the government to retain control of the money supply and to monitor (and regulate) capital. Finally, CBDC could enrich the central bank’s monetary policy toolkit, e.g. by allowing central banks to have a price target (Bordo and Levin, 2017) and eliminating the zero lower bound on interest rates (Agarwal and Kimball, 2015).

Given these advantages, the issuance of CBDC seems to be an inevitable option for the future of central banks. Rather it is a question of how and when it will happen. Recent papers investigate the optimal design of CBDC. For instance, Bordo and Levin (2017) argue that CBDC would be account-based and interest bearing in order to serve as a practically costless medium of exchange, secure store of value, and stable unit of account. Agur et al. (2019) consider the implications of different designs of CBDC, showing how a cash-like CBDC can reduce cash demand (and cause disappearance of cash), while a deposit-like CBDC design can lead to a contraction in bank lending to firms. Fernández-Villaverde and Sanches (2019) provide another interesting insight: the authors show how competition between many privately issued currencies can be inefficient. Therefore, government interventions can help to implement an efficient allocation.

In a recent International Monetary Fund report, Adrian and Mancini-Griffoli (2019) point out the possibility of central banks to synthesize a version of CBDC by allowing tech companies (and other e-money providers) to keep accounts at the central bank. Customers, in turn, would hold accounts at these stablecoin providers. As long as one stablecoin is backed with one unit of the domestic currency at the central bank, then it is as if customers are holding domestic currency at the central bank, which is just the essence of a CBDC. They define this as “*synthetic CBDC (sCBDC)*”. The main difference between

CBDC and sCBDC is who maintains the end relationship with the customer: for CBDC, this is the central bank, while private entities maintain the end relationship with customers with sCBDC.

The public-private cooperation in issuing digital currencies can be beneficial in several ways. In fact, this concept is very similar to that of so-called “narrow banks”. These banks take customer deposits and invest the proceeds in interest-bearing reserves at the central bank. The huge advantage of these institutions is that they are immune from runs, failures, and financial crises since they only hold liquid and safe government bonds (and currency). On top of this, stablecoin issuers also bring technological advantages and innovation in digital currency issuance, from which central banks can profit. In the next section, we highlight the advantages of sCBDC over CBDC.

Box 2: Ongoing CBDC projects

Sweden: e-Krona

In response to the decreasing cash usage in Sweden, the Sveriges Riksbank is working on an “e-Krona” project since early 2017. According to their report, e-Krona would be a complement to cash, as well as to current electronic payments- thus “value-based”. As a next step, the Sveriges Riksbank is procuring technical suppliers, such as a well-developed Distributed Ledger Technology, to develop and test the future e-krona.

Uruguay: e-Peso

In November 2017, the Central Bank of Uruguay began a pilot program to test their new CBDC, e-Peso, as a stable and widely used medium of exchange. Unique digital banknotes in several denominations were issued for distribution to an “e-note manager platform”. The platform acted as the registry for the ownership of the digital banknotes. The pilot was deemed a success and closed in April 2018. After this, all e-Pesos were cancelled. Now the program is in an evaluation phase.

Source: Barontini and Holden (2019).

4.2. Advantages of sCBDC

The alternative to sCBDC is to issue CBDC in form of electronic *tokens*, analogous to paper cash and stored-value debit cards. In this section, we provide three arguments why sCBDC would be a better alternative than central banks issuing digital cash in form of electronic tokens: (i) sCBDC have lower initial and maintenance costs; (ii) sCBDC enables central banks to regulate private tech companies; and (iii) the distance to the broad public will help central banks to maintain their reputation.

4.2.1. Lower initial costs

The issuance of CBDC is very complex, since it combines expertise in various areas. Besides the technical platform necessary for the implementation of CBDC, such as Distributed Ledger Technology and the provision of platforms for digital wallets, central banks would need to coordinate customer management, customer screening and monitoring including for “Knowing Your Customer” and Anti-Money Laundering and Combating the Financing of Terrorism (AML/CFT) purposes, regulatory management, and data management. Adrian and Mancini-Griffoli (2019) highlight this complex process of CBDC issuance and argue that they are all linked with substantial costs and risks. However, in case of a synthetic CBDC, the central bank would only offer settlement services and access to central

bank reserves to the stablecoin issuers that will provide digital money. All other functions would be the responsibility of the private entities.

This is beneficial given the fact that the technological status is not yet mature for most central banks to implement CBDCs. The Bank for International Settlements published a report where they surveyed central banks with regard to their research in CBDC (Barontini and Holden, 2019). According to the survey, central banks' work on CBDC is primarily conceptual, with only a few planning to issue a CBDC in the short- to medium-run. Compared to this, Facebook, for example, planned to issue Libra in 2020. By assigning tech companies the role as a digital currency intermediary, it is possible to use their technological advantage.

Especially during times when the growing threats of private stablecoins can disrupt the sovereignty of domestic central banks, a fast adoption of CBDC can be crucial for central banks to stay on the ball. For instance, the People's Bank of China, following the 2019 announcement of Facebook's Libra, announced to issue a CBDC in order to protect their monetary sovereignty. Their CBDC report claims that the People's Bank of China will distribute its CBDC to the public through state-run banking channels and widely adopted payment services like Tencent, Alipay, and WeChat. Since most of the population already uses these digital payment systems, the People's Bank of China would benefit from the large network of users and the spread of CBDC would happen very quickly.

4.2.2. Better regulatory conditions to control private stablecoin issuers

In the wake of the announcement that Facebook would launch Libra, global monetary and regulatory authorities intensively discussed what kind of regulatory framework is necessary to avoid potential misuse of monetary power. This debate, however, is of a very complex nature, due to the big size of such stablecoin issuers and their global reach in the financial markets (G7 Working Group on Stablecoins, 2019). To list a few, a stablecoin issuer must provide legal clarity on the nature of the claim to all participants in the stablecoin ecosystem, ensure data privacy and protection, as well as sound governance, including the investment rules of the stability mechanism.

Providing stablecoin issuers access to central bank reserves (or even restricting them to hold exclusively central bank reserves) facilitates a platform for efficient regulation. First, if stablecoin issuers act like narrow banks, as discussed in section 4.1., then there is no risk in managing the stablecoin reserves such that the digital coins are correctly collateralized. Therefore, the operation of the private entities becomes more transparent and, thus, more trustworthy. Second, central banks may impose high security standards on stablecoin issuers with regard to private data usage such that only entities fulfilling these requirements will obtain access to central bank reserves. Finally, by controlling the supply of reserves to a broad range of stablecoin issuers, sCBDC may foster healthy competition in the digital payment sector, which can foster innovation in this branch with providers developing superior products for the customers.

4.2.3. Lower reputational risk for central banks

Finally, we also discuss the potential risks of how CBDC may worsen the reputation of central banks. The primary mandate of central banks is to stabilise the price level of the economy. In order to achieve this goal, it is well known that reputation is key. Especially in the wake of the Global Financial Crisis of 2008, reputation management has become essential for central banks in order to regulate financial institutions and engage in macro-prudential policies. Therefore, central bank communication and forward guidance are important policy tools for many central banks. Unfortunately, reputation is complicated to manage due to its asymmetric nature: while agents normally do not notice successful supervisory roles, failures in financial supervision can have severe consequences – undermining public

confidence in the financial system and, even worse, in the central bank, thereby affecting the efficacy of monetary policy operations.

However, the issuance of CBDC requires additional operational duties that have nothing to do with the primary mandate of central banks, such as the management of customer relations. Becoming involved in such assignments may raise concerns of the public that central banks may neglect their main duty, leading to lower reputation of central banks. In addition, such customer management is very complex and is exposed to high operational risks, including fraud, technical disturbances, and hacker attacks. In case of a severe fail in either of these areas, central banks may permanently lose public trust, as negative experiences linger in people's memories.

Based on these facts, it seems reasonable to transfer this assignment to private entities. By doing so, central banks do not have to worry about the operational risk that comes with CBDC and the public will separate this risk from the ability of the central bank to keep its primary mandate. This is true for commercial banks today, where operational weaknesses of banks are not directly blamed on the central bank. After all, as John Cochrane states on his blog, "central banks cannot operate retail digital currencies. Who do you call when you forget your password?"¹⁰

¹⁰ Cochrane, J. (2019): Fed Nixes Narrow Banks Redux, The Grumpy Economist (John Cochrane's blog), May 30, 2019.

5. CONCLUSION

If you cannot avoid it, then enjoy it! This saying seems suitable when it comes to central bank digital currency (CBDC). The future will bring (full) digitalisation of money and large tech companies are well on their way to issuing their own digital currencies. Therefore, the most important assignment of central banks is not to decide whether to issue a CBDC or not, but rather to conduct extensive research on the most efficient and optimal design of CBDCs.

In our paper, we recommend that central banks closely coordinate with large tech companies and issue so-called “synthetic CBDCs.” We provide an analysis confirming the clear advantages of sCBDCs by showing how these can minimize the risk of large tech companies issuing digital monies with respect to, among others, data protection and transparency in risk management. Further, sCBDCs enable central banks to have a more stable and sustainable version of CBDCs by taking advantage of the advanced technology of tech companies, being able to regulate stablecoins in an efficient way, and sustaining their reputation.

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Stablecoins issued by large tech companies pose a significant challenge for traditional fiat money. In this study, we highlight the importance of a public-private-cooperation in dealing with this topic, where central banks closely work with stablecoin issuers in issuing synthetic central bank digital currency (sCBDC). This framework minimizes the risks of private money and utilises the technological advantages of stablecoin issuers.

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