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Digital Currencies – inevitable in a very near future all around the world[1]

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ABSTRACT: Digital currencies are already booming in the modern world and will be essential, particularly in geostrategic terms or in international trade. Digital assets will essentially use two different types of technology: whether they will be centralised (like the Chinese CBDC, or the digital Pataca currently being implemented in the Macau Special Administrative Region of the People's Republic of China), or decentralised (like the various cryptocurrencies, already accessible in the Western world through numerous exchanges).

This text focuses on the leading role of central bank digital currencies (CBDCs) and cryptocurrencies (as digital currencies) in the world as a whole and the leading role of digital assets in "emerging markets", namely in various countries whose economies and financial markets are still emerging or developing, such as in Africa.

Digital assets, being a CBDC or, differently, a legally private crypto like bitcoin or ethereum, for example - just to name the most popular ones around the world today - will play a decisive role in improving some economies commonly known as "emerging markets". These are markets that still need a lot of improvement, particularly because they are related to weaker macroeconomies, where some social and economic relations are strongly and usually linked to some lack of (traditional) money (or "fiat" currencies, such as the US dollar or the euro).

KEYWORDS: Cryptocurrencies – CBDCs – emerging markets – digital Pataca in the Macau S.A.R. (Special Administrative Region) of People's Republic of China.

[1] The present text was also published in Portuguese in Mozambique in the commemorative book entitled "Uma viagem jurídica entre o Rio das Pérolas e a Pérola do Índico", published by the Centre of Law Studies of the Faculty of Law of the University of Macau and the University Eduardo Mondlane, in July 2024.

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Introduction: the victorious emergence of cryptos globally

It is evident that *digital* currencies already constitute a topic which we all must deal with worldwide (almost).

There is no point in refuting such a simple truth: from Europe to Asia, the United States of America to Latin America, it is undeniable that various (different) digital currencies are being used by companies, individuals, and even by some sovereign countries (as legal tender)[2] for multiple and various reasons.[3]

If we take a quick look to the north American stock market, we can find huge public companies which took the risk to change their well-established business name in the financial markets (like Facebook to *Meta*) trying to absorb the changes brought by the enormous evolution in the current digital world (like the metaverse, augmented reality, digital gaming, etc.).

That notwithstanding, this phenomenon should be understood as a mere symptom of the topic which shall be addressed below in the present text: the emergence of a financial and legal ecosystem constituted by a lot of digital "currencies" and cryptos – *Bitcoin*, *Ethereum*, *Solana*, *Litecoin*, *Cardano*, *Polkadot*, etc.,[4] *i.e.*, private "currencies" exchanged and traded by individuals or companies among their business transactions.[5]

The unavoidable fact (which is not the author's opinion) is that traditional finance is progressively becoming extinct[6] and surely, Law cannot remain immune to those changes – not only in business law, but also in public finance. This evidently also implies some strong connections with Artificial Intelligence, but we should leave that for a future paper due to the tremendous importance of that issue.

1. Cryptos and CBDCs

The first step to understand the enormous difference between cryptos and *Central Bank Digital Currencies* (CBDCs)[7] is to accept that the only characteristic shared by both lies in their *digital* (and not physical)[8] *representation*, as evidenced by the given fact that any (standard) *crypto maximalist* shall strongly be in opposition to any modality of a CBDC.[9] For instance, a *bitcoin* extreme believer/*maximalist* shall vehemently condemn any present attempts of Ms. Christine Lagarde[10] of implementing a digital Euro (e-€) in the European Union (EU), or any possible

[2] The infamous example around the planet is El Salvador, where *bitcoin* is currently legal tender, *i.e.*, having to be accepted by all the population as a valid medium of payment in every transaction (*vide* https://www.nber.org/digest/202207/el-salvadors-experiment-bitcoin-legal-tender).

[3] Shortly and preliminarily having sovereign countries directly in view, perhaps meaning the extinction and transition from a *Keynesian economics* perspective into an entirely new scientific paradigm.

[4] It is quite understandable that *bitcoin* is often referred to when the talk is about cryptos, as *bitcoin* is dominant in the cryptos' ecosystem (*i.e.*, having the largest *market cap*).

[5] An overview of cryptos, *bitcoin*, CBDCs, metaverse, web3, the evolution and history of money, etc. can be accessed at https://www.youtube.com/watch?v=js5eTOn2X3k. Niall Ferguson is one of the most respected European historians in the analysis of money.

[6] At least partially extinct.

[7] A generic and basic characterisation of central bank digital currencies (CBDCs) can be found at https://www.investopedia.com/terms/c/central-bank-digital-currency-cbdc.asp.

[8] Like the ordinary banknotes that we all carry in our wallet nowadays.

[9] In our opinion, the huge hype recently generated by several crypto assets (as *bitcoin*, for instance) in the worldwide financial markets has accelerated the creation of CBDCs, even though their notorious lack of similarities.

[10] *Vide*, for instance, https://www.youtube.com/watch?v=xA_Lqgwn9ag.

future Federal Reserve's attempt at implementing a digital United States dollar (e-$) in the United States of America, or a digital Yuan renminbi (e-¥) in People's Republic of China by the Popular Bank of China.[11]

Putting it as briefly as possible, the crucial divergence lies in the option between *centralisation* or, alternatively, *de-centralisation.*[12]

In cryptos, particularly in the *bitcoin*[13] blockchain (as designed by Satoshi Nakamoto[14] more than 15 years ago), the choice is for *de-centralisation*, *i.e.*, by the "validation" of each financial transaction by all the members included and admitted to said blockchain[15] network (and not by any typical financial institution, *e.g.*, a bank not owning any bitcoin in its financial portfolio); in the ecosystem of any CBDC such validation remains *centralised*, *i.e.*, in the hands of the respective central bank (or, alternatively, in the hands of the monetary authority acting on behalf of such central bank or government)[16] and it is theoretically possible that blockchain technology is not even being used in the future by the relevant monetary system.

Practically, the above-mentioned concept of "validation" brings into play a general idea of *consensus* that was indeed one of the main causes for some ideological concepts generally associated to the origins of *bitcoin.*[17]

Nevertheless, those narratives should not be addressed in this text and are closely connected to an ancient *bitcoin* narrative[18] which (still) coincides with a period when it was being internationally and hotly debated: *i)* if bitcoin constituted a true financial *asset class* (like, for instance, precious metals, stocks, petroleum, etc.), *ii)* whether it made any economic sense to look for an *intrinsic value* in cryptos (besides the *network effects* mentioned by *Metcalf's law*) and *iii)* if any *spot*[19] – *bitcoin*

[11] The criticism over CBDCs (at least when coming from the west side of our planet) is usually based on the concept that CBDCs shall constitute the ultimate threat against one's privacy.

[12] As we used to repeatedly clarify, *i)* CBDCs do not constitute cryptos; CBDCs only share with cryptos the fact that they are both digital, especially because many CBDCs (some already created and/or implemented around the world, as in some provinces of People's Republic of China) will not require any *blockchain* technology; *ii)* the majority of cryptos' enthusiasts hate CBDCs (for good or bad reasons, and that should not be addressed in this text.

[13] For reasons of simplicity, we mainly refer to *bitcoin* (avoiding all the complexities deriving from the vast differences between crypto blockchains, namely the big differences brought by the *proof-of-stake* and the *proof-of-work* diverse systems) especially considering that *bitcoin* preserves a dominance higher than 50% in the cryptos' ecosystem (where we also can find *Ethereum*, *Solana*, Monero, Non-fungible-tokens, etc.).

[14] The identity of Satoshi Nakamoto remains a total mystery. There are numerous narratives in such regard, but the truth is that no one really knows who (authoring the infamous *bitcoin white paper* - *vide* bitcoin.pdf) precisely created *bitcoin* and thus who Satoshi Nakamoto really was, *i.e.*, whether a single individual, a group of cryptographers, or even a state agency (like National Security Agency in the United States of America).

[15] There is one different blockchain per crypto (example: the *bitcoin* blockchain is surely different from the *ethereum* blockchain).

[16] Like in the Macau S.A.R. of People's Republic of China, where AMCM plays a vital role in such regard; *vide* the official webpage of AMCM (https://www.amcm.gov.mo/en/) and Law no. 10/2023 (https://bo.io.gov.mo/bo/i/2023/25/lei10.asp).

[17] *Vide* Andreas Antonopoulos – one of the most educated *bitcoiners* – in Canada's Senate about *bitcoin* (https://www.youtube.com/watch?v=xUNGFZDO8mM) also talking about bitcoin's neutrality ("*neutrality is a principle in itself*" in https://www.youtube.com/watch?v=BT8FXQN-9-A).

[18] The *bitcoin* narratives were decisively developed and analysed (from a theoretical point of view) by Saifedean Ammous in the infamous book *The bitcoin standard* (Wiley, 2018).

[19] A *spot-bitcoin* ETF and not a futures ETF (*bitcoin* futures ETFs already existed – with small impact – in the United States of America stock markets).

exchange traded fund (ETF) should legally be traded in the United States of America stock market.

a) Being rather different from CBDCs[20] (namely, because cryptos are *de-centralised*), cryptos were highly responsible for the preponderance of *digital* currencies.

In a nutshell, although having totally different characteristics in contrast to cryptos,[21] CBDCs currently constitute one of the biggest challenges of several world financial ecosystems: CBDCs constitute digital money (*programmable money*) and are controlled (as it happened in the recent past with physical money) by a central bank. Differently, cryptos are legally "private" (and not legally issued by any state institution).

The following short summary abundantly shows the elementary (huge) differences between CBDCs and crypto assets (or cryptos):

i) Cryptos (including *bitcoin*) currently do not constitute true money[22] or any currency,[23] even if they were created (as *bitcoin*, for instance) envisaging such goal, because cryptos remain subject (at least for now) to a tremendous short-term financial volatility which impedes them to constitute a true medium of exchange;[24]

ii) Cryptos are legally private and thus do not constitute – technically and substantially – true money or a monetary currency (despite their possible names, *e.g.*, *bitcoin*): cryptos constitute a *non-monetary* economic *asset*.

This brief and simple distinction remains accurate and helpful: we should reiterate that cryptos are not legal money.[25] Quite differently, CBDCs, at least for now, can constitute true money (or any legal currency – *fiat currency*) which becomes merely digitally represented.

b) *Fiat currencies* (since 1971)[26] are not backed by any commodity or by any precious metal (like, for instance, gold). Hence, their supply by any central bank – as in CBDCs – is unlimited.

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[20] For a technological perspective on the current creation and development of CBDCs, *vide* https://www.youtube.com/watch?v=5yOHCWBw99g.

[21] Having in view *i)* the complete definition of "currency", and *ii)* that *bitcoin* was probably created and idealised by Satoshi Nakamoto to subsequently constitute a currency, the author keeps few doubts that *bitcoin* does not constitute a (true) currency due to its high volatility (which impedes – at least for now and despite apps like the *Lightning Network* – that *bitcoin* works as a reliable *reserve of value* and an efficient *medium of exchange*). And the author believes that no real problems are brought by the fact that *bitcoin* has not become (at least not yet) a valid currency because there are lots of examples of creations (and numerous assets) that have successfully become different from what they were planned to be/become.

[22] Despite all the digital apps (as, *e.g.*, the '*Lightning Network*') currently existing on the internet allowing fast and smallish acquisitions or transactions with *bitcoin*.

[23] Hugo M. R. Duarte Fonseca and Fátima Dermawan, "Sobre a nova lei de arbitragem de Macau e breves apontamentos acerca de criptoactivos", *Revista Internacional de Arbitragem e Conciliação*", 15 (2021): 287.

[24] Any true currency has two main economic goals: *i)* to constitute *unit of account* and *reserve of value*, *ii)* to be used as a general *medium of exchange*.

[25] Even in countries like El Salvador which recently legally established that a crypto (in this case, *bitcoin*) - without being issued by the local central bank – had become legal tender (implying its mandatory acceptance by all the population as a payment for rendering some type of services and for all economic transactions in general) – *vide supra*.

[26] *Vide* https://www.federalreservehistory.org/essays/gold-convertibility-ends.

On the contrary, that is not what happens with the most dominant crypto, *bitcoin*, as its supply is capped (pre-programmed) to twenty-one million units in the coming years.

Many say (rightfully or not) that *bitcoin*'s limited supply shall generate a huge *supply-demand shock* having in view the recent SEC's approval (in the United States of America) of multiple bitcoin spot-ETFs.

This approval constitutes a pivotal moment regarding bitcoin's 15-year history because it means that the Wall Street financial markets now deal with this crypto as a true financial asset (encapsulated in regular ETFs traded in the NASDAQ). But, most importantly, because this means the firm and clear acceptance of a *digital* asset (*i.e.*, a non-physical asset) in the developed financial markets.

That is to say that there is a moment *prior* and a moment *after* the SEC's approval because this demonstrated the financial legitimacy of a new asset (which is also being adopted in Hong Kong's financial markets in the immediate future).

To sum it up, debates over *bitcoin*'s intrinsic value and (simple) *network effects* (*Metcalfe's Law*)[27] lost some significance since the ETFs approval, and the debate became focused on deciding whether CBDCs could be a better modality of money than *bitcoin* (or any other crypto).

In some emerging markets the abovementioned financial legitimacy matters a lot. For instance, it's much easier to move *digital* assets than say, gold bars. This simple example illustrates the importance of *digital* wealth in some emerging countries, where economic development may not be high enough for the respective population (*vide infra*).

c) In the Macau S.A.R. of People's Republic of China, Law no. 10/2023 recently came into effect establishing the digital Pataca as a currency.

That's a decisive step towards the legal adoption of a digital currency and the recognition that the future will belong to *digital assets* (as any currency constitutes a true *asset* in financial terms).

It's still too early to know whether the digital Pataca shall constitute a CBDC using *blockchain* technology or not, but we can be sure that the digital Pataca:

- shall be a *centralised* currency (as other CBDCs);
- is not subject to huge financial volatility as cryptos;
- will progressively replace the physical/tangible Pataca;
- will be subject to tight legal regulation;
- shall be of utmost importance for the vast gambling industry of the Macau SAR.

2. The vital role of digital assets in emerging countries

Where economics still have a long way to go, *i.e.*, when we talk about countries where gross domestic product (GDP) still must be increased, populations rightfully feel the need of improving their financial condition and their living standards; therefore, it's easily understandable that *stablecoins*[28] (pegged cryptos) are being increasingly adopted there. Not only because of the relevancy of acquiring imported goods and the ordinary devaluation of the national currency, but also because of basic issues related to the transfer of personal wealth to foreign countries.

[27] An approach to Metcalfe's law can be found at https://a16z.com/beyond-metcalfes-law-for-network-effects/.
[28] For a mere definition, *vide* https://www.investopedia.com/terms/s/stablecoin.asp.

This doesn't mean any ideological assumption or any libertarian approach or point of view. Most digital currencies (whether CBDCs or not, whether mere financial assets as *bitcoin* or not) are ideologically *neutral*.[29]

When talking about emerging countries (where poverty may still be a real issue for vast parts of the population) solving the real problems often felt by local people in their daily life (and avoiding the U.S. Dollar as the current *world reserve currency*) becomes an important issue. And that was a decisive dimension for the recent preponderance of crypto's narratives: one of cryptos' main features is their ability to address the issues felt by unbanked people all over the world. In many countries located in Africa, Latin America, Central and East Europe, Middle East, Asia, etc., there are millions who do not have any connection to banks, millions for whom the anti-money laundering (AML) policies[30] do not make any sense, or that do not even have a regular bank account.

In short, these people want (and deserve) financial solutions to problems brought by their daily lives and the simple use of a mobile phone connected to internet services or the occasional utilisation of a personal computer anywhere were a strong reason for reinforcing the recent crypto narratives. Moreover, the so-called "network effects" brought by some cryptos and other digital assets in general are probably important in this context, *i.e.*, one should not ignore, especially in this case, the simultaneous relationship between personality traits and team behaviour, or the importance of social inclusion and diversity for all human beings.

To simplify, we can additionally think about the immense challenge felt by someone who is considering moving to a foreign country to improve their life conditions; the *portability* of existing personal assets then becomes a vital issue, and *digital* assets are surely much more portable than *hard* assets.

Conclusions

a) Will CBDCs financially exist sooner or later? Yes, most probably. For instance, an e-€ in the EU, an e-¥ (which has already been implemented in various mainland China provinces), etc.; that is simply unavoidable nowadays.

Many people – in the so-called developed countries with large economies – still do not understand, for instance, that CBDCs have nothing in common with cryptos except the (important) detail that they are both *digital*.

The arguments commonly put forward (against cryptos, and later to support any thesis against all forms of nontangible assets) are that *digital assets bring fraud and crime* to transactions, which seems evidently wrong that we usually neglect to address it. Nevertheless, one should not disregard such preconceptions since they still prevail to this day (for instance, by US Senator Warren, Nouriel Roubini, Jamie Dimon, to name a few).

Two facts demonstrate that the above-mentioned rationale is flagrantly misinformed: 1) any blockchain is probably the worst option to commit any type of financial crime because any transaction is traceable there, *i.e.*, those transactions leave easy traits (or *footprints*) for subsequent investigations to analyse them (whether

[29] In respect (solely) of *bitcoin*, *vide*, once more, Andreas Antonopoulos in his speech available at https://www.youtube.com/watch?v=BT8FXQN-9-A.

[30] Like 'know your customer' (KYC) policies being widely implemented by many banks.

in cryptos, or in CBDCs); 2) fraud and crime existed long before, for instance when suitcases full of banknotes or gold bars were being used.

This seems abundantly clear to us, hence why we often forget to mention this kind of thinking. Summarising: the big challenges brought by *digital* assets regulation should obviously be addressed, but that does not mean that everything worked perfectly when only hard and tangible assets (like gold or bank notes) were being used and transacted. A good example is given by MiCA[31] (the EU regulation for market in crypto assets) which recognises crypto assets as a distinct category of assets with its own set of rules and regulations designed to provide clarity, legal certainty, and consumer protection within the EU.

b) The issuance by a central bank (or any state or government institution)[32] is evidently the maximum symbol of CBDCs' financial *centralization* (as some cryptos are – or claim to be – *decentralised*).[33]

In our view, the following key points should be stressed:

- are cryptos (like *bitcoin*, *Ethereum*, etc., for example) an asset? Yes, including a financial *asset*;
- is the huge volatility of cryptos (at least currently) a negative detail? High volatility of cryptos is unavoidable (at least at this moment) and this is one of the reasons why a correct allocation (not exceeding 5% of personal financial portfolios) should be recommended to all;
- clear legal regulation is highly needed in the digital ecosystem (whether over cryptos or CBDCs);
- is *blockchain* technology a part of the present and an important piece of our future? Undoubtedly, although it is too early to know if *blockchain* is going to be applied in all CBDCs;
- was it important that *spot-bitcoin ETFs* (and not *bitcoin futures ETFs*) were approved by the regulator entity (SEC) in the United States of America (and therefore listed in U.S. stock exchange)? Whether the consequences shall be good or bad, that was an historic moment, because it brought the definitive rise of a *digital* asset to the universe of financial assets;
- are cryptos an *inflation hedge*, as it has been hugely publicised by international media? Probably not, considering recent economic data;
- are CBDCs a cause for our concern? CBDCs (like the e-¥ in mainland China, already being implemented in several Chinese provinces) will be inevitable. As I have said and written multiple times before, this will certainly occur in the European Union and later in the United States of America.[34] The obvious take-away is that our level of possible concern depends on our personal convictions regarding the role that governments and central banks should play in our financial lives;

[31] *Vide*, in detail, https://eur-lex.europa.eu/legal-content/EN/TXT/PDF/?uri=CELEX:32023R1114.

[32] That always depends on the specific legal system that we are talking about, because the legal status of Central Banks is vastly different in many countries around the entire world.

[33] It is doubtful that the second largest crypto (*Ethereum*) can be considered an entirely *decentralised* network/crypto once it is managed and controlled by a small group of individuals (leaded by *Ethereum*'s founder, Vitalik Buterin).

[34] An anti-CBDC bill was recently introduced in the United States of America's Congress (*vide* https://www.congress.gov/bill/118th-congress/house-bill/1122?s=1&r=89).

- are the imperfections of (many) cryptos blocking (at least for now) its usability as a *medium of exchange* a good reason to make us immediately think that cryptos are useless and worthless? Probably not, but it's still too early to know that for sure;
- are different cryptos true *currencies* (so that, *e.g.*, any present law could possibly identify them as a *currency*)? No (at least for now, we should repeat once more). Currently, cryptos are exclusively (volatile) financial assets, *i.e.*, a crypto may be a *store of value* subject to high volatility and not an efficient *medium of exchange*. Thus, cryptos do not constitute real and true *currencies*.

Not talking about cryptos anymore, but still addressing CBDCs as important digital assets, we must say that the main issue arising from CBDCs shall be the potential and possible loss of our *privacy*.

We should point out that we are somewhat sceptical of this type of (main) argument, as we are inclined to believe that we have already lost a substantial piece of our privacy in the recent past years with all the technological devices that most of us use in our everyday lives (some good examples are, for instance, mobile smart phones or personal computers).

In a nutshell: is some loss of privacy the main issue that should impose the rejection of CBDCs (as all the crypto *maximalists* currently maintain)? We sincerely doubt that (at least at the present stage), *i.e.*, that is surely an issue that should be carefully addressed, but its more or less high level can (and should) still be avoided by applying the right regulation around the world.