Toward Emancipatory Currencies: A Critique of Facebook's Libra Cryptocurrency and Ideas for Alternatives

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ABSTRACT

Money underpins everyone's daily life. Possible solutions for the global problems fail if there is not enough money. Yet changes to our monetary system are rarely included in the discussion. Against this backdrop, cryptocurrencies create important new precedents regarding how money can be created. Libra is a recent cryptocurrency project launched by one of the dominant social media companies, which has been the subject of intense international discussion. Because the details of Libra are not yet fully specified, we present different scenarios of how a successful Libra currency might play out and some of the problems that might follow. These scenarios include the monetization of the payment infrastructure, (ab)use of sanctioning power, a reduction of the reserve ratio, and an abandonment of reconvertability. These problems suggest a number regulatory strategies in response. Finally, we describe values and design requirements that might help guide future cryptocurrency innovation and provide ways of evaluating their success or failure.

CCS CONCEPTS

• **Social and professional topics** → **Corporate surveillance**; • **Computer systems organization** → *Peer-to-peer architectures.*

KEYWORDS

economics, cryptocurrencies, Libra, Facebook, monetary diversity

1 INTRODUCTION

Bank failures and recession are intrinsic to our global financial system from the beginning. But at least since 2008 it is in an ongoing crisis. The banking sector is characterized by too-big-to-fail banks

that are interconnected covertly into a highly fragile system that the global economy depends upon. This fact lead to a flourishing of reform proposals. On the 18th of June 2019 Facebook announced its plans to release a cryptocurrency called *Libra* over the course of 2020 [5]. For this purpose the Libra Association was founded, a group based in Geneva that is planned to consist of 100 members upon release. The announcement already included a list of 28 participants, among them were the payment service providers VISA, Mastercard and PayPal, as well as commerce in form of ebay, Uber, Spotify and strikingly no ordinary bank. In October 2019 Booking Holdings, eBay, Mastercard, Mercado Pago, PayPal, Stripe and Visa Inc exited the Association. Thereafter, Vodafone joined, but left again in January 2020. Since then, seven more members joined resulting in 27 total members at May 14th 2020. In April 2020 the Whitepaper was updated with significant changes to the Libra Reserve and in May the Libra Association appointed Stuart Levey as a CEO [1].

As a cryptocurrency that was developed by a dominant social media company and carried by an association of renown enterprises, Libra is intensively discussed in politics and media. The heated discussion however mostly focuses on the justified privacy concerns [36], or demands that the issuance of money stays under central bank control [3]. The following section will relativize to which degree this central bank control even is the case today. But in addition, further academic discourse is important, to develop criteria that future and present currency innovations can be measured against. After all, it can be expected that over the next years other non-central-bank actors will follow in the attempt to establish future currency systems and the Libra discussion can be developed into a precedential case.

The exits from the Libra Association as well as the update to the Reserve could be related to the regulatory headwind, due to which the currency design of Libra is also up to change. Furthermore, in this open process not only the eventual members of the Libra Association remain to be seen, but also the general adoption and possible further changes to its currency scheme. This uncertainty is further enhanced by the unforseeable consequences of the response to the COVID-19 pandemic. For this reason our discourse will use different future scenarios that are compared against a spectrum of regulatory approaches. For their assessment a more nuanced perspective on money issuance, that acknowledges the respective threats as well as potentials, is required. As a result of the analysis we are able to derive criteria that future currency systems can be measured against.

From the authors perspective there is a potential for emancipatory currency innovations, but an even bigger risk of loosing sovereignty and becoming further dependent on a small number of private corporations. This puts weight onto a considerate handling of the topic.

2 STATE OF THE ART: DIGITAL MONEY

2.1 Monetary Theory

What money really is, is highly contested in economic theory. Usually instead of a theoretical conceptualization merely the functions of money are enumerated: a medium of exchange, a store of value and a unit of account. After all the defining aspect is, what people use as money. It is well put with the saying *money is what money does*. Nonetheless different schools of economics do have their view on how to deal with money, regardless of its definition. Concerning the questions of money creation which are relevant here we can characterize the discussion by five interrelated divides.

First and foremost, there is the question of the *neutrality of money*, the idea that changes to the stock of money only affect nominal prices and have no impact on real economic activity. Although the assumption of neutral money underlies some mainstream macroeconomic models, like the real business cycle model, today most economists admit that there are at least short term real economic effects. However, many schools of mainstream economics still believe that the neutrality of money holds in the long term. Other schools of economic thinking fully deny the neutrality of money even in the long run, like John Maynard Keynes and the Austrian School economist Ludwig von Mises.

Among these critics, but not limited to them, there is debate about the *essence of money* being characterized either as credit or as an abstraction from barter. The barter or commodity theory is held for example by most Austrian School economics, who in a consequence often support a monetarian system which is backed by gold - being a highly valued commodity. By contrary, parts of the Keynsian school of thinking support the credit theory of money where money is the social construct of credit printed into a transferable form.

A third divide ranks around the macroeconomic *purpose of money*. Among others the Keynesian school of economics views money as a central instrument to steer the economy. By contrast, from a monetarist perspective, money is often metaphorically characterized as a lubricant for the economy, an sufficient amount of it is required to overcome regidites, but further manipulation is likely to be counterproductive. Monetarists thus argue for central banks controlling the money stock. e.g. according to the Monetarist and Neoclassical economist Milton Friedman's k-percent rule that fixes a constant monetary growth. Also leaning toward the lubricant characterization, but in private hands, Austrian School economist F.A. Hayek argues for a Denationalization of Money where privately issued currencies compete for the trust of the general public [38]. He argues that the most soundly managed currency would persist. Both authors later differentiated their position.

Similarly, not even on the *origin of money* there is an agreed upon consensus. According to the Banking School money resulted from banks as a service or product for the economy. Contrarily Chartalism believes that money originated from states that were able to back this money by their ability to raise taxes. Tendentially both schools advocate money creation in the hands of the entity it originated from. For example, Modern Monetary Theory, a Chartalist school that recently gained some influence in the public discourse especially in the United States, promotes states to actively use money issuance and redemption as a tool to steer the economy.

Lastly the regulation of the *stock of money* is debated. While Monetarists view money as exogenously determined by the central issuing authorities, Post-Keynesian economics argue how money is endogenously determined by the demand for credit in the economy. With endogenous money creation, even if the amount of money issued by the central bank is too scarce, a working financial system would satisfy the existing demand for credit and thereby effectively expand the money stock. To comprehend this part of the discussion and to give a context to money issued by private institutions, it is necessary to have an understanding of our conventional monetary system.

2.2 Our Conventional Monetary System

Today all developed nations have adopted roughly the same two layered monetary system. The first layer is the national currency that is issued by the central bank. The state defines this central bank money as the legal tender and citizens can only hold it in form of cash. The second layer consists of licensed and regulated commercial banks that issue private bank money. E.g. every time a bank gives a loan, it issues private bank money that is formally a claim on central bank money the account holder has against his bank [31, 40]. The biggest part of the monetary supply exists in form of bank deposits on private banks. This private bank money is convertible into central bank money, when customers withdraw their deposits in form of cash. But banks do not hold central bank reserves for a 100% backing which causes problems, when customers want to spend too much deposits by cash or to customers of other banks. The exact reserve requirement ratios vary between 10% and zero. In this way the biggest part of the monetary supply is issued by private banks, while central banks use key interest rates as one monetary policy instrument officially trying to ensure the currency's stability in value. However, since the financial crisis of 2008 central banks have successively expanded their repertoire of measures to prevent a collapse of the banking system. For example, they directly affect the stock of money by tools like Quantitative Easing. However, according to the Bank of England and the European Central Bank, these tools are reserved for unusual times [31].

Some heterodox economists hold the opinion that when money is only spent into existence with interest bearing debt, this creates in the economy an obligation to either grow exponentially or fall into a crisis [37]. When growth stagnates, the threatening crisis is postponed by an expansive monetary policy of the central banks. This however threatens to inflate the value of the currency.

In the past the central bank money was itself backed by gold reserves of the central banks, in which the central bank money was convertible [26]. After the Bretton Woods Agreement in 1944 currencies had a fixed exchange rate to the US Dollar and thereby in theory a gold backing. The US central bank's reserve rate that is the fraction of the central bank money for which it holds gold

reserves, decreased over the 20th century. When in 1971 France tried to convert their US Dollar reserves into gold, US-President Nixon overturned this gold standard and the Bretton Woods System altogether. Since then, the US Dollar and all national currencies related to it are unbacked. To preserve the trust in the US Dollar as an anchor and reserve currency the US has an interest that trade is happening in US Dollar, i.e. that oil exporting countries accept only Dollar as a means of payment [35].

In the Euro system the national banks have delegated their privilege to create the legal tender and their mandate for monetary policy to the European Central Bank [27]. Nevertheless, in the Euro and the Dollar case the amount of central bank money that could be created is theoretically unbounded. Therefore, the reserves that fractionally back private bank deposits are themselves only paper currencies without any scarcity anchor.

2.3 Complementary Currencies

From different angles of critique of the conventional monetary system many local currencies aim to repair different aspects. They realize that money is a social tool that can be designed to fit a purpose. Examples are the WIR [21], the Brixton Pound [23], the Chiemgauer [10], or the Bangla Pesa [15]. While all of them put a different emphasis, such as on an interest free credit creation or on negative interest on cash, they share in common a focus on the local usability that aims to keep the money circulating locally and prevent it from drifting away to big companies. Often they are merely brooked by the national banks and could be expected to be forbidden, if they would gain relevance on a bigger scale. Furthermore, they generally neither have the ambition nor the capacity to do so.

2.4 Distributed Ledger Money

The libertarian view that the banking sector and governments are equally oppressive when they control the monetary system spawned the idea of decentrally issued money. Most people in this early field were influenced in their perspective by the Austrian School of economics (see 2.1). Starting with Bitcoin various cryptocurrencies have been developed. A cryptocurrency is a currency for which the payment, the storing and the management is governed by a decentralized computer protocol instead of a central bank and which is secured against forgery by computer cryptography. Diverting from the libertarian ideal of emancipating from centralized institutions private ledger and central bank digital currencies are the responses of the private sector and central banks respectively to the technical advances of cryptocurrencies.

The technological development, however, did not halt with blockchains, nor their application on money and thus further blockchain alternatives have been developed, which are summarized under the term Distributed Ledger Technologies (DLT).

2.5 Blockchain Cryptocurrencies

The first generation of cryptocurrencies starts with Bitcoin in 2009 [32] and uses Blockchain (see box). In 2014 Ethereum expands the blockchain from a decentralized transaction ledger to a decentralized computer applying so-called Smart Contracts [12]. However,

the clever construction of a Proof of Work Blockchain results in two major downsides.

First an increasing market price of the currency, makes mining more profitable up to the point where the amount of computing power invested into mining drives the difficulty high enough that energy costs exceed the expected rewards and further investments are no longer lucrative. Therefore, the market capitalization of Bitcoin correlates directly with the energy consumption of mining. As a result the energy demand for Bitcoin today is bigger than the one of Switzerland [9, 24]. Since a decentralized consensus would not be necessary, if there would be a trusted authority guarding the data, one could argue that the energy cost is the quantified distrust in institutions.

The second downside of a constant block production is the limited space in the blockchain, constraining the transaction throughput of the network orders of magnitude below what would be needed for a globally dominant payment medium. In other words the network becomes less efficient, the more participants it has. This is called the scaling problem.

Most cryptocurrencies rely on a fixed supply. When their value is solely determined by the demand, the currency's price becomes volatile. Such a construction makes the currency vulnerable against value speculation. Although some advocates of cryptocurrencies may characterize this as the basis for a good investment opportunity instead of a vulnerability. However, it also makes the currency unqualified as a medium of exchange. A common approach is to add a construction that aims to bind the price, at which the currency is traded to e.g. the Dollar, such currencies are called stablecoins. An example of a stablecoin is Tether [20] and the G7 published an investigation of the impact and regulatory expectation for these currencies [4].

One heatedly discussed aspect of currencies is anonymity. Whereas the Bitcoin approach is pseudonymity, meaning that payments are transparent, but only according to the public addresses, to which the real owners are unknown. This approach argues that the freedom to own any number of accounts, together with pseudonymity offers sufficient privacy. Complete anonymity is a feature of cash that can hardly be preserved for digital currencies, since any digital payment needs to leave some trace in order to be verifiable at all. However, Zcash comes arguably close to the ideal of cash utilizing so-called zero knowledge proofs [22]. Another notable advancement in blockchain currencies is Faircoin, which tried to adopt the bitcoin protocol to ecology and democracy [14].

While the problem of energy consumption is specific for Proof of Work Blockchains, all public blockchains share in common the scaling problem. Nevertheless, Bitcoin proved that digital decentralized money is possible and thereby fueled the imagination of money enthusiasts.

2.6 Private Ledger Currencies

One answer to the scaling problem can therefore be to make the blockchain not public. For a private or permissioned ledger the distributed consensus algorithm is replaced with a single or a group of authorities that decide, who can read or write data into the chain. Thus, for a currency that is implemented via such a blockchain, all transactions reside with the control of these central authorities.

How a Blockchain works

Most cryptocurrencies rely on the same basic architecture as Bitcoin - a blockchain [32]. A blockchain is a form of storing data. Unlike a common database, for cryptocurrencies it is desired that data can only be added to and not removed from the chain. This is because users should be able to write outgoing transactions from their own account into the blockchain, but not delete transactions that have been carried out, because this would come equal to a manipulation of account balances. While this objective could be achieved easily by a central administration, the whole point of cryptocurrencies is not to rely upon any such central authority. This is the most characteristic feature that separates most of these currencies, from virtual currencies that existed before. To achieve decentralization and temper proofness the data is arranged in small blocks, which are connected with a hash function to a chain. The architecture and the properties of hash functions ensure that any changes to the data in one block would require a modification of all subsequent blocks. This property is crucial but not sufficient to make a blockchain temper proof. In addition, a consensus algorithm is required.

Bitcoin and its imitators use Proof of Work as this consensus mechanism. Therefore, only blocks of a certain form are considered valid and those need to be found difficultly and thus energy intensively by computers in a process called mining. Anyone can perform this task and is rewarded by transaction fees and newly created coins. However, the difficulty to mine a block increases the more computing power is globally spent on mining precisely in a way that ensures a relatively constant speed of block production. For Bitcoin, it is about one block every ten minutes.

How does mining help to make a blockchain temper proof? The consensus protocol states that the true blockchain is the longest one that consists of only valid blocks, each of which was mined with an amount of energy spent into it. Because changes to any block would require further changes to all subsequent blocks as well, these blocks needed to be mined again. In other words more energy would be required than the rest of the mining network invested since that point in time. In this sense the amount of energy that is consumed by the miners is precisely what makes the blockchain secure, because an attack would require more computing power and more energy than the whole network.

Something similar can happen, if instead of an attack scenario a part of the bitcoin network would decide to change the rules for bitcoin. In this case they would extend the blockchain in a different way. Both versions of the blockchain could be continued and everyone could decide which one to use. The result are two inconvertible currencies. Whether it happens via an attack or in good faith, such an event is called fork, since the single chain forks into two consecutives. A fork is made likelier when the interests of different stakeholder groups diverge, such as miners, developers, holders and users as a means of payment. However usually the expected loss of trust in the currency that is associated with a fork unites these groups sufficiently. Thus, a fork where both arms being continued, never happened for bitcoin. Ethereum, the second biggest cryptocurrency by market capitalization, did this once in 2017 to revert certain transactions, resulting in Ethereum classic and Ethereum, and it plans to another fork this year, when the consensus protocol is changed from Proof of Work to one called Proof of Stake [13].

Cryptocurrency enthusiasts would argue that such a construction has lost the advantages that a blockchain was all about. After all, Bitcoin is based on the libertarian ideal of money that is independent of banks and states. Nevertheless, a blockchain pattern can in some cases bring merit in the private or permissioned case, especially when mediated by a group of authorities that trust each other to some degree but not perfectly.

2.7 Central Bank Digital Currencies

In recent years the idea of central bank digital currencies (CBDCs) gained some traction [28]. Although central banks already maintain accounts where the registered commercial banks digitally store their reserves, this is not what the term CBDC stands for. Instead, it can be seen as a catch up by the central banks on to the development of our digital monetary system outlined above. One model how a CBDC could be implemented transfers cash into the digital age by giving ordinary citizens a possibility to hold central bank money in a digital form. A particular difference is that CBDCs by default would not preserve the anonymity aspect of cash. Such a step is particularly controversial, since it is a necessary prerequisite to abandon cash and expand the negative interest rate onto all central bank money.

On this foray Sweden is probably the farthest ahead where for years already in most places cash is not accepted anymore. In February this year the Swedish central bank launched a pilot program for the CBDC E-Krona [11]. In late 2019 the Chinese central bank announced their own CBDC that uses blockchain technology as well [25, 39]. In 2018 the government of Venezuela has launched an complementing oil based cryptocurrency called Petro. CBDCs can be implemented with or without blockchain technology, but the existence of cryptocurrencies as competitors fuels the development of these. It is debated and sensitive to the design choices of a CBDC, to which degree they attack the core business of commercial banks [28]. When people can store their money safely on and transact between their central bank accounts, would they still use commercial bank accounts in a near zero interest environment? Although the reversal of the trend that the amount of money in circulation is controlled increasing by commercial banks, might seem to be in the interest of central banks, they will not dare to destabilize the monetary system by such a step.

2.8 Post Blockchain Technology

The essential component for scalability and resource efficiency is to forgo a global consensus like Proof of Work. It is not obvious how to achieve that, while still minimalizing the degree of central authority that is required. Existing solutions include IoTA [18] and Hashgraph [16], which apply directed acyclic graphs (DAG) instead of a single Hashchain as the underlying mathematical topology. As an even older distributed peer-to-peer structure BitTorrent uses Distributed Hash Tables (DHT) to store data in a temper-proof way since almost 20 years. Holochain combines DHTs with hashchains to a data integrity engine that enables trustworthy authentication of data [17]. Without the room to explain the details here, technology that can facilitate a currency in a distributed, scalable and resource efficient manner exists.

3 LIBRA - DESCRIPTION AND PROSPECT

The first part of this section will neutrally describe the proposed structure of Libra as far as it is determined at this point in time on the basis of reviewing the official documents. In the second part we will critically paint future scenarios that relate to the foundation laid in the previous section. This procedure enables us to later discuss regulatory strategies with the long term prospect that is required for the matter of money. Furthermore, we can thereby take into account pathways that are relevant in response to future monetary innovations even if Libra eventually does not take them.

3.1 Libra

Libra is not Facebook's first advance in the direction of virtual currencies. Between 2008 and 2013 it was possible to pay platform related services with Facebook credits, a virtual currency that had a fixed exchange rate to the US Dollar [33]. The reason that Facebook credits did not find wide adoption could lie in the service fee of 30% that was charged, the limited possibilities to spend them, or the missing convertibility back into other currencies. Libra by contrast proclaims to use a blockchain, more precisely it is a permissioned blockchain. The Libra announcement included the publication of a Libra whitepaper [5] and a Libra Blockchain paper [7], on which the following analysis is based.

Similar to Ethereum, Libra enables Smart Contracts by a custom programming language called Move [7]. In contrast, Libra cites the disadvantage of the prodigal energy consumption of Proof of Work as the reason to instead use a private blockchain (see 2.6). In a private blockchain only certain members have the special right to be involved in the consensus. For Libra these members are provided by the Libra Association. The consensus procedure only regulates how these prospective 100 parties agree on the ledger state. From the technical protocol of the method used, it follows that a two-thirds majority (in the Libra Association) is required to obtain control over the network. Conversely, the network can be shut down by an at least one-third minority. So neither Facebook nor Calibra, the Libra-Wallet founded by Facebook, controls the currency. Instead, it is the Libra Association where each of them has only one vote in a hundred. Out of this control over the currency on the technical level follows that changes to the protocol can be made with a two-thirds majority. Consequently, it is also stated at the organizational level that this majority in the Libra Association is allowed to change the rules of Libra. How a change in those rules might play out is discussed in the next chapter. For now, it is important to note that here lies a crucial difference between the Libra variant of a private blockchain and consensus methods, such as Bitcoin's Proof of Work. In Bitcoin a rule change would lead to a fork (see 2.5) where both versions can be perpetuated and the users choose which one they continue to use. In Libra, there is no way for users to use an old version of Libra, if they for example disagree with rule changes made by the Libra Association. Since the Libra Association wants to minimize this risk of their users dropping out, these measures can only be expected once Libra has established. Let us therefore inspect how the current rules are supposed to instill trust.

Libra currency is only created by a deposit into a reserve, a similar approach to some stablecoins. Originally one Libra currency was proposed with a reserve consisting of a basket of currencies and assets like short term government bonds [6]. In the updated whitepaper there exist different stablecoins, Libra-USD, Libra-EUR, Libra-GBP, etc., each pegged 1:1 to a national currency and with their own reserves [19]. In addition there is a Libra currency LBR that is a collection of the Libra currencies with a fixed rate. We refer to all these currencies as "Libra". In any case the currency is 100% covered by the reserve. In other words money creation does not take place, given that one does not count both, the Libra currency and the reseve as money. The Libra Association decides on the composition and investment of this reserve. This reserve may be paid out against the redemption and thus destruction of Libra. But instead of every user, only selective organizations, such as exchanges, are authorized to make these deposits and withdrawals. They act as intermediaries in trading between currencies. In especially users that want to convert their Libra back into US Dollar for example sell them to an exchange. And only if the aggregate supply of Libra exceedes the aggregate demand for Libra on that exchange, it will redeem an amount of Libra to the Libra Association that is roughly equal to that difference. More detailed information on how this process works is not yet published. It is worth stressing that users have no guarantee for reconvertibility, the whitepaper merely states that due to a competitive network of exchanges *"anyone with Libra has a high degree of assurance they can convert their digital currency into local fiat currency based on an exchange rate." [7]*

3.2 A Prospect

Whether Libra will establish as a relevant system is even more speculative than the involved companies hidden motives. This is not to say that writing about it is pointless, but quite contrary that the answer is wide open, because it depends on the choices that will be made. The success of the Libra project will be primarily determined by the relative adoption of the currency. Therefore, the participation of commerce companies that accept Libra for payments is significant. The acceptance also depends on the regulatory counterpressure. Let us therefore draft different future scenarios to compare regulatory approaches against. For all of them the upcoming decade is a realistic time dimension. As speculative as they might be, we find tangible hints for them in the publications that accompanied the announcement of Libra. As a common starting point, the year 2020 started with an economic shutdown in response to the pandemic. It has the potential to shock the contemporary banking system with first a deflation, followed by a severe inflation, triggered by the central banks expansive monetary response. It would shake up the trust in the stability of Dollar and Euro, enough to let people search for value stable currencies where Libra steps in.

3.3 Monetization of the Payment Infrastructure

On the day of the release, David Marcus, head of Facebook's Libra Wallet Calibra and co-creator of the Libra system, stated in a CNBC interview [8] that their plans to monetize Libra is by bringing small businesses and other Facebook users together as customers. This should result in more trade over the platform, which in turn makes advertising more profitable. More generally, it could just be another building block that in order to let a bigger part of the

users' lives happen on Facebook and tie them closer to the platform. If this giant with about 2.7 billion users now wants to establish a currency, in a cooperation with big payment service providers, in view of the business model, it seems natural that this is an attempt to obtain more profound user data. After all, data on consumer behavior has the highest quality for personalized advertising. Even if David Markus claims that *[...] this is not how we will monetize it* [8] the full transaction data is in the hands of every member of the Libra Association. Therefore, in especially the sharing of data from Calibra to Facebook, which he promises will not happen, will be unnecessary anyway. In a previous LIMITS paper we stressed the incompatibility of this business model with sustainability and democracy [29].

The Libra Blockchain Paper [7] also announces that in the future it may introduce a higher transaction or storage fee for the data in the Libra Blockchain. *"We anticipate that as the system is used, eventually storage growth associated with accounts may become a problem. Just as gas encourages responsible use of computation resources [...], we expect a similar rent-based mechanism needed for storage. [...]. We discuss one option that can be applied to any policy that determines at expiration time after which data can be evicted."* The *gas* that is referred to here is a unit, which is used in Ethereum to measure the computational effort to calculate the outcome of transactions in order to pay miners the transaction fee accordingly. If Libra is established, it is likely that one needs to pay the Libra Association for the storage of transaction data. The greater the role of Libra as a means of payment, the more fees can be charged.

It may therefore be that after a relevant part of global economic activity will have made itself dependent on Libra, the Association will heavily monetize the Libra payment infrastructure. As we have seen, various ways to do so exist within the currently proposed set of rules.

3.4 Sanctioning Power

One aspect that deserves its own assessment of regulatory considerations, is sanctioning power. Suppose for a moment that Libra were the dominant currency in the future. As the infrastructure provider for such a monetary system the Libra Association would control who is allowed to make financial transactions. For cryptocurrencies like Bitcoin that deploy a Proof of Work consensus algorithm, such sanctions would require the majority of miners to collude and divert from the agreed upon protocol in something called a 51%-attack. With a private Blockchain like Libra uses it on the other hand, the selective denial of transactions does not even require a change to the protocol, but only a two-thirds majority in the Libra Association. The software that is run by the validator nodes of the association members could for example include a preceding filter of addresses whose accounts should be frozen. It solely requires the qualifying majority to refuse to commit any blocks that include transactions from a certain blacklist. It can be expected to remain the way that the vast majority of members in the Libra Association are US companies. Therefore, a US legislation would suffice to freeze the accounts of e.g. all Iranian users.

During the subprime crisis the US government feared an end of the US Dollar dominance in the global financial system. A call for a Office of the Director of National Intelligenc titled Evaluating the

Impact of U.S. Dollar Losing its Status as World Reserve Currency indicates that this concern aggravates with the emergence of Libra and CBDCs [34]. It may therefore happen that the US legislators on a factual level encourage the introduction of Libra, while publicly voicing a strong regulation, in order to preserve the power to impose sanctions into a post US Dollar era. In this scenario the establishment of the basket LBR-currency may succeed predominantly in the global south, which the Libra strategy targeted under the pretense of financial inclusion [5], but could be globally used for cross border purchases. China would try the same, resulting in monetary proxy wars between east and west emerging all around the globe. As the first mover in a network effect dominated playing field, Libra could win through in the areas where facebook is the dominant social media platform. That the thereby established sanctioning power lies in the hand of private companies instead of the state would increasingly manifest toward the end of the decade. Even without fundamental rule changes cases of blacklisting could pile up, whenever political actors, even pro US-government ones, interfere with the companies' agenda.

3.5 Reduction of the Reserve Ratio

In the above-mentioned CNBC interview [8], David Marcus puts his explanations of how Facebook will benefit first as *in the short term* and then corrects that this will take several years. This can be taken as a hint that there is another, more long-term strategy. Such a strategy is indicated by the original Libra whitepaper [5], in which the backing by established means of payment is justified: *"This approach has been introduced in the past: to help instill trust in a new currency and gain widespread adoption during its infancy, it was guaranteed that a country's notes could be traded in for real assets, such as gold."* As with most currencies the US dollar, even in the days when the system was officially called gold standard, only a partial backing by the central bank's gold reserves existed. This means that not all US dollars could have been redeemed at the same time in gold. This percentage was reduced further during the course of the 20th century. The comment suggests that the Libra will also repeat the path of the US dollar and drop its 100% coverage in the future.

With a reduction of the reserve rate, the Libra Association could benefit from the creation of money. This can be done in practice in different ways and it requires only a corresponding modification of the self-imposed rules by the Libra Association. A crude way would be simply distributing the money paid for the creation of Libra to the members of the Libra Association instead of investing it in the reserve. Another possibility would be for the Libra Association to issue new Libra that is used for investment, similar to the fractional reserve of e.g. investment banks described in 2.2. Such changes could happen slowly and stepwise, as loosening rule changes for the Libra reserve. For example, newly created Libra could be used to buy assets that would be held by the Libra reserve. As a next step loan agreements denoted in Libra could be accepted, allowing the Libra Association to lend money into existence. Further steps would be the purchase of real estate or funding investment programs that promote Libras political agenda.

3.6 Abandoning the Reconvertibility

Continuing the path of the US Dollar further, in 1971 US President Nixon announced the cancellation of the central bank's obligation to convert Dollar back into gold. In this sense it is conceivable that at some point in time a reconvertibility of Libra into national currencies will be denied. The promise of reconvertibility is crucial, because if it is abolished, the profit for the Libra Association would be tremendous, since all claims on the reserve would vanish into irrelevance. The current construction creates optimal conditions for this step, since only certain qualified intermediaries are allowed to redeem Libra against currencies from the reserve. Those intermediaries can be pressured, not to use this possibility, or their number could be decreased to those who are submissively dependent on the Libra Association. The hurdle for abandoning the redeemability will thus not be the required two-thirds majority in the Libra Association. The preceding scenario might continue by an increasing number of Libra users becoming suspicious. A run on the exchanges could take place. Because it exceeds the reserves capacity to pay, the Libra Association would announce that to preserve financial stability, similar to 1971, the reconvertibility is cancelled. Vendors would be pressured to accept Libra anyway and the public would turn back to normal. A new financial elite would have established that has an unlimited ability to print money, as long as the public is willing to use Libra, to which they are manipulated by the entirety of the online environment they encounter.

4 DISCUSSION

Facebook's business model is based on the accumulation, evaluation and monetization of the personal data of its users, for which the service is free of charge. That may sound harmless to some people. However, how this business model results in consequences in the form of consumerism, social fragmentation and political manipulation, is described in Zuboffs book and summarized in the authors previous LIMITS paper [29, 42].

The fact that no classical banks are involved in the Libra Association can be taken as an indicator that the project is rather an attack on the banking sector. Compared to the tiny reserve ratios of banks, the Libra Association holds a 100% reserve and offers with Libra a medium that is faster transferable than bank deposits. When a significant part of the liquidity in the economy would be held in form of Libra instead of bank deposits, it would be at least as impactful on the banking sectors business as ordinary citizen using CBDC accounts at their central banks [28]. The members that left the Association in October represented the payment sector. Their exit is presumably a sign that the internally expected regulatory response would conflict with the core business model of the payment industry (but not with others). The temporary membership of Vodafone is particularly interesting, since Libra puts emphasis on their mission for financial inclusion of underbanked people in the global south. *"We believe that we all have a responsibility to help advance financial inclusion" [7].* Vodafone capitalizes on the dominant position they hold in Africa with the M-Pesa. A similar choice between partner and competitor was presumably made by the non-participating Giants Apple Pay, Google Pay and Amazon, of which a competing foray can be expected in the future. With respect to the following scenarios the position of Apple and Amazon

is distinctively different to Facebook and Alphabet Inc. (Google), since both have a business model that currently relies less on the monetization of gathered data.

The choice of Stuart Levey as a CEO is a strong public sign for future compliance with political sanctioning [1]. Levy formerly served as the first Under Secretary of the Treasury for Terrorism and Financial Intelligence during the Bush and Obama Administrations. Therefore the sanctioning power scenario becomes particularly likely.

Facebook chose a technical design of the currency that is up to date of blockchain protocols, it avoids the problems that cryptocurrencies have with scalability, volatility and energy consumption. The result is a private blockchain and therefore fundamentally contrary to the egalitarian approach of the Bitcoin idea. From Facebooks perspective this is not a bug but a feature; it lays the foundation to impose rule changes on the users at a later point in time. The scenarios showed with increasing unscrupulousness, which direction these changes might take. But all of them are based on indications from the publications. Especially the last two scenarios require a significant deviation from the currently proposed rules for the Libra reserve, but not from the Libra technology. Even if it was clearly stated, that such deviations will not happen, how little such proclamations are worth, when they are not legally binding, shows for example the case when Facebook bought Whatsapp in 2014 promising that no user data will be shared between the companies, which was broken only two years later [2]. Positively the updated whitepaper states that the responsible *"FINMA [...] is expected to specify the continued full backing of each Libra Coin as a condition of the [Libra Association's] license"* [19]. Interestingly the update in response to the legislators concerns adheres to the Libra currencies as individual units of account instead of claims on central bank money, like deposits are. A plausible explaination is that the 1:1 correspondence is expected to be only temporary.

As daunting as the scenarios may seem, in the case of a hyperinflation of e.g. the Dollar the Libra Association would instead increase the Dollar price of Libra USD to prevent the spreading of the inflation onto Libra. One can expect the association to change the rules so that other assets are allowed in the reserve instead. Even though a part of the reserve may have become worthless, as long as Libra manages to be significantly less inflationary than its competitors, people will want to use it. In this situation the discussed scenarios would even seem to be the rescue from a collapsing financial system that became impossible to maintain by central banks and governments, leaving society and democracy in a precarious spot.

4.1 Regulation

A regulatory objective that the first scenario uncovered is the protection of privacy rights. The pseudonomous approach of most cryptocurrencies is reverted by the fact that businesses using such currencies need to respect KYC ordinances anyway. The main arguments for anonymous payment systems are based on the prevention of either freezing or data mining ones account. Indeed, these practices, especially as a business model, have devastating consequences for society and ecosystem [29]. Therefore, we should demand that any institutions that provide currency infrastructure should not be

allowed to datamine or pass on personal payment data. Instead, due to the immense power imbalance, the relationship they enter with the users of the currency needs to be the one of a fiduciary. In result, data mining companies are to be strictly separated from currency providing companies, reminding of the institutional separation of commercial and investment banks that existed in the US until 1999. In especially, any company that chooses to participate in the Libra Association would be as a fiduciary not allowed to have a business model like Facebook.

From the scenarios we painted above a second regulatory objective that comes to mind could try to siphon off the profits from the money creation, to redistribute them to the state. The fact that there is disagreement in the economic profession on how these profits, called seigniorage, are measured, should prove that an attempt to put this into tax law is unrealistic. It is not even clear how to measure the seigniorage for commercial banks that create deposits by giving loans, as mentioned in section 2.2. Let alone, how to apply this to existing cryptocurrencies. Furthermore, such currencies are used across national borders and even in simpler cases tax heavens are ubiquitous. Therefore, we desist from supporting such a regulatory objective. Instead, it is our best bet to encourage competition between such currencies. The design of "emancipatory cryptocurrencies" that support the values of sustainability will be discussed in section 5 as well as other key humanistic values, will be an important direction for future research.

It is quite significant to note that the threat of the scenarios is not primarily the ability to create money in the hands of private profit seeking institutions. As chapter 2.2 explained, in our conventional monetary system the overwhelming part of the monetary supply is already created by private banks. This is not to be said that this is not problematic. A part of the concerns apply to the conventional banking system already. The difference is covered in the connection between the privately issued and the central bank money. When the 1:1 correspondence is eliminated, the Libra system escapes the reach of central banks monetary policy. Currently the Libra versions of national currencies seem safer that bank deposits that are only fractionally backed, but the question is whether Libra currencies represent a legally enforceable claim on the respective reserve. If on the other hand the convertability of national currencies into their Libra counterpart is abandoned, the price of e.g. Libra USD can exceed the US Dollar. For example in case of an inflation the Libra USD could be the stronger currency and in a sense the Libra Association would slip into the role of a central bank. In recent years central banks have expanded their mandate and taken more drastical and costly measures in order to prevent a collapse of the banking system. Similar abilities would in the hand of the Libra Association be combined with the vested interests of 100 companies. Considering this power, it is worth mentioning that once seized, it is hardly put back into the box.

4.2 Etatism, Laissez-faire and Nationalism

When David Marcus was interviewed by the United States Congress on Libra on July 17, Republican Carolyn Maloney strongly advised him against the introduction of Libra [3]. The development of a new currency is a core task of the government and should be left to democratically accountable institutions. Even though, it does not seem as if the US Congress would stick to this course. Furthermore, a reasonable question is to what extent the democratic accountability is given for the US central bank (the Federal Reserve). But in view of the above scenarios, this point of view that we call etatist appears appropriate. Shouldn't legislators then try to ban all currencies that are not issued by central banks? This approach would declare the Libra project to be illegal in any case and if enforced would prevent all mentioned scenarios. Furthermore, it would try to ban all existing cryptocurrencies as well, which is a little more difficult, since there is no issuer to sue.

Contrarily, in the spirit of Hayek's Denationalization of Money, one might ask what is wrong with more competition for central banks. If people can freely choose to use the currencies that serves their needs, one could argue that the power of the issuing institutions is rooted in the choice of the people accepting money, not the ones holding it. In a sense this could be seen as a form of democratic legitimation, even though not expressed in the form of a traditional election, open to all citizens and using a secret ballot. This approach, however, would leave the door wide open for any of the mentioned scenarios to happen.

A third regulatory direction focusses on the sanctioning power over the new currencies. From a nations point of view, there is an interest in establishing or preserving this sanctioning power and therefore promoting those currency projects which are based in the nation's territorium and cooperate with the domestic secret services. This approach is not necessarily in the best interests of the nations citizens. Governments that do not perceive themselves as close allies to the United States, would try to protect their citizens against Libra gaining hold in their country. Similar to the blocking of many US internet platforms taking place in China already.

4.3 Matching with the Five Monetary Divides

Let us relate these considerations, to the five divides in the monetary question from section 2.1. If money was neutral in the short and long run, there was nothing to fear from the control over a part of the monetary system in the hands of the Libra Association. Those who believe in it can be expected to support either the Laissez-faire or the nationalist regulatory approach.

Similarly, the schools of thought that see money as a commodity might see no reason to regulate Libra, but would expect the project to fail, unless the Libra Association was able to design the currency as truly valuable to its users by a strong backing of the reserve. If, however, money is essentially credit, the currency issued by the Libra Association is basically a credit granted by the Libra holder. Therefore, regulation should focus on the legal enforceablility of the Libra currency as a claim against the Libra Association or the Libra Reserve. In this case, the problematic reconvertability that we discussed is particularly important, but a reduction of the reserve ratio is similar to the low reserve ratios of bank deposits.

If the purpose of money is a lubricant for the economy, regulation should achieve that money is sufficiently provided and for example target interest rates. As long as Libra is only complementing the trade happening in national currencies, it could be sufficient, to enforce a publication of quantitative data that enables the central banks to counteract variations. If the purpose of money, however, is

a steering of the economy, it strongly suggests the Etatist regulatory approach.

Accordingly, if money originated from banks one might follow that an appropriate approach was to treat the Libra Association like a private bank. Contrarily if the money creation belongs in the hands of the state, only the Etatistic approach can be supported. If, however, it only originated from states, Libra shows, instead of the obligation to pay taxes as the basis to enforce value onto their issued money, the Libra Association capitalizes on the participation of commerce companies which people are customers of.

The concept of an exogenous monetary supply suggests that it should not be controlled by a private rent seeking Association. But again, this would only cause problems, when national currencies would be marginalized enough that central banks could no longer counteract the variations in the Libra money stock. However, from the idea of endogenous money we can deduce a new aspect. In a functioning financial system the demand for money that is not satisfied by the issuing institutions, would cause a second layer of institutions that issue credit denoted in Libra to emerge. Similar to the layer of private banks in our conventional monetary system 2.2. This would further manifest the role of the Libra Association as a central bank.

4.4 Concluding Remarks

The discussion of the divides in the economic profession generated particular leverage points for regulation. But it may have also given the impression that there are many different opinion, some of which see the threats of Libra and others do not. It is therefore important to complement the discussion by an argument for new currencies.

In a world in which our centralized financial system has been in one ongoing crisis since the year 2008 the Belgian central banker Bernard Lietaer saw the solution in establishing many complementary currencies [30]. These are envisaged to increase the resilience of the overall system through decentralization. Whereas our current centralized system optimizes for certain efficiencies in a niche and thereby introduces fragility, resilience would result out of monetary diversity. In addition, innovative currencies could hold the potential to fuel social change and a development towards sustainability. On the other hand leaving, the virtual currency space underregulated could also block the playing field for emancipatory currencies. Because it is cumbersome for people to convert between different currencies, strong network effects occur. Similar to the centralization of the social media landscape into few dominating platforms, it would pull toward a few dominant internationally used currencies. The main reason why it has little effect on cryptocurrencies is that those are primarily used as speculative objects instead of as a medium of exchange. Therefore, the concern that an acceptably functioning, stable, scalable online currency wins the race regardless of its long term consequences for society and economy is justified. May it be the early bird of Libra or the improved version of a competitor, this winner takes it all effect pushes the society into dependency. Regulations for virtual currencies should thus do their part for the prevention of quasi-monopoly positions. The network effect has to be actively counteracted, which cannot be achieved by regulation alone.

5 TOWARDS EMANCIPATORY CYBERCURRENCIES

In the following, we will draw design requirements for the creation of cybercurrencies following an emancipatory line of thinking and a design-oriented perspective [41]. The requirements are based on the critique of the Libra approach. However, we will add concerns with regard to sustainability effects of newly designed currencies. The mechanisms by which these sustainability aspects are implemented in a currency are a creative design choice and can thus not be reduced to requirements. Yet, in the authors eyes they are an important part of the discussion and help to justify why we do not support the regulatory approach of Etatism.

5.1 Scalability at Reseasonable Ecological Impacts

The evaluation of the technology Libra uses revealed a positive aspect. It is in contrast to classical blockchain technology scalable (while being energy efficient). This upside should not be lost in the discussion of design requirements. However, we believe that future currency innovations utilize solutions based on blockchain alternatives (see 2.8) instead of private or permissioned blockchains, because these blockchains bring along the political problems we summarize in the next point.

5.2 Democratic Legitimation

The discussion revealed that any institution that slips into the role of a central bank for a monetary subsystem is problematic, unless it is properly democratically legitimized and controlled. We believe that to be fair this demand should also be applied to the existing central banks to take up the discussion to improve their democratic legitimation. If the purpose of money is to steer the economy (see 2.1), this requirement is mandatory.

5.3 Fostering the Sovereignty of Consumers

We discussed, how the users of a currency can slip into a dependency on the issuer. The opposite of that, an independent empowered user, is what we call sovereignty in this context. The first scenario explored the problematic issues of the Libra design that do not even require a change to the rules of the Libra Reserve. The major concern is privacy and our suggestion is an appropriate regulatory response in form of institutional separation between data analysts and fiduciaries.

The second Libra scenario illustrated the power over our society that results from the control over our payment infrastructure. As a protection the goal should be an empowerment of the user instead of the issuer. This means in especially the requirement to protect the user by design from sanctions of the monetary infrastructure provider. Therefore, it is required that the transaction data is stored on local devices and backed up by a network of users. In addition, the infrastructure provider may not have a veto, by intermediating the transactions. Instead, users communicate directly with one another, to process transactions.

5.4 Protection against Extraction

The last two scenarios showed the extractive potential of money creation. We argued in chapter 4.1 why the natural response that tries to prohibit these activities or rigorously taxes any profits that result out of them is barely possible. On the other hand ordinary people can hardly anticipate the consequences of their choices of money and once the society slips into a dependency, the power is in the hands of the money creators. Therefore a design solution that protects against the misuse of the money issuance privilege is desirable. Admittedly Facebook is going a step in that direction by sharing the authority with a group of other companies in the Libra Association. But that is not enough and it may eventually become only more costly, if every member wants to capitalize on their privilege. A satisfying implementation of this requirement is tricky. One technical design that would support this would be, if in the event of an impeded rule change by the monetary infrastructure provider a group of users was able to continue using the previous version of money. In blockchain terms that is a fork. A further solution is covered by requirement 5.7

5.5 Counteracting Monopolies

Also related to Sovereignty is the prevention of monopolies and the promotion of monetary diversity. We argued in chapter 4.4 that for that reason counteracting the network effect is paramount. So, if a commercial company incentivizes the payment via their own currency, the conversion should take place frictionless. This enables the customer to hold money in the form he or she prefers. One thing to consider here are open API standards.

More generally designs that hard code the rules of the currency into the protocol and enable a direct interaction between users are aligned with their sovereignty. In a previous LIMITS publication we discussed the design of social network alternatives based on peer to peer structures [29]. The same principles can be applied for the implementation of a currency via peer-to-peer architectures. This lets the transaction data stay under the control of the user as much as suitable.

5.6 Responsible Energy Consumption

In the discussion 4 we positively noted that the energy efficiency is an aspects of the Libra proposal that considers sustainability. Energy efficiency is a design requirement that must not to be lost in future currency schemes. However, there are further issues around sustainability that are relevant for future currencies. Our current financial system is characterized as highly fragile and after all the goal of a diversification of the monetary system should aim to increase the resilience.

5.7 Preservation of Value

Therefore, one sustainability dimension in which future currencies could improve upon is the stability in relation to real value. This would be supported by currency designs that are able to serve the underlying real economic activity in the case that the monolithic conventional banking system breaks away. Compared to classical cryptocurrencies the Libra Reserve achieves some stability, but only in relation to central bank currencies. This has the appearance of stability in times where the conventional monetary system is stable, but these are not the times when a real stability is required. In the case of a hyperinflation, the Libra Association could cut inpayments into the reserve to make Libra scarce in comparison to the underlying inflating currencies. But then it lacks of a scarcity anchor itself.

Instead of a reserve the value of money could be bound to the economy's ability to produce value. Given that some metric to measure this ability for a business was in place, money in form of interest free credit could be issued proportionally on that businesses account. Although commodity theories of money (see 2.1) would characterize this credit by the users as the business being the commodity backing the money, but without a claim on the property. This construction also implements the scarcity anchor (see 2.2) based on real value instead of speculation, as it is the case for Bitcoin. Nevertheless, on both sides of most of the characterized divides some economists might strongly disagree with this proposal being an improvement. Because it reduces the institutional control over the currency, which is undesirable in their but desirable in the authors eyes.

5.8 Avoiding the Logic of Consumerism

In 2.2 we brought up the connection between money creation and the obligation for economic growth. It is the reason, why we required the money creation to happen without interest. A further driver of growth is the business model of Facebook and its reliance on consumerism which chapters 3.3 and 4 mentioned. A further requirement is therefore, although the consumer is empowered, that consumerism is not supported. The areas of business for which interest free credit is created should therefore be limited to a preservation and enhancement in the quality of life, instead of artificially generated needs. Trying to capture this difference into an objective standard would be difficult, but nevertheless this direction is an important sustainability aspect in the authors eyes.

5.9 Respecting Ecological Carrying Capacities

In a third and related dimension it is desirable that the design of a currency reflects the ecological carrying capacities. This is incompatible with currency designs that either enable an indefinite growth of the monetary supply or fix it at arbitrary numbers, which do not relate to the economy. Instead, metrics that monitor the health of an ecosystem could be tied into the monetary system in a way that monetarily incentivizes a farsighted approach to ecology. How appropriate metrics could look like requires further and ongoing research. In any case, the complex ecosystem can never be fully measured and represented in a however complicated currency metric. It can only be an approximation and a significant improvement on our conventional system.

6 CONCLUSIONS

The success of currencies is determined by a combination of the technical possibilities, the regulatory response and most notably the public willingness for adoption. The technical limitations of blockchains were discussed and solutions were referred to. For a corresponding regulation an orientation was formulated. In its limited scope this article tried to on the one hand illustrate the threats of money creation under corporate control. On the other

hand it gave dimensions for the discussion of future post central bank money.

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