



Blockchain and the Future of Payments

— Whoever defines Money
controls the Future

WHITE PAPER

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— Whoever defines Money controls the Future

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Abstract

In this and in our previous White Paper we look at the changes that are happening within the payments industry. As argued in the first White Paper “[The Payments Industry after Covid-19 – Too early to call the End of Growth](#)”, changing consumer preferences and new and more agile competitors have changed the competitive landscape more in the last 5 years than the previous 45. There is definitely a sense of change in the air. The payments sector as such, will continue to see attractive growth for at least another 5 years, and likely for the rest of this decade, as Consumer2Business (C2B) payments become fully digitized in all major economic zones.

Longer term, one must question what will take over the growth-baton as C2B becomes saturated, as this will happen in the same timeframe as Distributed Ledger Technologies (DLT) and Central Bank Digital Currencies (CBDC) (see facts page 10) will be rolled out, offering alternative and likely much cheaper payment rails. What seems very clear today is that traditional banks will see even more commercial and regulatory pressure in the years to come, from lower market share in traditional merchant acquiring, lower merchant interchange fees, the growth of competing digital wallets and longer-term fundamental questions around the business model of lending in a world of Central Bank Digital Currencies.

From centralized to decentralized payments infrastructure

Since the early days of the internet anyone with a computer has been able to connect to the internet and access anyone with a web browser anywhere in the world. The original Web 1.0 was built as an open network, with open standard protocols, and decentralized infrastructure. This has enabled massive global network effects to happen in information, media, telecommunications, and software distribution. Anyone who creates a digital product can sell to a customer anywhere in the world and scale up incredibly fast. These network effects eventually led to the current state of the internet, Web 2.0, being highly consolidated by platform companies like Alphabet, Amazon, Meta Platforms, Alibaba and Tencent.

The next logical infrastructure layer of the internet is being built today and will be the foundation for Web 3.0 (see infobox, page 4). It is a layer that will enable value to be represented and to be exchanged in the same way that the open permission-less internet exchanges information, data, content, communications, and software today. Value will be represented either as new non-sovereign currencies like Bitcoin, as representations of fiat currencies through stablecoins (see infobox), as algorithmically issued stablecoins¹ and/or Central Bank Digital Currencies. This value layer on top of the internet will enable smart contracts where today's middlemen are removed from the value chain and make payments to be transactable with the same ease and low cost that we can "transact" information over the internet today.

Today, protocols allow computers to talk to each other. The World Wide Web is a protocol called HTTP that allows computers to exchange content in a structured way. Other protocols like internet email make it possible to communicate with each other despite having different email service providers. Other types of protocols are for example FaceTime or Zoom. The idea behind decentralized ledger technology and crypto is to be the protocol for money on the internet where anyone that connects to it can exchange value in the same way we exchange an email, a photo, or any other data.



Stablecoins

Stablecoins are cryptocurrencies where the price is designed to be pegged to a cryptocurrency, to fiat money, or to exchange-traded commodities (such as precious metals or industrial metals).

The value of fiat money linked stablecoins is based on the value of the backing currency, which is held by a third-party regulated financial entity. In this setting, the trust in the custodian of the backing asset is crucial for the price stability of the stable coin. Fiat-backed stablecoins can be traded on exchanges and are redeemable from the issuer. The cost of maintaining the stability of the stable coin is equivalent to the cost of maintaining the backing reserve and the cost of legal compliance, maintaining licenses, auditors and the business infrastructure required by the regulator.

Examples: USD Tether (USDT), USD Coin (USDC), Diem².

The significance of this is that anyone who creates a commerce product, a financial product or a digital wallet on a distributed ledger can connect to it and transact and settle with any counterparty directly on the internet. In addition, this can be done at the speed of the internet, and with the increasing cost efficiency of the internet by cutting out the middlemen.

¹) Hopes are high in the crypto-community that algorithmic stablecoins like Luna will see significant growth as they are totally decentralized making them far more resistant to regulatory crackdowns.

²) Source: Wikipedia, as of Feb. 2022.



Web 3.0

Web 3.0 philosophically diverges from today's Web 2.0 in that Web 3.0 is highly decentralized versus today's centralized internet, which is about broader ownership, by rewarding users that generate value to the network. Web 3.0 is based on user-generated value/reward, where users that are active in a new enterprise and drive value to it are rewarded in tokens. A simple analogy would be if Facebook's equity had been distributed to the billions of users who actively use and promote the platform creating network effects and strong communities. The ability for blockchain to distribute equity/tokens easily and programmatically according to a set of rules, has the potential to transform how businesses are created, operated, and owned.



A stable coin is a digital fungible token representation of some asset that exists in the "real world".

To make that work, we not only need the protocol itself, but also an existing representation of money, like the US dollar or Euro, and issue essentially a digital currency representation of that, that can then be transacted over these protocols. This

representation most likely will be a stable coin. A stable coin is a digital fungible token representation of some asset that exists in the "real world," like liabilities of commercial banks or central banks (cash), that can be exchanged over a protocol. USDC and USDP are examples of stable coin-representations of USD.

Fiat money has network effects, but trustworthy stablecoins could potentially also have huge network effects. The more people who have it, the more utility it has. The more utility it has, the more people that want to transact in it.

One way to look at stablecoins is as a market infrastructure that gives strong interoperability between the existing financial system and the digital decentralized currency rails of the future. Today, the largest usage of stablecoins is to facilitate trading in cryptocurrencies, most importantly Bitcoin. Longer term, stablecoins will likely connect the digital and real economy. One vision of the future is that there will be a digital world composed of many metaverses, each with their own (crypto) currency. Stablecoins can be the medium that connects the metaverse to the physical world.

Just as the internet became the new infrastructure of information and communications for data, this is the beginning of a new infrastructure development for economic activity in the world. Gradually, the business of payments and banking will migrate to this new economic infrastructure.

The existing financial system is closed and tightly controlled, built around central ledgers as originally invented in Northern Italian city states many hundred years ago. Media and television used to be controlled, permissioned and tightly regulated infrastructure models. With the advent of the internet, these industries within a decade or two saw huge disruption and are today much more open, global, and interoperable. This is also to be expected in finance and payments in the years ahead.

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This leads us to conclude that the phrase cross-border payments in future years will become an absurdity, just like the idea of a “cross-border email” or “cross-border web browsing session” would be absurd.

DLT disruption of the remittance industry

Remittances is one of the first areas stablecoins are making their mark, because if there's one area within payments where there are significant frictions in the form of long settlement times and high costs, it's cross-border remittances. Western Union has traditionally dominated this market and taken significant fees for sending (poor) people's money cross-border. USDC – the stable coin promoted by Circle and regulated as a “stored value instrument” under state money transmission laws by 46 state regulators in the US, is an open protocol anyone can connect to. In fact, hundreds of different wallets and exchanges around the world have connected to it, and created a global internet native dollar settlement rail, a network that can reach any country and move dollars at the speed of the internet and done at the interbank mid-rate. An example comes from Mexico. Bitso, the first DLT regulated and licensed exchange in Latin America, offers to transfer USDC to Mexican Peso to RTGS, the real-time gross settlement system in Mexico, getting from USD into any Mexican Peso bank account in seconds. This is the fastest and cheapest way to send money to Mexico. According to Bitso, they control 10% of the cross-border flows between the US and Mexico.

This leads us to conclude that the phrase “cross-border payments” in future years will become an absurdity, just like the idea of a “cross-border email” or “cross-border web browsing session” would be absurd. There are no borders on the internet and as payments move to the blockchain there will no longer be cross-border payments. And the costs will continue to plummet to close to zero.

3) Source: Wikipedia, as of Feb. 2022.



Distributed Ledger Technology (DLT)

A DLT is a decentralized database that is managed by various participants geographically spread across multiple sites, countries, or institutions. There is no central authority that acts as arbitrator or monitor. As a distributed log of records, there is greater transparency – making fraud and manipulation more difficult – and it is more complicated to hack the system. One form of distributed ledger design is the blockchain system, which can be either public or private.

The primary advantage is the lack of central authority. When a ledger update happens, each node constructs the new transaction, and then the nodes vote by consensus algorithm on which copy is correct. Once a consensus has been determined, all the other nodes update themselves with the new, correct copy of the ledger. Security is accomplished through cryptographic keys and signatures³.

Remittances is an obvious area for disruption because there is a lot of friction. But even more profound will be the potential impact on the much larger Business-2-Business (B2B) payments market, a market that supersedes the Consumer-2-Business (C2B) market today, and is totally dominated by legacy technology and legacy banks. It is very likely that a large part of the B2B payments market will be addressed by stablecoins and provide both cheaper and much faster payments in the years to come.



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Furthermore, it is easy to imagine that companies around the world are going to want to transact in digital currency and have the equivalent of a bank-like transaction that has seamless interoperability with the existing financial system. It is therefore very likely that a large part of the B2B payments market will be addressed by stablecoins and provide both cheaper and much faster payments in the years to come.

Finally, a word on regulation. At the end of the day regulators determine the rules of the game, and only regulated stablecoins will have any future in a payment system⁴. Regulated stablecoins will be required to hold government issued risk free assets including cash and government bonds as a backing for the issued stablecoins. It follows that as the demand for stablecoins grows, so does the demand for government issued risk free assets. This means that retail investors instead of holding cash in commercial banks increasingly will hold a (blurring) combination of cash and treasuries wrapped up together as collateral for stablecoins. This is another way to hold down the interest expense for the government and therefore the growth in stablecoins will be supported by regulation. There is no conflict – as long as the government sets the rules.

The state vs. DLT

The rise of DLT has together with Meta's announcement of its plans for a Stable Coin (the Diem) and the Chinese introduction of a CBDC by 2022 provoked a reaction from western central banks. The potential privatization and decentralization of money and China potentially leapfrogging its international currency status poses a real

⁴) There are big uncertainties about the backing of the largest stable coin, USDT or Tether, so this might fall victim to regulatory action.

threat to state authority in monetary affairs. The more that ordinary transactions come to be conducted in tokens, the more difficult it will be for monetary authorities to manage existing payments and monetary systems. If traditional cash becomes largely extinct, so too does much of the power of central banks.

That is why we now see mounting interest around the world in the development of CBDCs. A CBDC is an existing fiat currency that is issued by a central bank in digital form as a complement to or in place of conventional notes and coins. Where the difference is, is that most currencies today are actually a liability of the commercial banking system and not the central bank. CBDCs are a liability of the central bank.

In any competition with privately issued rivals, whatever public institutions lack in entrepreneurship and creativity they benefit from the advantage of being firmly backed by the full faith and power of their sovereign governments.

It is too early to tell who will prevail, but it is fair to assume that regulators will set high regulatory standards for privately issued currency. Furthermore, countries will react differently because they have different circumstances and motives. Countries with already highly digitized payment rails might not benefit to the same extent as countries with cash-based payments systems by going to a CBDC, and countries with deep commercial banking systems need to think twice about the consequences of CBDCs. This is because they risk draining the commercial banking system for cheap funding from deposits.



Central banks without CBDC risk losing their relevance and will face fragmentation and privatization of currencies and eventual loss of control of the payments and monetary systems.



Central Bank Digital Currency (CBDC)

A CBDC is a digital currency issued by a central bank as opposed to a commercial bank. A CBDC is or would be issued by a state and have an official legal tender status. Most CBDC implementations will likely not use or need any sort of distributed ledger such as a blockchain. CBDCs are currently mostly in the hypothetical stage, with some in proof-of-concept programmes; however, more than 80% of central banks are looking at digital currencies. China's digital RMB is the first digital currency to be issued by a major economy.

A lower commercial bank deposit base leads directly to lower lending capacity and a lower money multiplier effect in the economy. So, the effect on the commercial banking sector and the wider economy could potentially be quite dramatic. Therefore, there is today not a general acceptance of the inevitability of CBDCs. And the technical setup will be crucial.

However, it is likely that we will see the introduction of CBDCs in many economies over the coming 10 years. The reason being that central banks without CBDC risk losing their relevance and will face fragmentation and privatization of currencies and eventual loss of control of the payments and monetary system. In addition, a CBDC offers the government a new super powerful policy instrument when wanting to direct liquidity into the economy⁵ – on top of the surveillance capabilities a

5) In June 2020, Speaker of the House, Nancy Pelosi, introduced a "digital dollar" to deliver payments directly to U.S. citizens. The concept would have required the Federal Reserve's member banks to open and maintain digital dollar wallets for all customers, and therefore also an amendment of the law governing the Federal Reserve. The digital dollar didn't make it into the final stimulus package passed by Congress in the summer of 2020, but signaled that the U.S. has officially entered an increasingly heated race between advanced projects at several central banks around the world to be the first to issue a CBDC.



13.7941

44.1215

31.6166

92.2863

69.8112

0

10

1

75.0234

60.9867

12.4412

35.9398

0

10

1

0

10

1

0

30.7355

CBDC would offer, as pointed out by Agustin Carstens, general manager and leader of Innovation Lab at BIS, the “Central Bank of Central Banks”, stating that “*The key difference with the CBDC is the central bank will have absolute control on the rules and regulations that will determine the use of that expression of central bank liability, and also we will have the technology to enforce that*”⁶. One of the investment themes we identified after the financial crisis back around 2009 was ‘Bigger Government’ and CBDCs certainly fits into that theme.



Longer term, a digital RMB could facilitate deeper internationalization of the RMB and insulate the Chinese currency from the US controlled dollar standard and SWIFT system.

The ECB looks at a Euro CBDC as an instrument to improve its payment systems and take back some control from American dominated payment rails as well as a means to increase the Euro’s viability and enlarge its use as an alternative reserve currency to the USD. China’s motive for issuing a CBDC is that it wants to take back control from private enterprises. A digital renminbi (RMB) has great potential to help China’s central bank exert control over data in the financial system and bring the rapidly growing power of Chinese fintech giants under control. Broad roll-out of digital RMB would enable the central bank to become the sole entity to see and control all the transaction data, while the third-party payment giants AliPay and TenPay would be cut off from most data and only have access to the data necessary to finish the transaction. Furthermore, longer term, a digital RMB could facilitate deeper internationalization of the RMB and insulate the Chinese currency from the US controlled dollar standard and SWIFT system. The benefit to the Chinese Communist Party clearly supersedes the costs

as China really hasn’t got a private commercial banking system, and therefore the cost of losing something one doesn’t have is a low cost.



The price economies would pay for the introduction of CBDCs is a larger state involvement in financial intermediation, and another heavy blow to commercial banks position in the economy.

China introducing e-RMB in 2022 will also most likely lead to Europe and later the US to follow suit. However, their decision will be tougher, because the costs to the commercial banking system in Europe and US will be real. The price economies would pay for the introduction of CBDCs is a larger state involvement in financial intermediation, and another heavy blow to commercial banks position in the economy. Obviously, when countries introduce the CBDC these negative side effects will be downplayed, and the technical setup of CBDCs will be done so as to minimize the costs to the commercial banking system. However, the initial technical setups can be changed over time according to government desires and there will be a cost to the commercial banking system, as the Bank of International Settlement (BIS), writes:

“....Academic research is not unanimous on the potential impact of a CBDC on bank deposit funding but many note impacts on competition. A sizeable body of literature stipulates that a CBDC would structurally decrease deposit funding available to commercial banks as a CBDC, being on a par with deposits with regard to liquidity and convenience, would also offer advantages as a safe haven asset..... Many studies argue that CBDC is likely to weigh on bank profitability and lending”⁷.

6) Youtube, *Cross-Border Payment – A Vision for the Future*, as of Feb. 2022.
7) Bis.org, *CBDC – User needs and adoption*, as of Feb. 2022.

Final remarks

We have not covered the rise of cryptocurrencies like algorithmically created Bitcoin in this paper. The reason is that it is far from clear what their ultimate usage is going to be. Cryptocurrencies suffer from a lack of trust that only the state can provide, and today do not satisfy most preconditions to be counted as viable mediums of exchange and are therefore irrelevant in a discussion on the future of payments. Cryptocurrencies should probably be viewed as insurance policies against the meltdown of the global monetary system and potentially as a store of value as digital gold.

CBDCs as well as stablecoins will ultimately emerge as the key mediums of exchange that would be incorporated into the payments and monetary systems. Also, DLT and fintech are poised to drastically simplify and rationalize most financial transactions and significantly alter the modus operandi of today's commercial banks. At the same

time, this will offer central banks new tools to guide and control the economies, from direct distribution to the main street as envisioned by Nancy Pelosi in 2020, and funding state spending to impact inequality and climate agendas.

The importance of this shift cannot be overstated, as formulated by Sky Mavis CoFounder, Jeffrey Zirlin:

".. money has gotten more abstract over time, from shells to gold to paper money, to fractional reserve banking, and now to full digital currencies. Historically, whoever has been in charge of this abstraction of money has been able to define the future I think that's happening right now."

Now is probably too early, but sometime later this decade the definition of money will have changed, and it will have a very big broad impact on our economies – and the payments industry.

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