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PROJECT REPORT ON : NATURE OF MONEY & POSSIBILITIES OF CRYPTOCURRENCY AS MONEY.

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DECLARATION

I, **PRANAAV RAI** the student of T.Y.B.F.M. Semester VI (2021-2022) hereby declare that I have completed the project on **22-02-2022**.

The information submitted is true and original to the best of my knowledge.

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CERTIFICATE

This is to certify that **PRANAAV RAI**, Roll No: **(A34)** of Third Year B.F.M.,
Semester VI (2021-2022) has successfully completed the project on

Nature of Money & possibility of Cryptocurrency as Money.

Under the guidance of **Asst. Prof. MR. ROHAN KORGAONKAR**

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1. EXECUTIVE SUMMARY

The shortcomings of existing financial systems became widely criticised in the aftermath of the 2007–08 financial crisis leading to an unprecedented wave of interest in new ways of efficiently executing economic transactions while ensuring high levels of transparency and accountability. With over 2,000 in existence at the time of writing this report, cryptocurrencies have received a great deal of attention as a potential tool for radically altering financial landscapes for the betterment of society. The purpose of this report is to provide a comprehensive overview of how crypto-currencies could be used to achieve this purpose. This includes how cryptocurrencies currently function relative to the intentions of their pioneers, and how the general public, use, understand, and trust them. Some of the main findings include: Modern discussions and debates about cryptocurrencies tend to confuse ‘money’ with ‘systems of payments’ or, the mechanism by which transactions are processed and settled. Cryptocurrencies have the potential to vastly improve systems of payments if designed and implemented correctly. In practice, existing cryptocurrencies have failed to achieve the objectives envisioned by their pioneers and would generally not be considered as money. New innovations (stablecoins, proof of stake, CBDCs) are helping to make digital currencies more realistic candidates to replace traditional money and create benefits for users across large volumes of transactions.

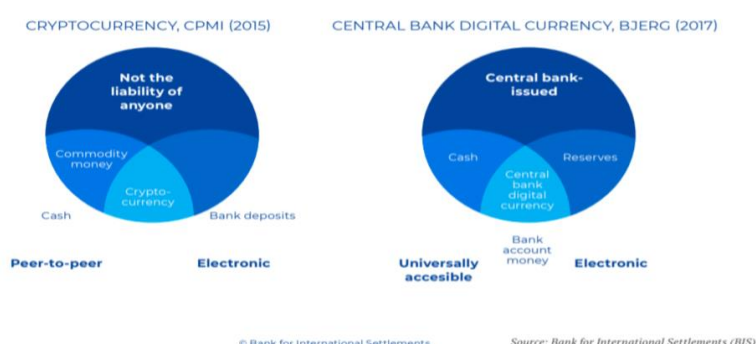
In addition to these technical challenges, the value added in this report comes from a unique empirical examination of how citizens understand cryptocurrencies and trust in different institutions to issue and manage money across a unique sample of eight countries including Argentina,

Brazil, France, Germany, Mexico, Spain, the UK and the US. Some of the main findings include: Knowledge, use, and understanding, of cryptocurrencies remains highly limited in all countries. The vast majority of citizens in all countries agree that money should continue to be issued by central banks. While all central banks enjoy a significant trust premium when it comes to the creation and management of money, large differences exist between Latin American countries (Argentina, Brazil, Mexico) and European countries (France, Germany, Spain, UK) and the US. Countries where central banks experience lower trust premiums are more open to adopting new digital currencies issued by alternative institutions. Trust in Facebook to issue and manage a currency remains very limited, especially in Europe and the US. The degree of acceptability and price stability play a key role in determining preferences for holding of money, regardless of who is issuing it.

2. INTRODUCTION

Since their inception in 2008 and the subsequent enthusiasm, media attention, delusion, reflection, and continuous innovation, ‘cryptocurrencies’ have become one of the most interesting and perhaps most misunderstood phenomena of the early 21st century. Their popularity and potential for ‘disrupting’ and improving traditional financial systems, however, have led to an expanding list of media commentaries, research papers, and policy reports. Unfortunately, many of these contributions have tended to focus on the contemporary positivist side of cryptocurrency without considering the normative intentions of its creators or, perhaps more importantly, the historical context under which money and monetary systems have evolved. These contributions have also tended to focus on digital money from a single

disciplinary viewpoint (computer science, economics, finance) without a great deal of consideration or integration of the valuable inputs from other perspectives. The idea of money has evolved continuously over time. In the context of the technological innovations of the 21st century, it has become a phenomenon with a wider range of feasible possibilities, some of which were in fact proposed as far back as the early 20th century. To give some idea of the new range of types of money, the Bank for International Settlements (BIS) published a series of taxonomies including the 'money flower' and more general taxonomies that distinguish between central bank-issued currencies (which are a liability on the central bank balance sheet) and private-sector issued digital currencies (which are not the liability of anyone). Within this wider context, there exists a variety of types of money, each of which has different underlying characteristics, or attributes.



For example, a physical cash transaction is issued and is backed by (a liability of) the central bank and is subject to some degree of inflation over time, has low transaction costs and is accepted by all sellers of goods

and services. On the other hand, a credit card transaction is backed by (a liability of) a commercial bank, is subject to the same degree of depreciation as cash, may come with some (explicit or implicit) transaction costs, and is accepted by all sellers of goods and services. Given some of the shortcomings of money and existing financial systems that became apparent in the aftermath of the 2007-08 financial crisis, Nakamoto (2008) proposed a new type of money which would effectively remove many of the third-party participants in transactions, making a more efficient, and less costly, way to make transactions with strangers. With over 2,000 cryptocurrencies in existence at the time of writing this report, cryptocurrencies have since become progressively embraced by speculative investors and growing market caps, but have yet to be adopted by the wider public as a viable form of money due to practical technical challenges along with a lack of trust in the issuing authorities and understanding of how to use them. Some of the more fundamental questions that deserve closer attention within ‘monetary ecosystems’ revolve around who creates the money and what is their relationship with the entity who creates and obtains value from it. This is especially important in a fiat currency environment where the value of money (digital or physical) depends on the degree of trust users have in those who issued or back the currency. The purpose of this report is to provide a more comprehensive overview of how cryptocurrencies could be used for the betterment of society, how they currently function and how the general public uses, understands and trusts cryptocurrencies across a sample of eight countries. The first chapter of this report will examine the normative nature of money including the role of community trust and the role that government plays in ensuring this trust. In this normative framework, we can think about the possibility of cryptocurrency as money and how this might be possible. A key part of this introductory

chapter is the idea of trust and money, especially in the fiat currency system that has emerged in the late 20th century.

The second chapter will provide a brief history of money over the 20th century, including the gold standard era, the design of Bretton Woods and the adoption of fiat currencies. This chapter will also touch on some of the historical themes that have re-emerged in the context of cryptocurrencies, including Hayek's idea relating to currency competition and some of the challenges involved with fractional reserve banking systems. Moving into the 21st century, Chapter 3 will consider the possibility of realistic possibility that 'money' will dramatically change in the coming years with the evolution of cryptocurrencies. This chapter will consider some of the arguments against the use of physical and untraceable cash including fraud and health concerns. More generally, this chapter will consider the social benefits of moving towards digital currencies and the associated risks/barriers. Chapter 4 will provide an overview of how cryptocurrencies work in terms of their degree of centralization, security and anonymity, token supply and governance (consensus protocols). This chapter will examine cryptocurrencies in terms of what they were meant to be from the perspective of Nakamoto (2008) and what they have become in practice. This chapter will largely draw on the case of Bitcoin, but will also discuss briefly new generation tokens (stablecoins, Libra). Chapter 5 will consider the arguments for the issuance of Central Bank Digital Currencies, including a review of the literature and survey of what Central Banks are currently doing in terms of the adoption of a central bank-backed cryptocurrency. This chapter will also discuss the implications for monetary policy and financial stability from adopting this new type of digital money. Lastly, Chapter 6 will discuss the results of the new IE Survey on 'Cryptocurrencies and The Future of Money' in the context of Chapters 1--5. From a diverse

sample of countries (Argentina, Brazil, Mexico, France, Germany, Spain, UK, USA). The results show that residents tend to place a trust premium on central banks-backed money. However, significant differences appear across countries, especially those in Latin America.

3. NATURE OF MONEY

A form of money, just like any other social phenomenon, is a property of a particular community, and so typically possessing various community-specific features. Many communities have produced money, however, and the concern here is with commonalities of all the numerous forms. In this regard, the most obvious common or shared feature is that by which a money can everywhere be identified or recognised. This is its property of being employed as a general means of payment, of being useable to discharge any debt in the community in which the money is produced. If, say, in any specific money community, an individual participant requests of a seller, a loaf of bread, or perhaps a meal, then, when the bread is handed over, or after the meal has been consumed, the buyer is in debt to the seller. It is an identifying property of money that, in all such transactions (excepting in cases where a specific alternative agreement on means of payment has been reached in advance of a debt being occurred), the money can be used to settle the resulting debt. A basic condition for a general means of payment to exist in any community is that the latter has a system of value accounting that includes, as a component, a (community-specific) unit of value. This is simply a unit of value measurement or assignment -- such as pound sterling, US dollar, euro -- in terms of which all goods, services, or assets in a community will have their assessed values expressed. Clearly all items of money must also be denominated in the same units as the debts, if the money is to be used to

cancel them. So, money will itself be a feature of a system of value accounting that includes a unit of value (or account) as an additional accepted component. If the nominal property of any money, i.e. that by which it is identified, lies in its being accepted as a general means of payment, a further more fundamental feature that grounds this property is the manner of the money's incorporation as a component of the community's system of value accounting. Most social phenomena (not just money) are in fact constituted through processes whereby certain kinds of things are incorporated into community systems as components. In all cases, the phenomena are created by processes of social positioning, whereby selected kinds of things are allocated to positions, thereby constituting them as different types of phenomena qua system components, and whereupon their uses, qua positioned items or system components, are governed by community-accepted sets of rights and obligations. To see this, it is enough to think of the creation and acceptable uses of means of transport, motorways, car parks, traffic lights, passports, schools and hospitals, etc.¹ Money is simply a specific conforming instance of this general process of social reality constitution. The creation of money involves the community acceptance of a money position within the community's value accounting system and the allocation of a certain kind of thing (currently, it is typically bank debt – see below) to the money position, producing money as a system component. As part of this positioning process, rights and obligations are allocated to community members, determining that holders of instances of the money have the right to use it to cancel their debts and corresponding creditors typically have a matched obligation to accept the money, if it is offered. The ability of money to serve as a general means of payment is, then, grounded in its additional property of being positioned (in the community's system of value accounting) in such a manner that its

uses are governed by the noted rights and obligations. As with all social phenomena, the existence of money is seen, finally, to depend on community acceptance. However, the notion of acceptance that is key here should be interpreted not as involving any necessary agreement or contentedness of community participants with the situation, only as a willingness to go along with it, at least for the time being. Typically, this general acceptance, in the case of money, takes the form of a preparedness to go along with the declarations of designated bodies to whom authority has been delegated. In modern societies this delegated authority takes the form of the government or central bank.

Purchasing Power and Trust

To this point the concern has been on the nature and constitution of money per se. However, the focus of primary interest here is on more than money per se and specifically on a money that functions successfully. An additional nominal property for a successful money is that (as well as being a general means of payment) it has generalised purchasing power. The manner in which money is constituted as a component of a community's system of value accounting ensures, as we have seen, that a participant who holds money has the right to use it to discharge any debts already held. However, there is no agreement entailed that participants must become creditors in the first place, that they must allow others to run up debts with them that can be discharged using the money. In countries with hyperinflation, is not unusual to see signs displayed saying goods or services can be acquired only if there is an advance agreement (i.e. prior to a debt being created) for payment to be made in a foreign currency. Thus, a restaurateur, say, will allow customers to order a meal and so acquire a debt if they in effect take out a contact in advance to pay by something other than the local currency. So,

a successful money is in place where participants can easily use it to make purchases, meaning that sellers, etc., are ready to become creditors in the knowledge that the money will be used to discharge the debts that so arise. For this to be the situation, community participants must trust in the money. Trust is key to the successful functioning of any money.² Specifically, community participants must trust that if they hold items of money, others will be willing to take such money from them, a condition of which being that no one expects items of money to lose value in the meantime. In short, to function successfully, a money must be trusted as a stable store of liquidity, a store of liquid (i.e. easily transferable) value. The dominant worry of recent monetary history is that money will lose value, as is markedly the case in episodes of countries experiencing hyperinflation. But an additional concern that can arise, one that will be seen to be especially relevant when considering the possibilities for cryptocurrencies, is that the money instead appreciates in value. In the face of an anticipated decline in its value, participants will not want to hold money; however, in the face of an expected appreciation in its value, participants will not want to let go of it. Either development undermines the usefulness of money for performing its canonical functions.

Money as Positioned Bank Debt



What, then, are the capacities or capacity required of a successfully functioning money? It is precisely an ability to instil trust in community participants that the money so formed through its positioning will be a stable form of liquid value. This will be most easily achieved where prior to positioning, the money has been found to be a store of value that is easy to pass on. Currently the money position, was indeed already regarded as a store of value, and became so positioned precisely to instil a trust in the money so hold. This is bank debt. Here the term debt is understood to be an obligation held by a debtor to satisfy a creditor. It is internally related to a credit, where the latter, technically and legally speaking, means a specific right to payment or satisfaction. Credit and debt, in other words, are two aspects of the same social relation - a credit/debt (or debt/credit) relation - connecting a creditor and a debtor; you cannot have one aspect without the other. Credit is simply this relation viewed from the perspective of the creditor; it is debt from the point of view of the debtor. In fact, in classical accounting terms, this credit/debt relationship was seen as an exchange of credere ('to trust') for debere ('to owe'),³ which concluded in the exchange of real underlying assets. Simply put, two entities bind themselves, at a specific point in time, to remain bound to, and trust each other, over the course of the agreement. How does bank debt/credit (positioned) as money work? Two forms of bank debt are involved, commercial and central bank debt. If, for example, a commercial bank makes a loan to a customer, it records the amount of that loan in the customer's account. The entry shown (or resulting increase in any entry) marks an amount of money thereby acquired by the customer. In the case of the loan, this money is created on the spot. It is done so through the formation of a debt of the bank to the customer. But the result is automatically an amount of money. For, since bank debt was at the relevant point in history first positioned as money,

all new items of bank debt come into the world already positioned as money. That is, just as a child of members of the UK Royal Family arrives in the world already positioned as royal, or indeed a child born in the UK of two UK citizens arrives in the world already positioned as a UK citizen, so, currently, all instances of bank debt arrive in the world already positioned as money. Of course, not all money held in an individual's deposit account was created by loans. But all the money there recorded takes the form of commercial bank debt positioned as money. The ability to create new debt/credit as money generally lies in the power of commercial banks and the central bank. The central bank can create money by extending loans to commercial banks in the form of the latter's reserves. Many indeed refer to the two cases as producing commercial bank money and central bank money respectively, the two together being bank money.⁴ So, the occupant of the money position currently relied upon to instil trust in a money formed out of it is bank debt (a kind of thing that to serve its intended role usually also requires a degree of continuous state backing, an orientation that can involve, but does not reduce to a reliance upon, laws of legal tender). Finally, as is the current situation with bank debt, the item positioned as money is not observable, a necessary additional feature of a community's system of value accounting is a set of markers or identifiers of money, or of those that hold it. In the case of commercial bank money, its markers are electronic entries in the community participant's bank account. In the case of central bank money, the markers may take the form of, first, cash, in particular where the money is held by the public, and, second, electronic markers, indicating money held as deposits at the central bank, including commercial bank reserves. So strictly speaking, neither electronic records nor cash are money but rather are markers of it. To summarise, a community's money possesses generalised debt-discharging

power and, when it functions successfully, generalised purchasing power. The first of these powers is grounded in money's property of being positioned as component of a community's system of value accounting in a manner such that its uses are governed by a specific set of community-accepted rights and obligations, in particular that debtors have a right to discharge their debts using the money and the corresponding creditors have an obligation to accept the money when offered. The second of these powers, i.e., generalised purchasing power, is grounded in a community's trust in it as a stable form of liquid value, a trust that, typically at least, is grounded in turn in the trust-instilling capacity of money backed up by the support of the statebacked banking system.

The Possibility of Forms of Cryptocurrency as Money

It follows that there are two basic properties that must be possessed by a form of cryptocurrency that is to function successfully as a community's money. First it must be accepted throughout the community as being a component of its system of value accounting and its use is governed by rights and obligations that serve to render it a general means of payment. Second, the money so formed must be trusted as a stable store of liquid value, grounding the property of it being a general form of purchasing power. The basic question to pursue, then, is whether systems based on forms of cryptocurrency can be devised wherein these two basic conditions are met. If the latter are identified as the essential features of a successfully functioning money, the forgoing outline does also point to additional factors to consider. For example, all cases of money have been seen to take the form of a component of a community's system of value accounting closely related to other components of the same system. This being so, it may be the case that, in order to replace one form of community money with another, it is necessary to replace or transform

other internally related components of the system of value accounting. For example, had the UK joined the European Monetary System, then not only would a different form of central bank debt have been involved, but the markers of money referred to as cash would have changed, as indeed would the unit of account (from pounds sterling to euros). Forms of cryptocurrency do indeed come as (sub) systems in themselves. To consider the most familiar case, that of Bitcoin, it seems this label is indeed best used for a whole subsystem rather than any one component. In actual practice the term Bitcoin tends to be used variously: for the proposed system as a whole, a revised unit of account, and both a money position and its occupant (to the extent that they are distinguished). An additional matter to consider is the nature of the community for which the money is intended. For, with all social phenomena being found to be community-relative, the possibilities of a form of cryptocurrency being accepted as money will depend on the specific community that is being considered. The central focus here is a national community like the UK. But it may be that forms of cryptocurrency can serve, and perhaps have already served, as money in some relatively small communities, especially illegal ones concerned with activities like the buying and selling of illicit goods online. At present, general acceptance in modern national or international communities requires authorisation by central authorities. Fundamental to the monetary workings of such communities at present are banking systems that issue, seek to control/regulate, and endeavour to maintain a stable value of, money. Prima facie, developments like Bitcoin not only do not make any appeal to regulators and bankers, but the very reason for their design is to bypass them, to leave these institutional factors out of the value accounting system entirely. At the heart of it all is a desire to create a peer-to-peer electronic system of buying and selling that does not require the necessary

mediation or intervention of any financial institution or other agency. As Nakamoto (2008) indicates in the opening sentence of the paper introducing bitcoin:

“ A purely peer-to-peer version of electronic cash would allow online payments to be sent directly from one party to another without going through a financial institution ”

— Nakamoto, 2008, p.1

To gain general acceptance, then, any such proposed cryptocurrency system must prove to be either 1) so widely popular or backed by organisations so powerful (as is presumably the intention, for example of Facebook’s Libra, with the proposed launching of its own global cryptocurrency backed by significant assets) that the state or states involved is/are unable to resist it; or 2) adapted/oriented so as to work through existing financial and government institutions, in which case its use would not be, as originally intended, to displace existing institutions and processes but to facilitate the working of the existing systems in some way. More can be said too on the task of achieving trust. As noted, an essential challenge is to achieve a situation wherein a form of cryptocurrency is trusted as a stable store of liquidity. This is the central form of trust to be achieved. However, other forms are essential too, albeit in ways, or for reasons, that depend on the particulars of the money form. Certainly, all forms of money are open to abuse. Money in the form of a positioned valuable commodity was subject to clipping (the practice of cutting small pieces from, especially, gold or silver coins, with cut-off

pieces often used to make counterfeit coins; this being a practice thought to be so undermining of the money process of Britain in the seventeenth century that clipping was deemed a matter of high treason, punishable by death). And, there are continuous (more or less successful) attempts to produce counterfeit versions of modern cash. Further, with the rise of electronic records of money, there are attempts to defraud through the duplication of these records. Without institutional intervention to prevent this under the current system, it would be possible for one and the same electronic record of money to be used to ground two or more expenditures (the so-called double spending problem). Cryptocurrencies involve peer-to-peer verified blockchain technologies designed just to avoid this sort of fraud. Community participants must trust that such efforts are usually successful. But these context-specific and contingent technical issues of trust generation aside, most significant of all is whatever the form of money developed, there must be a trust that the money so formed would prove to be a stable form of liquid value. In the case of a form of cryptocurrency, with no pre-existing record of attained trust (prior to its being positioned as money, were this to happen), and with potentially the displacement of all (state or bank) administrators who under the current system help stabilise a money's value through regulating actual transactions, the task of attaining the requisite sort and levels of trust would not be straightforward. Specifically, the task of creating a form of cryptocurrency that could be, and prior to positioning would be expected to be, a stable form of liquid value is a significant challenge. One final matter that might be raised here is the question of whether more than one form, and if so, how many forms, of cryptocurrency could simultaneously be constituted as money. For, if one form managed to overcome all the obstacles including acceptance by the

state (and so for example accepted by the state as a means of discharging tax debts) then presumably many forms could do so.

4. A BRIEF HISTORY OF MONEY IN 20th CENTURY

Money in the 20th century can broadly be divided into three parts: 1900–1933 when the international gold standard ensured that money was backed by the possession of physical gold, 1934–1971 when the dollar devaluation and the Bretton Woods System emerged, and 1972–1999 when fiat money was introduced and adopted (Mundell, 2000). The Gold Standard Era (1900–1933) – Under the gold standard, money is backed by the value of physical gold held by a country. Because a given amount of paper money can be converted into a fixed amount of an underlying physical asset, in this case gold, countries on the gold standard are prevented from increasing the supply of paper money in circulation without also increasing their holdings of gold reserves. This system was effective in preventing any irresponsible governments from taking advantage of their monopoly on money by printing too much of it. This allowed holders of that money to feel that the value of their paper money was ‘insured’, or ‘collateralized’ by the underlying gold that backed it. While the gold standard was generally regarded as an essential source of economic trust and prosperity in the late 19th and early 20th century, deflation and depression in the 1930s revealed some of the defects of the inflexibilities in the gold standard. To understand why the gold standard was abandoned, it is important to understand the deflationary bias of the gold standard, which triggered deflation and depression in the 1930s. During the gold standard era, gold flowed across different countries. As a result, some countries possessed more gold than necessary for conversion against its total money supply, in accordance to the fixed conversion ratio

(the gold-surplus countries), while others possessed less than required (the gold-deficit countries). Economic historian Peter Temin pointed out an asymmetry between gold-surplus and gold-deficit countries in their monetary response to gold flows (Temin, 1989). Since gold-deficit countries had more money supply than could be supported by their gold reserve, they were forced to reduce their money supply and deflate; failing to do so could trigger people to worry about the convertibility of their domestic currency, scramble for gold, and would eventually lead to a complete loss of gold reserves in the country. Hence, gold-deficit countries faced plenty of incentive to deflate their currency to prevent devaluation. On the other hand, gold-surplus countries had insufficient money supply for conversion against their gold reserve. To prevent undervaluation of their domestic currency given the fixed conversion ratio, they were supposed to expand their money supply and inflate. The asymmetry was that no sanctions prevented gold-surplus countries from sterilizing gold inflows and accumulating gold reserves indefinitely. Such asymmetric dynamics led to a deflationary bias in the gold standard. The bias was not obvious during the pre-war periods, since the gold standard was centred around the operations of Bank of England, which as a profit-making institution strived to avoid gold accumulation as opposed to interest-paying assets. However, WWI led to the decline of British economy. Meanwhile, as economic historian Barry Eichengreen showed, the two major gold-surplus countries of the interwar periods, the United States and France, did little to avoid gold accumulation (Eichengreen, 1986). As a result, the deflationary bias of gold standard began to manifest itself by the end of 1920s.

The Fiat Money Era (1972-present) – Fiat money is a medium of exchange that is neither a commercial commodity nor title to any such commodity. It is “not convertible by law into anything other than itself

and has no fixed value in terms of an objective standard” (Keynes, 1930). The value of fiat money is derived from a premium based on a collective trust in the continued existence and stability of the entity issuing it. In simple terms, the difference between the cost of producing money and its value to people who own it is the trust they place in it. The fiat money era solved many of the problems of the gold standard era by allowing policymakers greater levels of flexibility to adapt to economic circumstances and/or influence the economic decision making of households and corporations. The adoption of fiat currencies effectively expanded the central banker’s toolbox to allow adjustment of the supply of money through interest rates and capital reserve requirements. Nevertheless, the fiat money era also opened opportunities for abuse by irresponsible policymakers – under the gold standard, policymakers were forced to demonstrate ownership of an underlying asset (gold) that could act as collateral against the paper money they printed. Fiat money, however, is uncollateralized and thus is only as valuable as people believe it to be. This potential for abuse was recently summarized by the Governor of the Bank of England

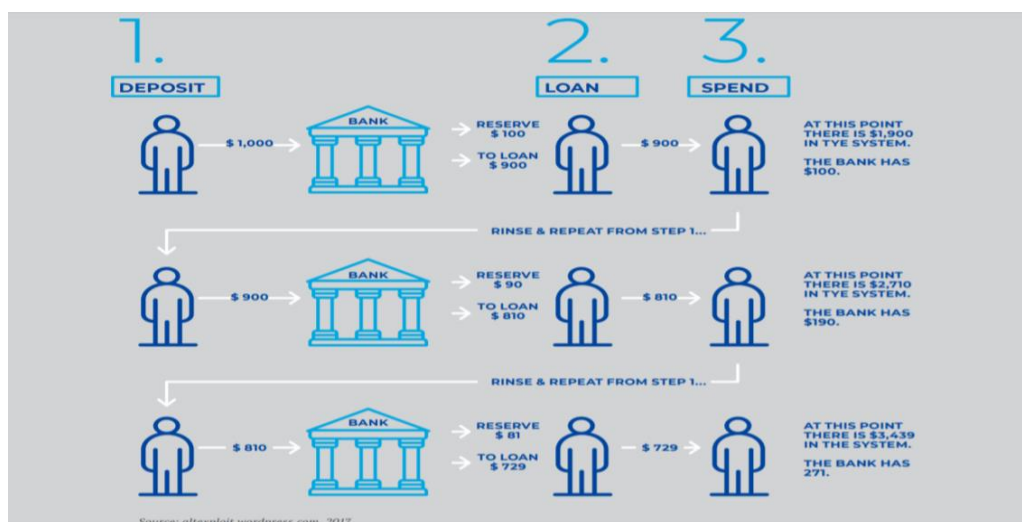
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“ Most forms of money, past and present, have nominal values that far exceed their intrinsic ones. And this gap has meant that money has a long and sorry history of debasement. Over the centuries, forms of private money, such as the notes issued by American banks during the free banking of the 19th century, have inevitably succumbed to oversupply and eventual collapse. ”

– Mark Carney, 2018 ⁶

Episodes of extreme inflation caused by irresponsible policymakers are dotted throughout history, often causing long-lasting economic hardships on a country's population, due to the irresponsible printing of new money (often to finance government debt). A few well-documented cases are shown below (Zimbabwe) and to the right (Mexico, Brazil, Venezuela)

The Fractional Reserve System – As the international monetary system evolved in the 20th century, fractional reserve banking has remained widespread. In fact the practice dates as far back as the 1300s, but is not well understood by the public or academic textbooks. The fractional reserve system is a banking system in which all depository institutions—commercial banks, credit unions and other banks—are required to maintain reserves against transaction deposits, which include demand deposits, negotiable order of withdrawal accounts, and other highly liquid funds. Reserves against these deposits can take the form either of currency on hand (vault cash) or balances at the Central Bank.



Fractional reserve banking can be simply explained using the scenario to the left where 1,000 units of central bank issued 'base money' is

deposited at a commercial bank. Where the bank is required to hold a percentage (10 in this case) of their loan liabilities in reserves, they can loan out 900 units backed by a 100-unit deposit (first row). If we suppose that the household taking the loan purchases a house from another household, the house seller will likely deposit those funds back in the bank. In this case, the bank can again lend out 90% of those new deposits.

5. MONEY IN THE 21ST CENTURY

According to modern international standards, “broad money” is defined as “all liquid financial instruments held by money-holding sectors that are widely accepted in an economy as a medium of exchange, plus those that can be converted into a medium of exchange at short notice at, or close to, their full nominal value.” 10 (IMF, 2016, p.180) In a 21st century context, these would include, fiat currencies issued by central banks, short-term digital credit facilities (swaps, credit cards, paypal, googlepay, payday loans, WePay, AliPay, M-Pesa, etc.), digital currencies issued by private sector/nonprofits or central banks (Bitcoin, Libra, etc). From the discussion in Chapters 1 and 2, we can begin by distinguishing currency types across five attributes, including: i) who issues and backs the currency, ii) how acceptable is the currency, iii) are there transaction costs, iv) how stable is the value over time (inflation/deflation), and, v) is it digital/electronic or physical. Each type of money has both benefits and drawbacks in terms of its usefulness. For example, a credit card (digital) is widely accepted but may come with transaction costs and is backed by a private sector corporation, while cash (physical) may be less widely accepted but has no transaction costs and is backed by the central bank. This is why many forms of money coexist. In fact, it is not uncommon for people to use more than one form of money in a given day/week, making

some payments with cash (a central bank liability) and some others with transfers or credit cards (which are private sector forms of money). To get a better understanding of current usage of types of money, we asked 1,000 respondents across eight countries (Argentina, Brazil, France, Germany, Mexico, Spain, UK, USA) what types of money they most commonly use. The results are shown below. It is important here to distinguish between narrow money that is created by central banks from broad money created by commercial bank deposits and central bank cash. Both of these centralized institutions make up almost all of money we currently use and act as clearing houses for almost all of our money transactions (system of payments). A recent IMF report has argued that these “two most common forms of money today will face tough competition and could even be surpassed. Cash and bank deposits will battle with e-money, electronically stored monetary value denominated in, and pegged to, a common unit of account such as the euro, dollar, or renminbi, or a basket thereof” (Adrian and Mancini-Griffoli, 2019, p.1). Building on this and the work of other academics/institutions, the IMF has recently provided a further dissection of money according to its ‘type’ (is it a claim on another entity or an object), ‘value’ (fixed, variable or a unit of account), ‘backstopper’ (government, private sector), and, degree of centralization (‘technology’). From Figure 5 below, we can see that several types of digital money have already been widely adopted (AliPay, WeChat Pay, M-Pesa), while others probably do not qualify as money based on our definition of broad money above. Thinking about this in the context of cryptocurrencies, these are interesting because they bring a combination of new and old ideas about money. Firstly, ownership rights are managed in a decentralized network as argued by Hayek using a distributed ledger (no backstop). Because of this, there is no central authority responsible for managing currency ownership rights, ensuring

price stability, and regulating illicit transactions. Blockchain technology also has a decentralized accounting system where “miners” are the book keepers and no debtor/ creditor relationship (i.e. cryptocurrencies are not a liability on anyone’s balance sheet). This decentralized management of ownership of digital assets is a fundamental innovation of Nakamoto (2008). More importantly, the system of payments infrastructure envisioned by Nakamoto (2008) was created with the intention to disrupt the current financial system, by affecting all business and government agencies that have monopolized the creation of money in the 20th century. With these new innovations in the early 21st century, some writers have argued that this will mark the death of cash. Why Replace Cash? – In order to change a system, it helps to have a problem with the existing one. This is a view shared by many economists and policymakers who see physical cash and existing digital money created by the central bank and commercial banks as doing a pretty good job, meaning there is no need to take unnecessary risks by adopting an entirely new, and potentially risky, form of money. So why has there been such a large push for the adoption of digital currencies? Some of the well-known downfalls of physical money are the need for the buyer and the seller to be physically present at the same location, or have a geographical connection to deliver the cash, which makes its use time consuming and impracticable for online commerce. Studies have also found that physical cash is a public health concern, finding traces of faecal matter, cocaine, heroine, and bacteria (among others) on dollar bills, making it a good candidate for spreading disease across large populations, leading experts to conclude that “if the question of a cashless society is approached purely from a public health standpoint, the answer seems clear” (Maron, 2017). 10 This would be especially important in low income countries who are more vulnerable to epidemics. Another drawback of cash relates

to tax evasion and the financial operations of illegal activities, which have become increasingly salient since the publication of Panama Papers in 2015 and Paradise Papers in 2017. Money laundering, financing of illegal activities and tax evasion all pose a pervasive challenge to society in both developing and developed countries. In his study of how physical cash is related to the daily financing of these illegal activities, Sands (2016) suggests an interesting approach in order to fight these financial crimes. His proposal is to eliminate high denomination notes (he gives as examples the €500 note, the \$100 bill, the CHF1,000 note and the £50 note). According to the author, these notes are preferred in illegal activities, given the anonymity and lack of transaction record in cash payment system. Moreover, because they are of high value, it is easier to transport and execute payments of large value. By eliminating high denomination notes, it is argued that we would make life a lot harder for those perusing tax evasion, financial crime, terrorist finance and corruption. Without being able to use high denomination notes, those engaged in illicit activities would face higher costs and greater risk of detection. The author concludes that the benefits from the elimination of such high denomination notes far outperform the drawbacks. Given the availability and effectiveness of electronic payment alternatives, these high denomination notes play little role in the functioning of the legitimate economy, yet a crucial role in the underground economy. In “The Curse of Cash”, Rogoff (2017) goes one step further. While Sands (2016) advocates for the eradication of high denomination notes, Rogoff (2017) advocates getting rid of cash once and for all. He extends the argument of Sands (2016) by linking the increasing amount of money in circulation to the volume of cash being used for tax evasion, corruption, terrorism, the drug trade, human traffic; in summary, by all sorts of illegal activities. Nevertheless, he expands the benefits of

eliminating cash to monetary policy. If policy makers not only eradicated high denominations, but all notes (except very small denomination ones and coins), Rogoff (2017) argues that this would in fact increase the effectiveness of monetary policy by, for example, allowing for negative interest rates. The idea of Sands (2016) and Rogoff (2017) that physical cash makes the financing of illegal activities significantly easier cannot be ignored. In fact, Brazil's Car Wash operation, the biggest corruption scandal ever uncovered in history, showed that companies involved in illegal donations to parties developed very sophisticated methods to raise physical cash. They collected cash from different small business, sometimes even paying a premium in order to hold cash, so that they could use this cash to perform their illegal activities. Cash, however, still maintains some unique advantages in comparison to other existing types of currencies discussed above. Users of cash can remain anonymous, in the case of stable advanced economies it is widely accepted/trusted by sellers, and there is free access to cash payment systems (no transaction costs). Users of cash also do not need to open bank accounts or create a digital wallet to use physical cash. Transactions are final and people can engage in trade even if they do not know or trust each other. The electronic money that we currently hold in commercial banks, on the other hand, involves counterparty risk, requires the use of a bank account and often has charges relating to transactions (for example, transfers to other accounts). 11 Berentsen and Schar (2018a) believe that there is a great demand for currencies issued by a trusted party to save outside the financial system. To prove their point, they present the number of Swiss Francs in circulation as a fraction of GDP from 1980 to 2017 (see Figure 6 below). We can see that after the crisis the demand for Swiss Francs increased significantly. This shift is explained as a move to safety - the financial crisis and the subsequent euro crisis have increased the demand

for cash exactly because it is the most liquid asset for savings outside of the private financial system. In other words, cash has been used as an insurance against the insolvency of financial institutions. Further evidence of the growing demand for physical cash issued by a trusted backer was shown by a 2019 IMF Finance and Development article ('Boom in the Benjamins') which attributed a rise in \$100 bills to an increased global demand for the US dollars as a safe haven, as well as its ideal anonymous role in illicit transactions in the underground economy. High denomination notes also offer higher seignorage returns for the Federal Reserve, making the \$100 bill the most profitable to print. This combination of factors lead the authors to conclude that American dollar bills are not likely to dissipate any time soon (Weir, 2019). The extent that fiat money will be used as an insurance mechanism depends on the degree of trust that holders of that money have in its issuer. In this sense, Switzerland and the US would be exceptional cases where a run to safety resulted in an increase in the demand for cash in stable economies. Bech et al. (2018) show that the amount of cash in circulation has increased or remained stable in a large number of stable advanced economies (see Figure 8). Although the value of card payments has increase significantly, Sweden is the only country where the cash in circulation has actually decreased between 2007 and 2016

6. WHAT ARE CRYPTOCURRENCIES?

To understand cryptocurrencies, we need to distinguish between what they were envisioned to be and what they currently are. The ambition in Nakamoto (2008) was to create a fair, borderless, and secure currency that can be transacted in a secure way across a network of anonymous participants. This stood on the shoulders of decades of innovation in

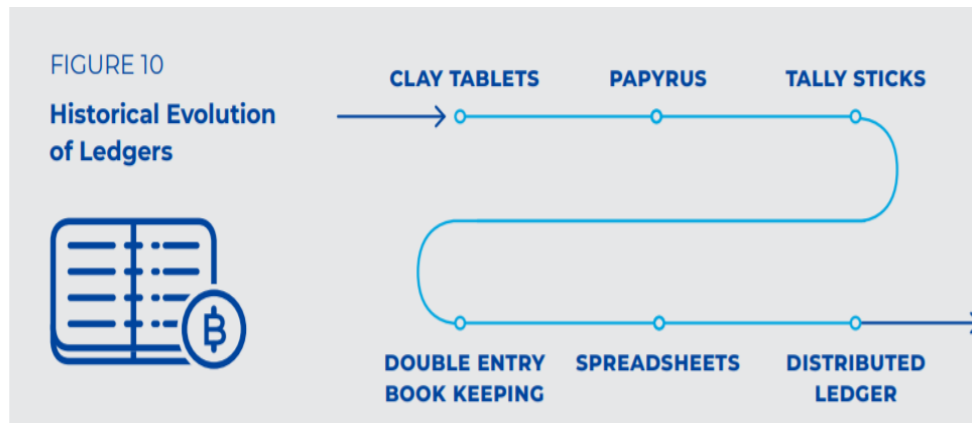
databases, cryptography and network protocols, which all combined to give the innovation of blockchain technology. From a technical perspective, the real achievement of Bitcoin relies on the coordination of the underlying features of blockchain technology, embedded with a pre-programmed economic incentive scheme (akin to a monetary policy). Blockchain technology enables an exchange of trust via a tamperproof, publicly auditable record of transactions between parties with no requirement of a pre-existing trust in each other or need for a central authority to govern and manage the network. The initial underlying philosophy behind the Bitcoin system (or broadly any ‘decentralised’ network) was to ensure that no one entity can act to censor transactions or prevent person(s) from joining the network. Rather, each participant in the network has a ‘voting’ right given they have computational processing power. In the context of this chapter, cryptocurrencies are any form of currency that only exists digitally as part of a payment system that has no central issuing or regulating authority and uses a decentralised system to record transactions and manage the issuance of new units/tokens, and that relies on cryptography to prevent counterfeiting and fraudulent transactions. This definition excludes ‘Central Bank Digital Currencies’ (CBDCs), which will be discussed in Chapter 5.

Cryptocurrencies are built on the principles of blockchain technology or what is more accurately known as distributed ledger technologies (DLTs). There are theoretically two types of DLTs, open and closed, more formally, ‘permission-less (open)’ and ‘permissioned (closed)’ blockchain. Permissionless and Permissioned Blockchains – To understand the difference between permission-less and permissioned blockchains, it is important to understand how the source code of the software applications is managed (that is to view code, copy it, learn from it, alter it, or share it). Most cryptocurrencies are based on decentralized

permission-less blockchains, including Bitcoin and Ethereum, whose transparency is built on open-source code (accessible to everyone on the network). Permission-less blockchain-based cryptocurrencies allow anyone to access the Bitcoin code, inspect it, copy it and improve it. (For example, [click here to see bitcoin source code](#)). Permissioned blockchains on the other hand are typically more centralized, closed systems, whereby there is a known custodian of the blockchain network who qualifies participants based on certain pre-defined criteria in order to access and use the blockchain data. Permissioned blockchains are typically used by large, private groups of enterprise organisations who require a great deal of trust, as they are likely to be using the blockchain for its technological efficiency gains in specific use cases, as opposed to its economic digital currency features and capabilities.

Ledgers – Ledgers have existed and evolved as a form of accounting for over a millennium. For example, ledgers were found to be used by Mesopotamians (modern day Iraq) as far back as 3200 BC to record expenditures, traded goods and record accounts payable on Clay Tablets (kept safe in temples, considered banks of the time). Then ledgers were used in 633 BC by Persian civilisations as an auditing tool to regulate the collection of alms (wealth tax). During the Middle Ages, there was a scarcity in gold across Britain, which caused a decline in circulation of coins; as a result the Exchequer introduced tally sticks as a physical proof of payment, whereby the stick would be split in half. One half was kept as stock by the payer (contract), and the other half as debt retained by the Exchequer. Hence, when accounts were audited, the pieces were fitted together to check they ‘tallied’.¹² By the 14th century, tally sticks had spread across Europe, fundamentally acknowledging the emergence of debt and contracts, which were used to pay wages to workers and taxes to the state, and also traded to buy and sell items, similar to coins. They were different in that they also acted as

an 'IOU' pledge, whereby whoever issued the stock was liable to pay in gold whoever owned the other half of the stick. Thus, the stock had a value in gold, and could be spent accordingly to the same value of actual gold



What were Cryptocurrencies meant to be?

The motivation behind Bitcoin and other DLT apparatuses involves the application of cryptography to monetary networks in order to eliminate trusted third parties across messaging systems. Most people already use cryptography when using internet applications, in sending or signing off on packets of data or messages (e.g. the https protocol for internet browsing or Whatsapp for secure peer-to-peer messaging). Encrypted messages prevent observations from an intermediary, and signing preventing tampering of data have eliminated the need to trust a third party to carry the message, for example SMSs where data packets go through centralised data exchanges usually administered by Telecom service providers. When considering the innovation of blockchain, it allows the same, the elimination of third parties in financial transactions through the use of payment tokens. Some of the benefits of blockchain technology applied to monetary systems are: ▷ Decentralisation – no single point of trust, no single point of control (no central authority), no single point of failure ▷ Security and Anonymity – non-repudiation and irreversibility of records with pseudo-anonymous transactions. ▷

Transparency, Auditability, and Governance – anyone can join participants can verify the veracity of records directly, without external querying In the original Bitcoin whitepaper, the author envisioned Bitcoin becoming a digital payment system with emphasis on a key innovation called ‘decentralisation’: removing the need for a trusted third-party institution in processing transactions, whose rules are enforced by consensus, with anyone being able to participate. Nakamoto frames the discussion around the trusted third-party issue in economic terms, arguing that: The focal point here is not money itself, but the way money is used and managed (system of payments), specifically with no intermediation. In fact, cryptocurrencies have several similar characteristics to cash (low transaction cost, quasi-anonymity). The key difference envisioned by Nakamoto was the stripping out of a centralized authority and clearing house for money, instead having transactions verified by a global group of participants using blockchain technology The main point here is that the important innovation in Bitcoin isn’t the alternative unit of account – it seems very unlikely that, to any significant extent, we’ll ever be paying for things in Bitcoins, rather than pounds, dollars or euros – but its settlement technology, the so-called “distributed ledger”. This allows transfers to be verifiably recorded without the need for a trusted third party. It is potentially valuable when there is no such institution and when verifying such information on a multilateral basis is costly

Why Decentralize? – When considering existing (digital) business models, which are all predominantly centralised, there are certain risks involved to network users. 13 Some of these risks include: ▷ Single-point failure ▷ Exclusion, abuse, and mistrust ▷ Low Transparency and high transaction fees Single Points of Failure – Looking back at previous figures on pages 51 and 53, Figure 11 and Figure 13, it should be clear that a peer-to-peer decentralized payment system is inherently more

robust than a payment system requiring an intermediary or clearing house. Bitcoin achieves this by using a blockchain-based consensus mechanism to manage an agreement on the state of a distributed database. While the network relies on the underlying Internet connectivity (which is itself decentralised), there is no single entity whose failure would disrupt the network. Centralised payment systems are exposed to failures of hardware and breaches of security procedures which, in the worst cases, can bring the whole payment network down (as was the case for Visa in Europe on 1 June 2018). Having a decentralised network ensures that the failure or break down of any node cannot disrupt the entire system. For example, if a central clearing house (say the central bank) was to suffer an attack, this would prevent the entire monetary system from functioning in a centralised system; whereas, an attack on a server in the Bitcoin network would have no effect on the functioning of the system (i.e. users could still make transactions using Bitcoin). Exclusion, abuse and mistrust – Blockchain-based permissionless cryptocurrencies have, by design, a uniquely low barrier for entry – any individual can participate in the payment system as long as they have access to an Internet connection. This makes it possible for anyone to actively participate in the system and ensure the accountability of others in the network. With 1.7bn people in the world without access to a bank account, regular payment providers have often failed to provide access to an effective payments system. This is especially true in the midst of a worldwide surge in access to the Internet and secure internet servers as can be seen in the Figure 14 below. The decentralized network also prevents a centralized authority from excluding members participation or abusing their unique position as the only group with access to a private ledger. This lack of transparency in a centralized system can lead to popular mistrust, which is remedied by allowing all participants access to a common decentralized ledger. High

Transaction Fees – With the invention of electronic transfers (credit cards, debit cards, etc.), financial transactions have become considerably cheaper and more efficient over the past thirty years. There do remain some types of transactions which require significant third-party fees to complete. The most prevalent of these would be transactions involving multiple currencies (i.e. remittances, tourism, imports/ exports of goods and services). For example, looking at data from the World Bank for remittance fees over the 2011–2017 period, we can see that remittance fees to some countries are still close to 20%, and still range around 10% in strong emerging economies like China and Thailand. A more extreme, and persistent, example of high third-party fees is the exchange of currencies at international airports. While these companies pay high rents for real airport estate, the fees charged by monopolistic money exchange facilities in many UK airports have remained disproportionate for several years without much change. The persistence of this problem has been well documented in the press over several years in the UK. Table 2 below provides select articles with a comparison of the rates charged at airports with spot exchange rates. Security and Anonymity of participants – While blockchain-based transactions are public by the nature of the payment protocol, blockchain-based cryptocurrencies are ‘pseudonymous’.

Transactions can be linked to the public keys they originated from and were sent to, but it is much harder to establish a link between a public key and the identity of the person making the transaction. Notably, the transaction is ‘pseudonymous’ not only from the broader public, but also from the other counterparty – not unlike a cash transaction between two strangers. This security and anonymity removes the risk of a financial intermediary misusing client details, having them unintentionally stolen or legally sharing them with third parties (e.g. a suppressive government) without the explicit consent of the client. This pseudo-anonymity also

helps to overcome some of the problems with purely anonymous cash identified by Sands and Rogoff from Chapter 3. For example, large movement of funds could be followed as they move through the network, allowing for law enforcement to track conspicuous transactions across the globe. Transparency, Auditability and Governance – Similar to banks, blockchain-based cryptocurrencies record all transactions in a secure and immutable ledger. The blockchain is a transactions ledger of tokens where the entire history of transactions is recorded. One block contains a group of transactions and has a unique pointer that refers to previous blocks in the chain. In contrast to centralized systems or banks, in the case of Bitcoin, the ledger is not stored in one ‘safe’ place. Instead, everyone using Bitcoin (i.e. who has the core software) is connected through a peer-to-peer network and saves a replica of the Bitcoin’s blockchain (ledger). There are many replicas of the same ledger existing on multiple machines, guaranteeing its safety against system failures or attacks and full transparency for all users on the network. Effectively, this means that anyone can access and audit records of all pseudo-anonymous transactions and does not require intervention or permission from a third party (i.e. a central bank). As depicted in Figure 16, this system allows buyers and sellers of goods and services to interact in a transparent manner with each other without needing a central bank or commercial bank to act as an intermediary, or backer of the currency used to make the transaction. For example, with Bitcoin, everyone can download the software, transfer fee-free money, store the ledger and even maintain it, democratizing the control over the system. Transparency is a key component for trust to be established. As modern commercial banks have scaled up operations from knowing their users personally to cross border business models, participants have become identified as a ‘number’ and

see the running of operations inside the banks as ‘black box systems of authority’

7. CENTRAL BANK DIGITAL CURRENCIES

Central bank digital currency (CBDC) can be broadly defined as “any electronic, fiat liability of a central bank that can be used to settle payments, or as a store of value” (Barker et al, 2018, p.2). Note that, unlike the case of cryptocurrencies, CBDCs are considered a liability on the central bank’s balance sheet (see last part of Chapter 2) As will be demonstrated in the next section, established central bank currencies have a significant advantage as a trusted form of money rather than an entirely new, and not well understood, option. Lagarde (2018) also argues that monetary authorities will continue to remain a pillar of trust given the breadth of work they do, not only issuing stable money but also regulating the financial and payment system. While providing greater access to digital forms of currency is not a new idea, 17 it has recently gained traction given the debate about the role of monetary authorities in future currency and systems of payment. Even though it is issued by the same monetary authority, CBDC can be considered as a disruptive change to the existing system of payments, which can be slow and tedious. For example, some international transactions can take several days to pass through regulatory checks and clearing houses. The potential use of blockchain technology for improving the efficiency of money raises many questions about the role of central bank money, direct access to central bank liabilities and the structure of financial intermediation. Some of the characteristics and advantages of a well-designed CBDC would include a practically costless medium of exchange where individuals could hold accounts directly with the central bank. This

would allow the central bank to have an additional tool for conducting monetary policy, better information on potentially fraudulent activities and avoid intermediary costs associated with commercial bank lending, especially for lower-income households. CBDCs could also act as an interest-bearing risk-free store of value, with a rate of return in line with other risk-free assets such as short-term government securities. 18 A well-designed CBDC would also overcome the price stability issue that exists with most privately issued cryptocurrencies (with the exception of stablecoins) by actively managing the supply in line with an underlying basket of goods and services. As noted above, an account-based CBDC could be implemented via accounts held directly at the central bank. Such an approach “would be reminiscent of the early years of central banking, when individuals and nonfinancial firms held accounts at the Bank of England and the Sveriges Riksbank” (Bordo and Levin, 2018, p.7). The reason that these individual accounts were discontinued was largely due to the impractical technicalities involved with maintaining such a large volume of accounts. Given the new technology available to central banks, this barrier should no longer exist with the use of an integrated accounting system into the CBDC framework. There are clear differences between these types of CBDCs and cash. A CBDC in these forms would not necessarily be anonymous. Moreover, unlike cash, it could pay or charge interest. Figure 22 presents the attributes of these of CBDCs and how they compare to the current forms of central bank money In terms of active and evolving research agendas, the Bank of England was one of the precursors on studies regarding cryptocurrencies and CBDCs (Kumhof and Noone 2018; Barker et al., 2018; Barrdear and Kumhof, 2016; Ali et al., 2014). The UK’s monetary authority first raised the possibility of a central bank-issued digital currency in their research agenda in 2015. Since then, the most complete work done by the Bank of

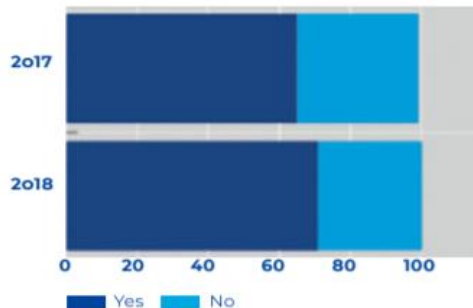
England regarding CBDCs and their implications has been Kumhof and Noone (2018). The Sveriges Riksbank is also investigating whether an e-krona would provide the general public with continued access to central bank money and increase the resilience of the payment system (see Skingsley, 2016; Riksbank, 2017). Other than the British and Swedish monetary authorities, several central banks are also developing new research agendas for CBDCs. These include the National Bank of Denmark (Gurtler et al., 2017), the Reserve Bank of Australia (Lowe (2017), the Bank of Canada (Engert et al., 2017) and many others. The Committee on Payments and Markets Infrastructures (CPMI) at the BIS did a survey in 2018 with central banks to understand the current B. Current State of CBDCs stage of their work on CBDCs and what were their conclusions regarding this topic. More than 60 central bankers participated, representing countries that count for 80% of the world population. Figure 23 presents the results of this survey. Seventy percent of central banks are working on some sort of CBDC. Nevertheless, only about half of the central banks doing work on CBDCs have actually moved toward testing this idea. According to BIS CPMI's report, this means that central banks are examining the benefits, risks and challenges of potential issuance from a conceptual perspective. Only approximately a tenth of the central banks engaged with CBDCs have moved into the phase of experimenting with the different types of possible technologies, by developing pilot arrangements

CPMI CBDC work in Central Banks

CENTRAL BANK CBDC WORK

SHARE OF RESPONDENTS

Engagement in CBDC work



Focus of work¹

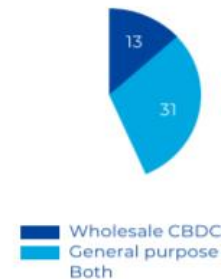


Figure 24 shows the answers of central bankers when asked if they plan to issue a CBDC in the short or medium term. Only a very small amount of these think they are likely to issue a CBDC in the short to medium term. The results are basically the same for retail and wholesale CBDC. But why have central banks chosen not to provide these digital services? The reason for this lies in probably the most important question regarding the discussion of CBDCs, the impact that the implementation of such currency would have in the financial and monetary systems. Many studies have been made by academics, monetary institutions, and even practitioners in trying to analyse these possible effects. In fact, most of the literature regarding CBDCs has focused on this topic. In the current fractional reserve system, only commercial banks have access to digital account-based central bank money. By contrast, physical central bank money (i.e. cash) is widely accessible to the general public. As discussed in the previously section, the use of cash will likely diminish as businesses adopt more hygienic and efficient forms of payment. With this possibility, the public would no longer have wide access to central bank money (bank notes), which would need to be replaced with a digital alternative. If household and business deposits are concentrated in the central bank, CBDC schemes would implicitly end the practice of, and

risks associated with, fractional reserve banking. This ‘narrowing’ of the banking system (depositors deal directly with the central bank) is effectively a revival of the ‘Chicago Plan’ as discussed in Chapter 2. 19

In addition to more efficient and safer payments and settlement systems, a CBDC could come with additional benefits. Given that CBDC can allow for digital records and tracing, it could improve the application of rules aimed at anti-money laundering and countering financial terrorism. Moreover, it would also possibly help to reduce informal economic activities. Finally, Lagarde (2018), Coeur and Loh (2018), Broadbent (2016) and many others defend CBDCs as an important tool for financial inclusion, particularly in developing countries, where a significant part of the population is still not included in formal financial systems. Monetary policy implications are likely to be more pronounced if a CBDC emerges as an attractive asset to hold. According to Coeur and Loh (2018), if a CBDC is set as a new and liquid central bank liability, it is likely to have an impact in the channels of transmission of policy rates to money markets and beyond. Given the high demand for low-risk government-issued assets over the last decade, a CBDC would be likely to affect holdings by investors, particularly in markets for liquid, low-risk instruments (such as government bonds). If institutional investors could hold CBDCs without limits, the interest rate on these would help to establish a hard floor under money market rates, as this financial instrument would be the government bond with shortest (instant) duration. Regarding households, if a CBDC is implemented in such a way that it becomes a viable alternative to commercial bank deposits, it would be able to make the rates on these deposits more linked to what the central bank would pay on its digital currency. As a result, this is likely to strengthen the pass-through mechanism of the policy rate to the general public. Since the 2008 crisis, developed markets have dived into negative

rate territories. As we currently stand in 2019, it does not seem like we are surfacing anytime soon. In fact, more recently, interest rates in emerging economies are also converting to historical lows. With even the monetary authorities of emerging markets starting to discuss the possibility of negative interest rates for government bonds, a tool to pass these rates to money markets and deposit rates would be welcomed by central banks. In the fractional reserve banking system that we have, monetary authorities are able to charge negative rates on bonds and deposits that financial institutions hold at the central banks. Nevertheless, the effectiveness of the monetary stimulus of setting negative rates is limited. Financial institutions cannot pass these rates to client's deposits, since they always have the option of holding cash, which yields a non-negative rate. If monetary authorities were to replace cash by an interest-bearing CBDC, this would open the possibility of expanding negative yields to accounts of households and firms in the real economy, hence increasing the effectiveness of negative interest rates. In fact, Goodfriend (2016) and Dyson and Hodgson (2016) argue that the issuance of CBDCs could alleviate the pressure on the zero lower bound even if physical cash was not extinct, as long as it came along with a reduced desire for cash holding. As it currently stands, however, the dependence of key market rates on the policy rate seems to be satisfactory to most central bankers (Coeur and Loh, 2018). Even though these are not perfectly correlated, this does not represent a challenge as long as central banks have enough control over the financial system and its institutions. Regarding the effectiveness of CBDC as a tool to impose negative interest rates on the general public, it is uncertain how this would work in practice. General equilibrium effects may make the implementation of such strategy unfeasible even with digital currencies. There is no guarantee that society would accept a negative yielding currency to be "imposed" by central

banks. By trying to set negative interest rates more broadly, monetary authorities could in fact cause the demise of national fiat money, as people could escape to non-negative yielding competitors, like commodity money or even cryptocurrency alternatives. The overall effects of CBDC on the term structure of interest rates are very hard to predict and will depend on many factors. More generally, the implications of a CBDC relative to other instruments are likely to depend on each jurisdiction's specific operating environment. Also, since operating environments may change in the future, monetary policy cost-benefit analyses related to CBDCs may need to be revisited periodically. Finally, weaker demand for cash does not imply the need for CBDCs. In fact, monetary policy can remain effective even without cash. 20 On balance, the study from Coeur and Loh (2018) argues that it is not clear that there is a strong basis at this time to issue a CBDC for the purpose of enhancing the efficacy of monetary policy.

Financial Stability –

Implementing a CBDC would almost certainly imply in a more active role for central banks in financial intermediation. This would not, however, necessarily mean more financial stability. One example is that by having to passively accommodate the demand for CBDC, the central bank could potentially introduce a high level of volatility in the demand for government debt. A general purpose CBDC could have a large impact on the structure of financial intermediation and the activity of traditional banks. If this digital currency is attractive to individuals and firms, it could result in a withdrawal of funding to commercial banks. This could lead some banks to raise spreads and increase transaction fees in order to maintain profitability. Depending on how the financial system is organized, banks might have to shrink their balance sheets, with possible adverse economic consequences. Arguably, the most significant and plausible financial stability risk of a general purpose CBDC is that it can

facilitate a flight away from private financial institutions and markets towards the central bank. Faced with systemic financial stress, households and other agents in both advanced and emerging market economies tend to suddenly shift their deposits towards financial institutions perceived to be safer and/or into government securities. Of course, agents can already shift funds towards the central bank by holding more cash. But a CBDC could allow for digital runs towards the central bank with unprecedented speed and scale. Even in the presence of deposit insurance, the stability of retail funding could weaken because a risk-free CBDC provides a very safe alternative. The central bank could try to manage the interest rate on this CBDC in order to control such runs. Nevertheless, changes on this rate, even towards a negative territory, may be unsuccessful in periods of economic turmoil when agents seek safety at almost any price. Another solution could be to impose quantitative limits on the amount of CBDC that each individual or firm could hold. But this would most likely result in price differences between different types of money, in contradiction to the principle of money being exchangeable at par and hampering the conduct of monetary policy. Overall, one can notice that a lot of the questions raised by the issuance of CBDC are very similar to the points once discussed by those who advocated for full-reserve banking.

8. PERCEPTIONS OF MONEY AND FUTURE OF CRYPTOCURRENCIES

New results from the IE Survey on ‘The Future of Money’ suggest, unsurprisingly, that the majority of respondents are either, not familiar with fractional reserve banking (between 44 and 75%), or, are familiar with it but not sure what it means (between 17 and 43%). Interestingly,

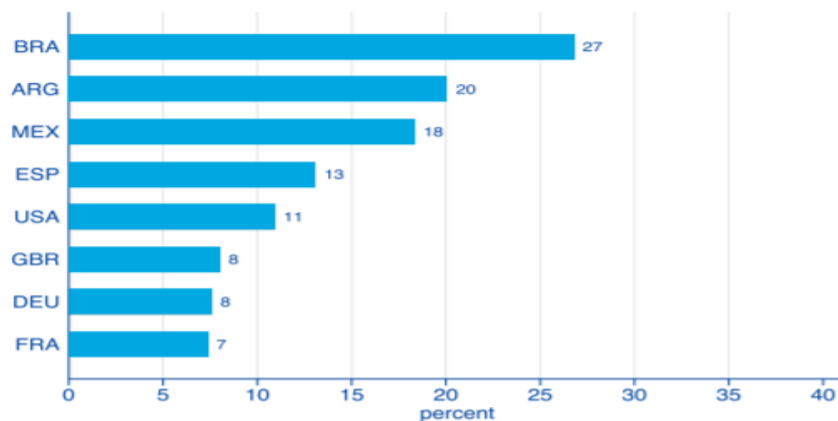
the US and UK rank amongst the lowest in terms of understanding fractional reserve banking with around half of the degree of understanding in Germany. In a 2012 UK Government Office for Science research paper, Dr Y.V. Reddy, (former Governor of the Reserve Bank of India) was quoted saying that: “Trust is difficult to measure, but on the basis of surveys conducted and anecdotes reported in the media, there appears to be an erosion of trust in the financial sector as a whole, and banking in particular, in advanced economies”.²¹ There is continued evidence of this erosion of trust over ten years after the financial crisis. For example a 2018 YouGov poll of 2,250 adults on behalf of campaign group Positive Money found 66% of adults in Britain do not trust commercial banks to work in the best interests of society, with only 20% stating that they do trust banks to work in the best interest of society (White, 2018). Part of this lack of trust may come from people’s attitudes toward the government’s regulatory response to the financial crisis. From Figure 26, we can see that many respondents in our survey felt that government has not taken meaningful steps in regulating the banking sector since 2008. From the above figure we can see that there is considerable amount of variation with the majority of respondents in Argentina, Spain, Germany, Mexico and France believing that government has not taken meaningful steps in regulating the banking sector since 2008. In Brazil and the UK, a slight majority believe that government has taken meaningful steps, while Americans were split 35%–35%. Figure 26 Government response to Financial Crisis Figure 27 Explaining Government Response to Financial Crisis Given the high levels of dissatisfaction with government response to the financial crisis, we asked those respondents who answered ‘no’ to the previous question to identify why they feel that government has not taken meaningful steps. From Figure 27, it appears that the majority of respondents in almost all

countries in our sample felt that it is an important issue for voters in their countries, but lobbying exerts too much influence on government for any meaningful changes to take place'. Interestingly, the two financial centres of the world (along with Spain) had the highest levels of agreement that government was overly influenced by lobbying efforts. This continued erosion of trust and lack of effective government response may contribute to an increasing willingness for people to adopt alternative ways to store money. For example, a 2018 Bain survey of 151,894 consumers in 29 countries found that 29% of respondents trust at least one tech company more than their primary bank and 54% of respondents trust at least one tech company more than banks in general (Bradley et al., 2018). Despite people's movement towards private third-party payment systems, our survey results suggest that they still prefer that central banks create and manage money. From Figure 29 we can see that the majority of respondents (between 65% and 89%) in all of the countries in our sample trust central banks and commercial banks to create and manage money (as their first/second choice). Specifically, central banks are the most trusted across all countries and commercial banks, with the exception of Germany, which prefers the central government to commercial banks, are the second choice for respondents. In the case of Mexico, the central bank and commercial banks have fairly equal levels of trust, while the government has incredibly low levels of trust. These results do not show very optimistic prospects for the successful launch of Hayek-type currencies with very limited support for private companies (i.e. Facebook) or peer-to-peer networks to create and manage money. Putting this together we can see from Figure 30 below that central banks are the most preferred institution for creating and managing money. In a June 2018 ING survey on cryptocurrencies, 8% of Americans, 6% of UK residents, 8% of German residents, 6% France residents and, 10% Spain

residents reported owning cryptocurrencies. In the 2019 IE survey, there has been an increase in all countries with the exception of Germany, which remained unchanged. Specifically, there was a 3% increase in American ownership of cryptocurrencies, a 2% increase in UK ownership, a 1% increase in French ownership and a 3% increase in Spanish ownership. Among owners of cryptocurrencies, these are predominantly held as investments, especially in countries where the ownership levels are highest. In almost all countries, only about 2% or owners claim to use these specifically for purchases. For those who don't own cryptocurrencies, we found that, in the case of Mexico, Argentina and Brazil, the reason for not owning cryptocurrency was not due to a lack of interest, but not knowing how to buy them. In the case of Mexico, 55% of respondents said they did not own cryptocurrencies because they didn't know how to buy them with 53% and 47% in Argentina and Brazil, respectively. Figure 33 Reason for not Owning of Cryptocurrencies For the US, UK, Spain, France and Germany, the majority of respondent did not own cryptocurrencies because they felt they were too risky. There was also a higher emphasis on cryptocurrencies not having an advantage over the currencies which were currently being used. In general, these results suggest that countries with a less stable history of monetary stability are more open to new types of money. This brings us to the future of cryptocurrencies. As can be seen from Figure 35, in all but two countries (US and UK), the most likely reason to not support this hypothetical cryptocurrency was a lack of trust in new currencies. In the case of the US and UK, respondents felt that cryptocurrencies do not offer any advantages over the money they already use. The recent high profile announcement of Facebook's Libra has led to a variety of surveys and articles written on its viability in terms of consumers' willingness to trust it. The results have not been overly positive. For example, a June

2019 Viber survey of 1,000 US and 1,000 UK residents found that nearly half of respondents in both countries (49%) say they would not trust Facebook at all, and less than 3% and 2% of US and UK respondents, respectively, said they would be willing to try Libra for payments (Viber, 2018).

Ownership of Cryptocurrencies



9. CONCLUSION

Over the past ten years, attention to money and the financial systems has come under greater scrutiny by a wider public concerned with current levels of transparency, management, accountability and fairness.

Accompanying this scrutiny is an era of unprecedented technological innovations that open up the range of possibilities for how money works, some of which were proposed by Austrian School economists in the early 20th century. Destabilisations in financial markets often lead to short revivals of these Austrian school ideas regarding the role of money and banking in society making it no coincidence that the Nakamoto (2008) paper emerged in the aftermath of the 2007/08 financial crisis. The widespread distrust arising from the financial crisis and greater public scrutiny led to the seminal contribution from Nakamoto (2008) and

subsequent invention of Bitcoin. The decentralized nature and democratic consensus protocol of Bitcoin was envisioned to become a digital payment system with emphasis on removing the need for a trusted third-party institution in processing transactions, whose rules are enforced by consensus, with anyone being able to participate. There are other good reasons to move from cash to blockchains based electronic payment systems including the elimination of a source of illicit financial activity, public health benefits and overall efficiency of not having to be physically present to make very fast transactions with strangers. In fact, digital payment systems have been slowly replacing physical cash for many years with the majority of respondents to the IE Survey on the Future of Money using credit cards and debit cards as frequently as cash. Several other digital alternatives to physical cash have already become successful systems of payments (M-Pesa, AliPay, Paypal, etc.).

Unfortunately, in practice, cryptocurrencies are struggling to uphold their creator's objectives, given that no existing cryptocurrency has been universally successful in fulfilling the role of 'money'. This is partly due to the failure in practice for a decentralized system to work in the presence of large mining consortiums, a lack of price stability, high transaction costs with large electricity consumption (with Proof of Work consensus protocols) and, potentially lower degrees of transparent governance. There also exists a general distrust of new currencies issued by new institutions. While central banks are not perfect, in most advanced economies they have built a trust premium compared to private sector companies, which makes them better candidates in the opinion of most citizens for issuing money and managing/regulating financial transactions. These trust premiums and low levels of trust and understanding of cryptocurrencies are confirmed by the unique results from the IE Survey on the Future of Money. Specifically, residents of Argentina,

Brazil, Mexico, France, Germany, Spain, the UK and USA all i) place significant premiums on money which is issued by a traditional authority (preferably central banks), ii) place a heavy discount on currencies which lack price stability, and, iii) place a high premium on money that is highly accepted. Based on these results and the technical challenges listed in Chapter 4, cryptocurrencies have a considerable amount of obstacles to overcome before gaining widespread acceptance by general public. The good news is that central banks are currently working diligently to investigate/establish Central Bank Digital Currencies (CBDCs) which would overcome some of the challenges associated with cash while still being managed by a trustworthy central authority in the case of advanced economies. Where central banks have poor records of money issuance and management or high degrees of exclusion abuse and mistrust, such countries could benefit in the short term from the introduction of a privately issued cryptocurrency, especially with the vast increase in world-wide Internet users and availability of secure servers.

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THANK YOU