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From cash to private and public digital currencies: The risk of financial instability and "modern monetary Middle ages"

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Abstract

The article analyzes the unstable equilibrium between innovating national monetary systems by means of (private/public) digital currencies while maintaining financial stability as secured by "tangible" store of values like notes/coins. Which are those elements of innovation strengthening today's payments system? And, at the same time, which modern trends might destabilize the above-mentioned equilibrium? The paper will identify some fundamental monetary principles to be respected, no matter what the innovation level in post-modern economies might soon look like. Cryptocurrencies will be also compared to central bank digital currencies (CBDC), which might soon complement (or even replace) notes and coins. But, is cash truly a "barbarous relic"? And, which impact might have its legal limitation (as it is occurring in several European countries)?

Keywords: cash; central bank; cryptocurrencies; digital currencies; monetary system
JEL Classification Codes: E4, E5, G21, G23

1. Introduction

Among the relevant economic concepts, which scientific literature has written volumes about, there is "money". However, it would be a far cry to sum up a centuries-old debate about what money is ordoes (to use a famous definition by John Hicks (1967). This paper, instead, deals with today's payments systems, which are characterized by the coexistence of legal tender (i.e. notes and coins) issued by national central banks and digital money created by commercial banks. We could also easily highlight that today's international payments system is also characterized by an anomalous distinction (and disparity of treatment) between non-key currency countries obliged to discharge international obligations in real terms (i.e. by transferring reserves coming from external commercial/financial transactions or by borrowing from the rest of the world) and key-currency countries, which are instead allowed to use their domestic, also

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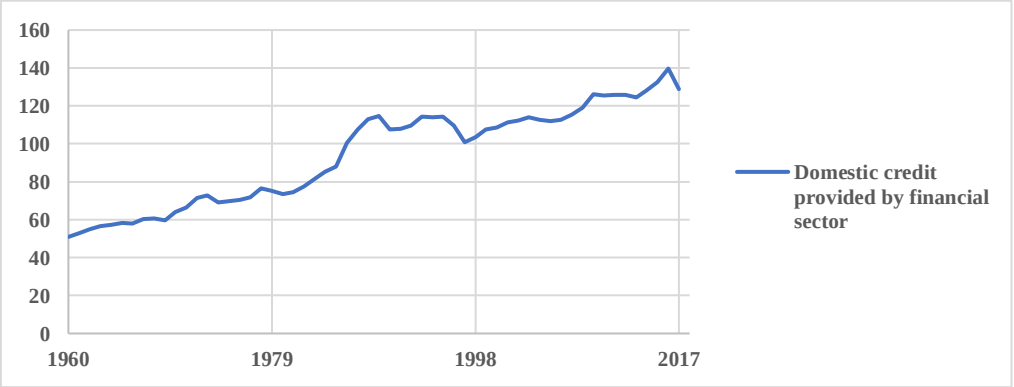
internationally accepted money (Takaya 2006). While the first one is a real-terms payment the second one is purely nominal, because it merely implies the transfer of a spontaneous (and not redeemable) acknowledgement of debt. We could also point out that a more pyramidal system of payments (e.g. from commercial to central banks) should be envisaged to avoid pandemic consequences in terms of financial distrust because of lacking centralization, which is precisely what occurred right before the global economic and financial crisis burst. We could mention all of this (and much more). The main point will be however another one and be founded on the (often neglected) essence of today's bank money.

2. The essence of money – then, now and in the future

For instance, there cannot be any uncertainty with specific regards to the fact that "banks monetize current output by issuing numerical units. Since numerical instrument, nominal money, have no intrinsic value, banks can freely issue any amount of nominal money required by the economy" (Carayannis, Pirzadeh and Popescu 2012). Any macroeconomist should be aware (as peers of the past indeed were) that money units do not bear any real value without a corresponding amount of goods/services (i.e. current real values) or financial securities (i.e. rights to obtain future goods/services) to be associated with. Money is not an asset, since assets themselves are current/future output (i.e. goods/services/financial securities) and are counted by a corresponding amount of money units issued at no cost by the banking system. For instance, "[Adam] Smith defined real money as money's worth and identified it with purchasing power. 'That revenue, therefore, cannot consist in those metal pieces, of which the amount is so much inferior to its value, but in the power of purchasing, in the goods which can successively be bought with them as they circulated from hand to hand' (Smith 1978: 387-8). […] Real money is the result of production and cannot be directly issued by banks, whose task is to furnish what we have metaphorically called an empty vehicle" (Cencini 2013).

Any macroeconomically founded argumentation should remember that no one − neither central nor commercial banks as well as any other economic subject − is capable of issuing (nominal) means of payments enabling them to "finally" discharge real-term economic obligations. It would be far too simplistic if someone − simply because of his/her/its influence or technological superiority − would be on the one hand allowed to create a financial instrument out of nothing, which should on the other allow its users to settle commercial/financial transactions in "final" terms, namely in the traditional sense implied by the Committee on Payment and Settlement Systems (2003). Sadly enough, it cannot be claimed that banking and financial systems have always acted in a monetarily correct way, namely issued a corresponding (or, at least, not exceeding) amount of monetary units as compared to their real backing (i.e. goods/services/financial securities). In fact, it is no mystery at all that the financial sector systematically over-lends (*Figure 1*).

Figure 1. The structural over-lending by the financial sector (1960-2017), percentage of GDP.



Source. The World Bank Group (2019).

Is our argumentation therefore wrong? We do not think so, because – otherwise – between "income" (i.e. goods/services as measured by a corresponding money issue) and "money" (i.e. a numerical unit of account issued by commercial/central banks at zero cost) there would subsist no clear distinction, which is instead the case Any "non-value" always remains such from a macroeconomic perspective. The fact that the banking and financial system has historically (and wrongly) abused of its ability to over-issue money should not allow us to claim that anybody should do the same. This is precisely the (wrong) approach underlying private digital currencies, as we will explore in the next section.

3. Private digital currencies *à la* Bitcoin as parallel means of payments?

Among cryptocurrencies Bitcoin is the most relevant (*Table 1*). These particular financial instruments have begun proliferating from 2009 and are issued (or "mined") by subjects by means of the computational capacity of a PC's graphic card connected to a powerful network. Otherwise stated, because of technology, even private individuals might issue a certain number of cryptocurrencies, which are purely electronic and virtual in their nature. It can be also claimed that cryptocurrencies are a response to the distrust traditional banking systems have suffered from during the global economic and financial crisis. As reminded by Satoshi Nakamoto (2009) who developed Bitcoin, "[t]he root problem with conventional currency is all the trust that's required to make it work". At the same time, the systematically unregulated monetary activities of banking systems might have contributed to the insurgence of parallel currencies *à la* Friedrich August von Hayek (1976).

Table 1. Top 10 cryptocurrencies by market capitalization (as of March 25, 2020).

Ranking	***Name***	***Market cap***	***Price***	***Volume***
1.	Bitcoin	120,801,065,869$	6,606.17$	47.137.233.606$
2.	Ethereum	14,943,636,984$	135.55$	13.966.205.836$
3.	XRP	7,037,632,184$	0.160288$	2.146.156.406$
4.	Tether	4,654,419,481$	1.00$	55.424.128.225$
5.	Bitcoin Cash	3,997,790,472$	217.86$	3.514.995.851$
6.	Bitcoin SV	3,139,087,250$	171.09$	2.725.333.247$
7.	Litecoin	2,510,457,921$	39.01$	3.199.425.906$
8.	EOS	2,102,900,781$	2.28$	2.670.276.399$
9.	Binance Coin	1,905,073,191$	12.25$	331.819.495$
10.	Tezos	1,193,200,648$	1.69$	158.080.548$

Source. CoinMarketCap (2020).

Similarly to national currencies (traded on the Forex), cryptotokens are endowed with a positive price resulting from real-time exchanges (i.e. from simultaneous interaction between suppliers/demanders) on specific electronic platforms. Panagiotidis, Stengos and Vravosinos (2018) have, for instance, analysed that "[o]verall the effect on bitcoin returns is: (i) negative from uncertainty, (ii) positive from exchange rates, (iii) positive from interest rates, (iv) positive for gold and oil, (v) the expected one from information demand and (vi) mixed from stock markets". After each commercial/financial transaction a numerical block code will add up to the previous ones leading to an increase of the cumulative length of the blockchain. While on the one hand this is responsible for a numerical sequence defining the transactions carried out so far, on the other − precisely because of such complexity − anonymity levels are high. Another recurrent argument in favor of cryptocurrencies is the independency from central banks, namely the so-called "money-issue monopoly", which should make them less subject to economic crises originating in the traditional banking and financial sector. Therefore, cryptocurrencies have been often described as an emerging way of settling transactions by means of a new *numéraire*,

but also as a potentially alternative investment typology ("Bitcoin […] is the first decentralized peer-to-peer payment network that is powered by its users with no central authority or middlemen" (bitcoin.org 2019)). Instead, Belke and Beretta (forthcoming) argue that "nobody can create wealth (or positive purchasing power) by a stroke of a pen, but just (excess and, therefore, inflationary) liquidity. Otherwise stated, the increased frequency of such attempts to avoid the monopoly of issuance of the central bank can be compared to a "modern Middle Age" in monetary terms when seigniorage still ruled".

It goes without saying that investing in cryptocurrencies is − at least, today − associated with a high degree of riskiness, which derives from the excessive volatility of their prices. In this specific regard, Panagiotidis, Stengos and Vravosinos (2019) also find that "the nature of bitcoin as an alternative asset [is] minimally affected by the macroeconomy". At the same time, as macroeconomists we are well aware of the difference between "value" and "price". For example, the price of each unit of cryptocurrencies is more than positive, but at the same time it appears contradictory to claim that its value is more than (almost) zero. How can such a strong statement be explained? Simply because cryptocurrencies are created by a stroke of a pen without being secured by any collateral like GDP, which should instead be the case for "sound" issues of money by the banking system. It also makes barely sense to claim that most cryptocurrencies cannot be issued over a certain amount (e.g. 21 million Bitcoin). "Scarcity" is only one among several characteristics, which financial instruments should entail. Additionally, scarcity of something which has no intrinsic value certainly doesn't alter its status quo. This matter of fact does not contradict − as empirical evidence clearly proves − that if demand for cryptocurrencies should be high their price of selling might be strongly positive.

It also derives that no economic subject − no matter how powerful − can discharge real-term obligations by means of (nominal) monetary issues. By accepting the contrary, we would neglect that all payments have to be made by means of existing income (e.g. savings or wealth). Of course, central banks have historically overissued liquidity for very different reasons. More recently, national central banking institutions did so in order to "strengthen" the economic and financial system, which was trying to recover from one of the heaviest crises after the World Wars. Although this would be a far cry for such a short article, a similar behavior of any economic agent will always and everywhere lead to inflation (Friedman 1992) in its truest monetary meaning, namely "a rise of money in circulation in the economy" (Hyman 2011). As reminded by Belke and Polleit (2009), "[s]ustained money growth in excess of the growth of output, adjusted for the trend change in income velocity of money, produces inflation. For ending inflation, money growth must be brought in line with the growth rate of real output, adjusted for the trend change in velocity". Why, according to CPI data, this does not seem to have (yet) happened should not be explored in this context.

Blockchain technology might have a great potential (Belke 2019), but allowing to transfer funds within a limited time and with no supervision by banking institutions seems paradoxical since several European countries are legally limiting the use of cash (i.e. the legal tender) because of anonymity concerns. Although the latter ensures a high level of privacy, instantaneous medium-large transfers are not possible at all and make paper money less usable for illegal activities. The best way to conclude this section is, however, to highlight the price differential between an ounce (28.35 g) of gold − the epitome of wealth is currently at 1,493.18 Euro (Goldprice 2020) − and Bitcoin (6,103.58 Euro) (Coinbase 2020). This is not justified and is a clear signal that something very striking is going on − once again, it should be said − on the financial level.

4. Central bank digital currencies and the irreplaceability of cash

An example of public digital money would be central bank digital currency (CBDC), which would enable economic subjects to hold non-tangible central bank money representing in turn

a claim against the national banking institution of issue. This would be an additional central bank liability, which would be also convertible into cash at a fixed (and one-to-one) exchange rate (Kiel Institute for the World Economy 2018). CBDCs might also partially (or entirely) replace traditional bank deposits becoming the dominant way of holding money. If so, commercial banks might progressively lose deposits (Meaning, Dyson, Barker and Clayton 2018). The fractional reserve banking system would be hence confronted with unexpected challenges as soon as huge transfers of resources to CBDC accounts would occur. In the worst-case scenario, commercial banks' customers might even start a bank run with the only difference that they would not even have to wait in front of ATMs (Wadsworth 2018). Since an account with the national bank might prove to be more reliable, central banks might also have to prevent the collapse of the remaining banking and financial system even more frequently than nowadays. This would also represent a great responsibility for central banks (Kumhof and Noone 2018) while CBDCs might transform today's fractional into a full reserve system (Nyborg 2016; Bacchetta 2018).

Since commercial banks are currently allowed to issue money out of nothing, under these circumstances they would have to rely solely on financial intermediation, namely the simple transfer of already existing funds like preexisting savings made of deposits, without being anymore able to create money. If cash would be simultaneously abolished, monetary policies would not be anymore subject to the zero lower bound (Rogoff 2016). However, it goes without saying that a similar approach would necessitate strong consensus and – if this condition should not be met – resistance might be expected. Physical cash also provides a level of privacy that may prove difficult to be replicated in its digital version. It is even noteworthy to remind that the central bank would be aware of residents' balances, but not of their transacting counterparts. Although major national banks like the European Central Bank (2019) are developing "digitalisation solution[s] for AML/CFT compliance procedures whereby a user's identity and transaction history are nevertheless hidden from the central bank and intermediaries other than that chosen by the user", this would be mostly the case for low-value transactions. At the same time, the fact that all digital currency transactions would be in the hands of a single institution might be responsible for excessive risks (Mishra 2009).

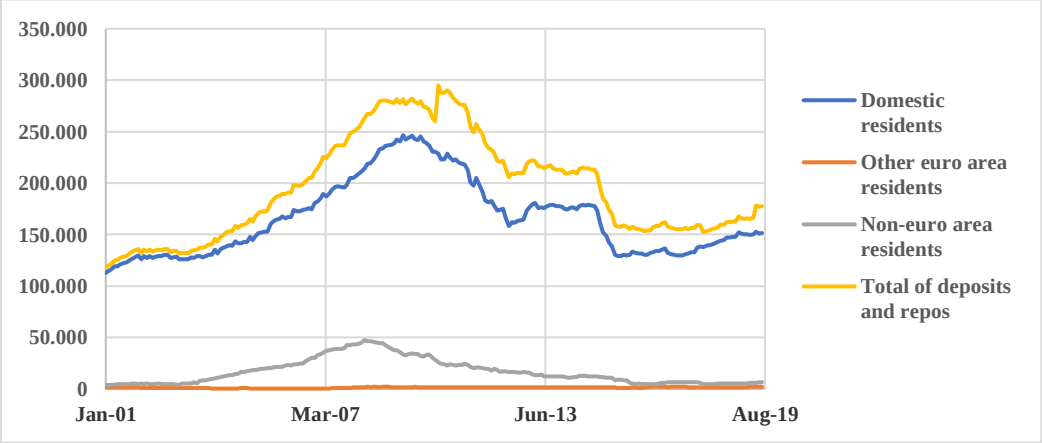
Another fundamental question is whether these monetary options should replace traditional means of payments or rather complement them. According to our analysis, the answer should be negative for both scenarios. For instance, there are emotional and practical components, which strongly justify the use and holding of cash. Despite that, several European countries

Table 2. An overview on cash payment limitations (set by law) in European countries.

Belgium	3,000 € (goods/services)
Bulgaria	9,999 leva (≈ 5,110 €)
Croatia	15,000 €
Czech Republic	350,000 CZK per day (≈ 14,000 €)
France	• 1,000 € (taxpayers based in France and foreign salesmen) • 15,000 € (non-resident taxpayers)
Greece	1,500 €
Italy	2,999.99 €
Poland	15,000 € (≈ 62,220 PLN)
Portugal	1,000 € (goods/services between consumers and traders)
Romania	10,000 RON/person/day (≈ 2,260 €)
Slovakia	• 5,000 € (B2B-, C2B- and B2C-payments) • 15,000 € (natural person acting for purposes outside his/her trade)
Spain	• 2,500 € (residents) • 15,000 € (non-residents)

Source. European Consumer Centre Germany (2020).

Figure 2. Deposits and repos of non MFIs in MFIS in Greece (excluding the Bank of Greece) (January 2001 – August 2019), millions of Euro.



Source. Bank of Greece (2019).

have recently limited it by law (*Table 2*). Beside the fact that national monetary units (as conceived in their tangible essence) represent local identity, people might want to allocate their economic wealth in diversified ways as financial logic usually teaches. A combination of notes and coins, shares, bonds, certificates of deposits etc., namely a portfolio made of different economic assets, represents for sure a more appropriate saving strategy than focusing on a single fund typology. Equally importantly, economic agents make consumption expenditures if they feel sufficiently "safe" or "secure" in economic terms, which is in turn based on subjective perceptions depending on several factors (Beretta 2017).

Therefore, any abolition and/or limitation of cash might destabilize the economy as a whole and hamper its economic growth. This would be no surprise given that the most used payment instrument – if this should be not the country-specific case: the legal tender – would be limited by law by means of a top-down approach. Although notes and coins are less used than several decades ago (G4S Solutions 2018), in today's economic systems (which are not collateralized by precious metals) cash has acquired the role previously held by gold *& co.* It is no coincidence that during crises depositors run to local banks to withdraw (i.e. not to transfer) their savings. The Greek case is just one paradigmatic example (*Figure 2*). Cash might be a pure preference in good times but becomes epitome of "safe heaven" as soon as a crisis occurs (Beretta 2015a, 2015b and 2016). For instance, in January 2002 the total amount of Euro notes and coins in circulation corresponded to € 221.45 bn. while in February 2020 it was already equal to € 1,267.66 bn. (European Central Bank 2019), namely experienced an increase by 477.33 per cent (*Table 3*). But, there is an additional element in favor of notes and coins even in 2020, namely privacy which is a fundamental right and a source of financial trust too. And, not by chance, the lexical origin of "credit" goes precisely back to the verb "to believe" (Collins Dictionary 2019). Economics is hence based on "trust" and "belief" and, in their absence, financial instability is unavoidable.

Central bank digital currencies, which appear to be a compromise between avoiding the abolition of cash while making it at the same time immaterial, do not seem to be a sufficiently reasonable solution. In fact, bank runs, namely a characteristic common to almost any economic and financial crisis in history, do not occur because savers want to withdraw their deposits from commercial banks to store them at the central bank or, in any case, in the corresponding banking and financial system. Instead, they take place because depositors have (at least, temporarily) become reluctant to hold savings in their immaterial form on a bank account and want them turned back into its tangible form. Physicality and tangibility are still irreplaceable elements in today's economies and become even more relevant in bad economic times.

Table 3. Euro-banknotes and -coins in circulation (January 2002 – February 2020), billions of Euro.

	5 €	10 €	20 €	50 €	100 €	200 €	500 €	Total
January 2002	9.60	20.00	39.24	70.85	36.40	15.08	30.31	**221.48**
February 2020	9.62	25.92	79.06	551.17	304.87	89.85	218.16	**1,278.66**

Source. European Central Bank (2020).

5. Concluding remarks

The paper presents some major elements of innovation characterising today's banking and financial sector. While on the one hand a part of the economic literature supports (digital) private currencies *à la* Friedrich August von Hayek (1976), on the other central bank digital currencies are increasingly identified to become a complementary (or even substitute) alternative to cash. We do not criticize that banking systems should take innovation seriously and keep themselves up-to-date. What we instead remark is that technological advance cannot take place without bearing in mind some fundamental monetary principles, which remain despite their longevity essential in today's monetary systems and cannot be openly neglected without accepting the negative consequences (i.e. financial instability) deriving from the failure to comprehend them.

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