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ESSAY

Cryptocurrencies: Opportunities and Challenges for the African Economies version 1; peer review

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Abstract

This paper proposes a reflection on the opportunities and the challenges of the use of digital means of payment (decentralised and regulated ones) in the African economies. In this perspective, we structure our reasoning around three axes. First, we try to show that digital currencies can serve as a lever for financial inclusion and the revolution of means of payment in an increasingly digitalization context. Second, we discuss the technical and the infrastructural constraints (deployment of the blockchain, electricity and Internet access) which condition the effective use of digital currencies. Third, we discuss the trade-offs and the possible implications that arise from the circulation of the Bitcoin, the Altcoins and the Stablecoins on the one hand, and the Govcoins on the other. In our view, the African authorities should first focus on overcoming infrastructural and institutional obstacles, rather than rushing the adoption of cryptocurrencies. Some policies implemented in this direction would in fact offer the continent the opportunity to anchor itself once and for all to progress.

Classification JEL : D73, E00, E58, G18, O33, O55

Keywords

Cryptocurrencies, Govcoins, Central Bank Crypto Currencies, African economies

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Introduction

Although many countries (Algeria, China, Egypt or more recently Qatar, Russia and Thailand) have decided to ban cryptocurrencies transactions on their territories, the Bitcoin and its avatars (Altcoins and Stablecoins) have globally gained in popularity around the world these late years. For example, about 7% of American adults held or used cryptocurrency in 2023 (FED, 2024). In France, almost 1 in 10 people – approximately 4.8 million – held crypto-assets (cryptocurrencies or NFTs) at the beginning of 2023, and more than a quarter of them would consider acquiring them in the future (Adan, 2023). Africa is no exception to this craze. This continent hosts the second-largest number of cryptocurrency holders in the world – about 55 million – after Asia and North America. More specifically, with more than 47% of users, Nigeria reportedly has the world's third-largest Bitcoin holdings as a percentage of GDP (Stolp *et al.* (2019); Wanjiru (2023)).

In addition to the adoption of these so-called “non-regulated digital currencies” of which the number is currently over twenty thousand, more and more countries are launching their own cryptocurrency projects (which will be “sovereign” and de facto centralised cryptocurrencies). In Africa particularly, Ghana launched a pilot project (e-Cedi) in September 2021. In October of the same year, Nigeria launched a digital version of its currency: the e-Naira. In 2022, the Central African Republic – the first African state which adopted the Bitcoin as an official currency alongside the CFA (XAF) – officially launched its digital currency project (the Sango Coin). At the end of July 2023, Cameroon carried out some discussions (with the support of the American giant IBM) with a view to acquiring the technical and operational capabilities required to manage a cryptocurrency platform intended, among other things, for “some sovereignty expenses” with the neighbouring Nigeria.

Let us open a parenthesis to make two remarks. First, unlike the e-Yuan (or crypto-Yuan) and the e-Naira which are what literature generally calls: Central Bank Digital Currencies (CBDCs – see Bech and Garratt (2017); Carapella and Flemming (2020); Infante *et al.* (2022)) –, the Cameroonian and the Central African Republic National Digital Currencies projects are not managed by any monetary authority. Indeed, the BEAC (Central Bank of Central African States, the issuing institute of the community to which these two countries belong) is not taking part in these processes at the time of this writing¹. These two projects are therefore quite atypical in the sovereign cryptocurrencies world. They nevertheless raise some interesting issues about the conduct of monetary policy, to which we will return at the end of the third section. Second, in the rest of the paper, the expression “digital currency” – rather than “virtual currency” – is used to designate either non-regulated/decentralised cryptocurrencies (Bitcoin, Altcoins and Stablecoins),

or sovereign/national cryptocurrencies (Govcoins). This will avoid any confusion between the digital currencies blocked in the virtual universes and 3D games, on the one hand, and the digital currencies which can be used in the real economy, on the other hand.

Furthermore, it should be noted that the consensus algorithms used to operate a blockchain are constantly evolving. Satoshi Nakamoto's still remains widely popular, but new processes such as: Proof of Stake, Proof of History, Proof of Service, etc. have already emerged (Huynh-The *et al.*, 2023). Some crypto-monetary projects such as Iota even go further, as they purely and simply offer to operate without blockchain². It then appears that the usual dichotomy between decentralised cryptocurrencies and regulated ones does not reflect the wide range of digital currencies. If we add to this the major concerns they raise relating to their volatility, their propensity to finance some criminal activities, their high carbon footprint (Adrian & Weeks-Brown (2021); Stoll *et al.* (2018)), we understand why their regulation gives rise to so many debates in the literature.

Based on these observations, this paper proposes a reflection on the opportunities and the challenges linked to the use of the digital currencies in African economies. We particularly aim to provide some answers to the following questions: on the one hand, to what extent is the cryptocurrency revolution an innovation that brings new growth opportunities to Africa? On the other, what are the constraints and the threats that their democratization brings to the fore for the African economies?

The interest of this paper is that it addresses the question of the advent of the digital (cryptographic) currencies, particularly taking Africa as a framework for reflection. Indeed, the literature review shows that most of the studies devoted to this issue apply almost exclusively to the US, the European or even the Chinese macro-financial frameworks. The latter are characterized by developed financial markets and access to cutting-edge technologies. However, as we shall see, the digitalization in Africa has been sharply accelerated in recent years. With an average of one new Internet user per second (IMF, 2020), Africa is along with South Asia, the only region in the world to have directly adopted mobile phones for financial services such as mobile money, without going through neither the development of the fixed telephony at a large scale nor the traditional banking institutions (AfDB (2013); FinTech Times (2021)). Africa also serves as an incubator for technological advances and the creation of innovative solutions in the FinTech sector (ECA (2021); McKinsey & Company (2022)). However, some specific characteristics of the African economies call for a greater caution with regard to what Adrian and Weeks-Brown (2021) call: the “cryptographic euphoria”, as the aborted projects in the Central African Republic and the difficulties being faced by the Nigerian authorities tend to prove (see below).

¹ BEAC is the issuing institution of the CFA Franc (XAF). Its area (CEMAC) includes: Cameroon, Central African Republic, Congo, Gabon, Equatorial Guinea and Chad.

² See Ntonga Efoua (2023) for an attempt to categorize the digital currencies and a discussion about the trends of the cryptocurrency market.

The originality of this paper also lies on the fact that it proposes a reflection on all the cryptocurrencies (decentralised and regulated ones) contextualized in Africa, unlike most papers which essentially either focus on the Bitcoin or the CBDCs – see for example [Diedrich \(2016\)](#) [Bech and Garratt \(2017\)](#), [Corbet *et al.* \(2019\)](#), [Agbo and Nwadior \(2020\)](#), [Chiu & Koeppl \(2022\)](#), [Infante *et al.* \(2022\)](#), [Ozili \(2022\)](#), [Alberola and Mattei \(2022\)](#).

The rest of the paper consists of three sections followed by a conclusion. The first discusses the channels through which cryptocurrencies can positively impact the world of finance in the African economies. The second discusses the related technical/technological constraints, while the third section looks at the challenges linked to their regulation.

The benefits of the cryptocurrency adoption in Africa

In this section, we discuss the opportunities offered by the cryptocurrencies in terms of financial inclusion and the anchoring of the African economies within the future's path.

Offering diversified financial services at lower cost

Africa's macroeconomic framework is a potential catalyst for the adoption of blockchain-backed financial solutions, particularly with regard to national and international remittances. Admittedly, Africa is globally characterized by low banking penetration – and therefore low financial inclusion – as well as a limited supply in terms of financial services ([Aker & Mbiti \(2010\)](#); [World Bank \(2022\)](#)). In addition, a large part of the African population operates in the informal economy ([IMF \(2017\)](#); [World Bank \(2019\)](#))³. It therefore becomes difficult to send funds to people living in the countryside. This is a difficulty that cryptocurrencies could help to overcome.

Certainly, the mobile money accounts (through a mobile phone network) also allow users to deposit funds on their SIM card, transfer funds by a short message, make some withdrawals and pay bills ([Aker & Mbiti \(2010\)](#); [Demirgüç-Kunt & Klapper \(2012\)](#); [Jack & Suri \(2011\)](#); [Mbiti & Weil \(2011\)](#))⁴. In some countries such as Kenya, more than 90% of people with a mobile phone also have a mobile money account. However, this rate drops to 25% in some countries such as Cameroon ([Bidiassé & Mvogo, 2019](#)). Decentralised cryptocurrencies therefore offer many advantages over both the traditional means of payment and the mobile money; particularly with regard to the cross-border transactions, confidentiality and transaction costs.

African people are increasingly using their mobile phones to connect to the Internet. Although the global digital divide remains significant, the gap between Africa and the rest of the

world is constantly narrowing ([Sajitha, 2021](#)). Internet penetration on the continent has increased tenfold since the start of the 2010 decade, compared with a threefold increase in the rest of the world ([IMF, 2020](#)). By enabling owners of a telephone connected to the Internet to send money at low cost ([Zins & Weill, 2016](#))⁵, digital currencies appear to be cheaper and faster means of payment. Indeed, the funds transfers in cryptocurrencies are made without exchange fees, at the same time as bypassing SWIFT and national payment systems ([Saiedi *et al.*, 2021](#)). For example, when the South African residents want to send money to a relative in a neighbouring country such as Mozambique, they have to pay more than 20% in transaction fees to financial intermediaries. With the Bitcoin, these fees are almost zero. [Folkinshteyn *et al.* \(2015\)](#) estimated that the average cost of the Bitcoin transactions is between 0% and 1%, whereas a traditional bank transaction would cost between 2% and 5%.

The possibility of transferring international funds at a lower cost is also one of the advantages of the cryptocurrencies over the mobile money, insofar as the “cryptos” remove the constraint associated with mobile phone operators. Indeed, although the latter have diversified their services offering during the Covid-19 pandemic – which have somewhat accelerated financial inclusion on the continent – not only the exchange fees were not removed, but the costs of international transfers remained high ([GSMA, 2021](#)). Furthermore, in several countries, money transfers between different operators are not possible. Even if these operators have the status of e-money issuers, users have to provide some personal information in order to benefit from these services. It therefore appears that the sustainability of mobile money services can be jeopardized by some regulatory policies (taxation, compliance costs, data localization costs, etc.), especially as the African continent is generally characterized by a complex regulatory framework, which has a negative impact on the investment climate. This undoubtedly explains why the international money transfers by mobile money have only increased from less than 10% to 20% of all transactions between 2012 and 2022 ([GMSA, op.cit.](#)). However, transactions in decentralised cryptocurrency bypass the financial intermediaries. They are also confidential and anonymous. From this point of view, they therefore appear to be more attractive, although they also present many risks of piracy (see below).

Another innovation in the field of cryptocurrencies is the potential for raising funds for many start-up projects (ICOs)⁶.

³ In Africa, the informal sector contributes between 25% and 65% of GDP. It is generally accepted that it also accounts for between 30% and 90% of non-agricultural employment.

⁴ In 2016, the number of registered mobile money accounts in sub-Saharan Africa exceeded 277 million ([GSMA, 2017](#)).

⁵ Access to financial services particularly depends on the density of banking infrastructure (branches, ATMs) and the quality of transport. Globally, not only is the density of branches low in Africa, but the quality of communications also increases the cost of access. We will come back to this in the next section.

⁶ Initial Coin Offerings (ICOs) are sometimes compared to Initial Public Offerings (IPOs). However, there are at least two differences between them. Firstly, an IPO allows to acquire shares in the capital of a company, whereas an ICO allows to acquire some digital tokens that represent, for example, a right to use the service that is to be developed. Secondly, there are currently no strict regulations concerning the ICOs, which is not the case for the IPOs.

This is why Ether (the cryptocurrency of the Ethereum blockchain) is one of the most popular digital currencies after Bitcoin. ICOs are in fact creating new opportunities without frontiers for financing innovation in terms of speed and ease, and would be likely to revitalize the financial markets, which have generally remained in an embryonic state in Africa (Andrianaivo & Yartey (2009); Ntonga Efoua (2021)). Indeed, setting up an ICO and raising funds can be done more quickly than by venture capital financing or by an initial public offering (IPO) – a long and costly process during which many intermediaries have to analyse the project, the business plan, the market or the financial strength of the issuer⁷ –. An ICO can therefore raise very large amounts of money in a very short space of time. In 2017 for example, Brendan Eich (the co-founder of Mozilla and the creator of the crypto-browser Brave) was able to raise almost \$35 million in less than a minute. Following a similar logic, Achille Agbe (an Ivoirian entrepreneur) launched an ICO through the issuance of LiorS, a DAO multifunctional token based on the Ethereum blockchain in 2022. However, as we shall see in the next section, implementing ICO projects requires the mastery of many skills, as well as an appropriate regulation in order to guarantee the trust underlying any transaction.

Some of the advantages listed above particularly with regard to financial inclusion and improving the efficiency of the retail payment systems (faster, safer and lower cost transactions) could also be capitalized with the introduction of some Govcoins (especially CBDCs) – see Carapella and Flemming (2020), Infante *et al.* (2022), Alberola and Mattei (2022). The merchant flows are indeed hampered by the vagaries of exchange rate fluctuations and the conversion costs between some forty African currencies. This undoubtedly explains why simplifying the financial transactions was one of the objectives announced when the Nigerian authorities officially launched the e-Naira. The same applies to Cameroon's cryptocurrency platform project (see above). If we develop this reasoning, it appears that the adoption of cryptocurrencies could ultimately stimulate economic and monetary integration on the continent. Ozili (2022) and the African Union High-Level Panel on Emerging Technologies (AUDA-NEPAD, 2023) expressed similar views, encouraging African countries to explore the utilization of some appropriate alternative blockchain-based payment systems to facilitate the cross-border trade.

Finally, given the disintermediation process and the opportunities offered to the economic agents to diversify their portfolios (insofar as they represent a new class of asset different from those to which they have been accustomed), the cryptocurrencies could facilitate financial inclusion (IFC, 2017), cross-border transfers, could strengthen the resilience of the payment service providers and the competition between them (U.S. Department of the Treasury, 2022). This could bring

a significant change to a large part of the population on the African continent.

Accelerating financial innovation in an increasingly digitalized world

As of 2017, the cryptocurrencies have gone from being a marginal technological curiosity to a flourishing international market (Campbell-Verduyn, 2018). Many believe that these instruments are destined to become the main players in the economy of the future⁸. Their role as catalysts for growth on the African continent can be highlighted in the areas of fiscal policy and governance improvements.

In theory, the blockchain should permit to operate in a (relatively) more secure and transparent (or less corrupted) environment (Diedrich, 2016). Indeed, taxation is one of the main ways in which governments mobilize some resources. However, as well as depriving the governments of significant budgetary revenues, corruption also creates a propensity for actions that hamper economic decisions. In 2016 for example, it was approximately estimated that 148 billion US Dollars – about a quarter of the continent's average GDP – were being annually lost in Africa due to corruption (OECD-AfDB, 2016). This is happening in a context where the African continent is facing countless economic and social challenges, such as armed conflicts, access to water, electricity and health, the climate change and the commodity price shocks.

In the same vein as digital tools taken as a whole, the cryptocurrencies could play a considerable role in eradicating fraud and corruption, alleviating and reducing the cost of some procedures through accessible information and simpler cross-checks. They could also help to monitor the spending efficiency in order to optimize economic policies results (Campbell-Verduyn (2018); IMF (2016)). As already noted, the adoption of digital currencies not only enables near-instantaneous transactions and borderless remittances by eliminating financial intermediaries (thereby reducing processing times and transaction costs), but the traceability of such transactions would deter any attempt to pay any bribe to public officials. In fact, the simplicity and the digitalization – two levers activated by the access to digital currencies – are among the channels identified by the World Bank (2019) for increasing tax revenues in low-income countries which most of are in Africa.

However, in order to play their role effectively, the cryptocurrencies users should be assigned a code or an ID card number to end their anonymity. Such a process could be achieved by issuing of a digital currency regulated by some economic policy authority (see below). In this way: (i) the blockchains could contain data (such as the nature of the expenditures and the project or activity that triggered the granting of funds) facilitating the work of the services responsible for combating fraud and corruption; (ii) once a “block” is verified,

⁷ In France for example, it costs about €500,000 to raise funds through a traditional process, not including the time and energy spent in procedures for compiling an extensive and complex dossier. For an ICO, a lawyer may be sufficient. However, this is not totally free. There are many costs involved, such as websites, servers and marketing campaigns.

⁸ In 2002, an OECD report on the future of money predicted that “[...] the destiny of money is to become digital”.

it would be possible to ensure that the data are conform to some “smart contract” – i.e. the autonomous program that automatically executes the conditions and terms of a contract –. These terms could set out the conditions for releasing funds, as well as the dates on which these transfers should be made (Agbo & Nwadiakor, 2020). As Carroll and Carroll (2018) point it out, some of these features are already built into the Ethereum technology, from which the authorities could draw some inspiration for the release of their Govcoins.

Furthermore, as the concept of a virtual economy becomes popularized, it will inevitably be necessary to set up a payment system for the plethora of transactions. However, at the same time, decentralised cryptocurrencies are particularly unstable, their mining is energy-intensive and time-consuming. It would therefore be necessary to design some reliable and more resilient institutions such as CBDCs to handle the corresponding transactions in a futuristic world. It is within this perspective that the Central African Republic’s digital currency project falls. Effective policies in the field of cryptocurrencies therefore offer the African continent a chance to make the technological leaps that will enable to join the engine of progress. Nevertheless, to achieve this, it will first be necessary to overcome many hurdles.

Infrastructural and technical constraints

Some of the main challenges that the African economies will have to overcome to succeed in their digital transformation – and therefore properly manage their digital means of payment – concern the infrastructure access and the blockchain deployment mode.

The infrastructure access

The infrastructural issue particularly concerns the Internet quality and the access to electricity. African economies are nowadays in their early stage of development in terms of digital transformation and they have a significant potential (see above). Nevertheless, nearly everyone agrees on some facts. First, in the New Technologies sector in general and the Internet in particular, Africa lags far behind the rest of the world. Second, the Maghreb countries are generally more advanced than Sub-Sahara’s. Some of them are even outperforming South Africa. Third, regardless of the region of Africa considered, most rural communities do not have access to electricity.

Thus, although Egypt has the largest population of Internet users in the MENA (Middle East and North Africa) region with a global e-commerce market representing a turnover of around 7,541.6 million dollars in 2023 – putting this country ahead of the South African Republic in this area – its e-commerce still lags behind many other Arab countries’. In the same vein, the average mobile download speed in sub-Saharan Africa is 7.4 Mbps, which is three times slower than the one in the rest of the world (IMF (2020)). Generally speaking, the African continent remains dependent on digital facilities, and the Internet access is still very limited in some regions. In the Central African Republic for example, about 15% of the

population has access to electricity and 9 out of 10 residents have no access to the Internet. Sub-Saharan Africa also faces chronic power supply problems (insufficient generation capacity, poor connectivity, low reliability and high costs). The electricity generation capacity of the 48 sub-Saharan African countries is around 80 gigawatts (GW), which is less than the generation capacity of South Korea. If South Africa were excluded from it, the region’s overall generating capacity would be halved (IEA, 2022). As for the Central and West Africa regions, they have the world’s lowest rates of access to electricity: around 42% for the total population and only 8% for the rural population (World Bank, 2023).

The harmful consequences of the lack of this infrastructure are obvious to the extent that they jeopardize any prospect of putting into circulation any Govcoin (National Digital Currency or CBDC type), even if it is based on a technology that works without Internet connection. As a matter of fact, in 2015, the Government of Cameroon reportedly trialled Trest, a Bitcoin-like digital currency. Although the results of the tests were “excellent”, the high cost associated with electricity acted as a hindrance to further testing (Stolp *et al.*, 2019). It is therefore not surprising that the initiatives of the Central African authorities have stalled⁹. As for the e-Naira, the first CBDC to be launched in Africa in October 2021, it was expected to enter its second phase around August 2022. Through this digital currency, the Nigerian Central Bank aimed to integrate around 8 million active unbanked users. However, at the end of 2022, the e-Naira barely exceeded 840,000 downloads for approximately 270,000 active wallets and approximately 200,000 transactions. As a result, by 2022, e-Naira was struggling to compete with the payment systems linked to mobile phone operators (see above). These facts demonstrate that it is not enough for a currency to be digitalized to attract popular support. This should also serve as a framework for reflection for the other African Central Banks which are thinking of issuing their own cryptocurrencies.

Deploying the blockchain

Even if we leave aside the infrastructural constraints (electricity and Internet access) that Africa faces, developing the blockchain-based payment methods is not without difficulty. From our view, the following analysis is just as valid for African countries as it is for countries where digitization is already well advanced.

The profitability of the mining activity decreases over time. On the contrary, production costs increase. Miners in fact have to invest in some computers with ever-increasing computing power, hence the concentration of the market is dominated by a few pools (F2Pool, AntPool, BitFury, BTCChina Pool, BW.COM, etc.). This race for power makes mining a process that generates significant energy wastage which is counterproductive from an ecological point of view (Stoll *et al.*, 2018).

⁹ Originally, the Central African Republic was supposed to raise over \$1 billion through its Sango Coin. In the end, however, the initiative attracted just one million investments (one thousandth of what was expected).

According to recent studies, Bitcoin-related activity is equivalent to the energy consumption of Ireland or Hong Kong, and emits as much CO₂ as one million transatlantic flights. In May 2021, for example, the cryptocurrency boom led to power cuts in Iran, prompting President Hassan Rohani to ban mining activities on his territory. In Africa, however, only six countries have 75% or more household access to electricity. Nearly two-thirds of African countries have access rates of less than 50%, with Mauritius and the Seychelles being the only countries on the continent to have achieved a near-universal coverage (Blimpo & Cosgrove-Davies, 2020).

Furthermore, as Figuet (2016) points it out, in the long run, there is a risk that one of the above pools obtains at least 51% of the computing power. It could then systematically collect the bonuses, spend the same Bitcoins many times, block the third-party transactions, rewrite the blockchain and therefore cause the collapse of the value of BTC. This could also have serious consequences for the confidence and indeed on the financial systems stability. Such a concentration of the mining activity would only increase the technological dependence of the African continent on the rest of the world and/or on big tech. Clearly, this is diametrically opposed to the objectives of competitiveness and emergence as set out by most African governments.

Many other technical issues remain unresolved. The most obvious is related to operational risks (Alberola & Mattei, 2022). Despite numerous improvements in recent years, the duration of a mining operation lasts between four seconds and 10 minutes (Figuet (2016); Pavel (2017)). A priori, this does not pose any problem in narrow markets such as Bitcoin's or Altcoins'. In contrast, this technical characteristic is incompatible with transactions on a larger scale, including financial markets where the effects of congestion could lead to a blocking of transactions either in decentralised cryptocurrencies or Govcoins.

The challenge for regulation and the institutional constraints

It is hard to imagine digital payments in informal markets plagued by a lack of transparency and poor governance. Now these are primarily some of the ills from which African countries suffer.

Illicit financial flows and the destabilizing impacts on the financial systems

One of the advantages of the decentralised cryptocurrencies is also one of their main threats, namely: the lack of regulation. They are not issued by any central administration and they circulate on peer-to-peer networks where there is no designated trusted third party in theory. If some user loses one of his keys, he has no way of recovering it, for it is technically impossible to reproduce them. The same applies if the computer is lost, stolen or hacked. What is more, unlike the financial markets where there are some regulatory authorities, anyone who fraudulently loses his cryptocurrency will not be able to turn to any institution, nor take advantage of

any insurance. It is therefore not surprising that crypto scams have multiplied in recent years. Between 2020 and 2021 for example, the biggest digital currency scams on the planet took place in South Africa. In 2020, some 300,000 users, including 23,000 US residents of the Mirror Trading International (MTI) platform, were defrauded of the equivalent of \$588 million in Bitcoins through a Ponzi scheme. An even bigger fraud took place there in April 2021. One of the biggest Bitcoin scams of all time involved Africrypt, a company whose the founders (Amir and Reez Cajee, two brothers respectively 17 and 20 aged) allegedly stole 69,000 Bitcoins, approximately \$3.6 billion from some investors by transferring the customers' accounts and their wallets to the darknet. In Cameroon in 2022, Lyeplimal, a financial product transformed into cryptocurrency (Limocoin) was revealed to be a Ponzi scheme involving 200,000 users from 125 countries.

The cryptosphere therefore has some weaknesses in terms of operational practices, governance and risk. So far, these incidents have not had a significant effect on the stability of financial systems as a whole. However, as cryptocurrencies become more popular – according to a study by the Boston Consulting Group, the number of cryptocurrency holders could reach one billion by 2030 –, the potential impacts on the global economy will necessarily increase. In fact, in general, more than a third of cryptocurrencies might be held by their holders beyond one year (Figuet, 2016), since most of the gains from holding the Bitcoin and the Altcoins come from the significant variations between their prices and those of the main currencies (the Dollar and the Euro). This high volatility also explains why unregulated cryptocurrencies cannot theoretically be used as a unit of account (Corbet *et al.*, 2019), for merchants would be forced to constantly calculate their prices. This would induce uncertainty for the consumer and involve some significant updating costs (Lo & Wang, 2014). The anticipation of a limited supply¹⁰ likely to match with a potentially growing demand should amplify this phenomenon of volatility in the value of the cryptocurrencies (BTC in this case). As a matter of fact, this is a strong incentive for hoarding cryptocurrencies with a view to speculative investment.

The growing volume of the Stablecoins that are generally pegged to some currencies also poses some problems. For example, Tether (USDT) – the most popular Stablecoin in the cryptosphere – is based on the principle that for every USDT put into circulation, the same amount of Dollars is put in reserve, in order to maintain the parity: 1 USDT = 1 Dollar. In reality, many controversies have arisen regarding this mechanism. In September 2020 for example, as there were about 14.4 billion USDT in circulation, Tether claimed to have \$14.6 billion in reserve at the same time; but that was not accurate, according to the New York State Attorney. Finally, Tether had to pay a fine of \$18.5 million to the State of New York

¹⁰ The protocol for issuing this cryptocurrency anticipates the creation of a predetermined number of Bitcoins halved every four years: 50 Bitcoins in 2009, 25 in 2013, 12.5 in 2016, and so on, until a total of 21 million will be reached by 2140.

in order to end the legal proceedings at the end of February 2021. After the mid-2022 flash crash, Tether briefly lost parity with the US Dollar, falling from \$1 to \$0.95. These events prompted investors to withdraw about \$10 billion in the following weeks and rush to other Stablecoins such as USD Coin and Binance USD. We can therefore argue that some events like this could be linked to many others “stable” cryptocurrencies so that viewed from a national or international scale, they might give rise to episodes of financial panic.

In the future, the rapid and widespread adoption of decentralised cryptocurrencies could also pose considerable problems by increasing the dollarization and/or the “cryptoization” of some economies, as their residents begin to use some digital currencies (other than Govcoins) in place of the local currencies (Drakopoulos *et al.*, 2021). This “cryptoization” could then hamper the ability of central banks to implement their own monetary policies. Likewise, the government revenues would be exposed to currency risk if the tax revenues were denominated in cryptocurrencies while expenditures are mainly made in local currencies (due to the currencies mismatch), or vice versa (Adrian & Weeks-Brown, 2021).

A similar problem would arise for bank loans in cryptocurrencies or for those whose digital currencies are used as collateral, due to the volatility specific to the Bitcoin and the Altcoins (ACF, 2022). For example, by creating funding and solvency risks, the “cryptoization” could increase the risk of destabilization for the African financial systems. Furthermore, anonymity in the use of transactions carried out by the decentralised digital currencies poses a problem insofar as the latter are generally the prime means of payment used in the shadow economy, i.e. sales and purchase of arms and drugs, arms trafficking or prostitution (Saiedi *et al.*, 2021). They can also be used to finance terrorism, for tax evasion and money laundering. Issues like that came to light when the Silk Road website – a darknet black market offering drugs, firearms, hacking kits and false papers in exchange for Bitcoins – was shut down by the US federal authorities in October 2013.

Some governments and international organizations are increasingly aware of the need to regulate the use of cryptocurrencies. The Financial Action Task Force (FATF, 2019) for example, has set some standards for regulating cryptocurrencies and the activities of Virtual Asset Service Providers, in order to reduce the risks in terms of financial integrity. The problem is all the more pertinent for, on the one hand, the African countries are the lowest ranked in terms of financial regulation, and on the other hand, their economies are highly informal (Demirgüç-Kunt & Klapper, 2012). In fact, about regulating the cryptocurrency market, the current situation in most African countries is either a disrespected ban or an unregulated tolerance (Vedie, 2022). All of this might raise fears that Africa could become the next Eldorado for crypto-scams and money laundering (Alberola & Mattei (2022); Fuje *et al.* (2022)).

Governance framework and monetary stability

Failing to regulate the cryptocurrency market, more and more central bankers believe that they should take up this case, i.e. ban (or at least strictly regulate) the use of cryptocurrencies

and issue their own digital currencies. However, exploiting the potential of CBDCs-type is not that easy. It requires significant investment, as well as difficult political choices; particularly with regard to clarifying the role of the public and the private sectors in the supply and the regulation of the digital currency instruments (Adrian & Weeks-Brown, 2021). Some financial regulators point out that issuing crypto-currencies (Govcoins-type) would prevent fraud (see above) but would be at the expense of anonymity, one of the main attractions of the decentralised digital currencies. Furthermore, issuing crypto-currencies (CBCCs-type) would mean opening up access to the Central Bank to anyone. As a matter of fact, this issue would require more in-depth reflection on the role of the Central Bank and that of the secondary banks. For example, given the G7’s reluctance regarding the Diem Association’s cryptocurrency project on behalf of Facebook, it seems reasonable to ask whether the Central Banks and other regulatory authorities in Africa should allow some cryptocurrencies that compete with their own cryptocurrencies? If so, could this competition be fair? From a normative point of view, should there be competition between governments (rising from the citizens’ democratic power) and the private companies?

Indeed, most monetary and financial codes define which currency is legal tender in a territory. That means in any country in which the Bitcoin, the Altcoins and the Stablecoins are not explicitly legalised (or banned), non-financial agents have the right to refuse to be paid in those cryptocurrencies. However, there is also no legislation preventing them from accepting them in payment of a debt (Stolp *et al.*, 2019). From what has been said earlier in this paper, it is quite conceivable that in any territory where unregulated cryptocurrencies and Govcoins were to coexist, the former would be preferred to the latter, because of the anonymity that makes them so attractive (Oh & Zhang, 2020). This hypothesis is particularly plausible, given the people’s mistrust and even their distrust in the banking system since the 2007 crisis. The records broken by the Bitcoin value in these late years illustrate the relevance of this reasoning (Fantacci & Gobbi, 2021). In Nigeria, for example, it was the desire to gradually divert the attention of its population from the decentralised cryptocurrencies that pushed the country’s Central Bank to develop its own digital currency. However, at the same time as digitalising the exchanges, the Nigerian authorities also planned a renewal of the banknotes at the beginning of 2023. This way, the banking authorities did not only introduce some limitations on the bank withdrawals in order to encourage the population to use the e-Naira, but the new notes put into circulation were rare. In this monetary chaos (queues in front of the bank counters for withdrawal requests) coupled with the shortage of foreign currencies (US Dollar especially), at the beginning of February 2023, the Bitcoin value on the Nigerian market was outperforming the rest of the world’s at +65% of its spot price. We might therefore conclude that, at the point we are, the Nigerian national cryptocurrency is continuing a “forced march”.

In the same vein, it should be remembered that one of the debates linked to the issue of the Govcoins (CBDCs-type) concerns the possibility of allowing agents to directly deposit

their funds to the Central Bank without going through the traditional intermediaries, namely the banks (Bordo & Levin, 2017). The resulting disintermediation process is likely to weaken the banking system (Alberola & Mattei (2022); Infante *et al.* (2022)). Such a dynamic would be more marked on the African continent where banks do not have any good reputation. In particular, they are criticized for holding idle cash and under-financing the economy (Avom & Eyeffa Ekomo (2007); Doumbia (2011); Fouda Owoundi (2009); Ntonga Efoua (2019)). The logical consequence of this situation would be a risk of widespread banking fragility/instability.

In the specific case of the Franc zone countries, we also remind that one of the main axes of the financial reforms of the late 1990s (after the financial distress which led to the CFA devaluation) was the modernisation of the mechanisms for financing the economy. This involved among other things, to put the Central Banks in the background – in order to reduce the propensity to resort to printing money – and to strengthen the role of the banking systems as actors in the financing of development (Bekolo Ebe, 2001). Also bearing in mind that at the time of this writing, Govcoins could be two types depending on whether they are managed by the government (National Digital Currency - NDC) or issued by the Central Bank (CBDC), this resurrects the age-old question of Central Bank independence and its corollaries: printing money and discretionary/inflationary policies.

Let's take the example of the Sango Coin, the Central African Republic NDC. By backing its natural resources – whose gold and diamonds are the main potential and valued by the said government at 3,000 billion Dollars – to this cryptocurrency, that government (a member of the Franc zone) is mortgaging them at medium and in the long term. There is therefore a risk of seeing the country's public debt (already estimated at 46% of GDP – see AfDB (2022)) increase, insofar as the (future) holders of this cryptocurrency will claim their payment in raw materials that serve as collateral. Such an analysis has also been made by the Committee for the Cancellation of the Third World Debt (CADTM, 2018) regarding the Petro, the national cryptocurrency of Venezuela, another country experiencing political instability and facing a drying up of aid possibilities due to US and European sanctions¹¹. Indeed, as a money printing scenario cannot be completely excluded in such a configuration, it becomes obvious that a Sango Coins over-issuance (in relation to the natural resources actually exploited) would cause an over-indebtedness which could be detrimental to the macroeconomic stability of the country. Indeed, the Central African government is encouraging holders of this national cryptocurrency to “froze” their

assets for 3 to 10 years, in order to gain some advantages such as an electronic residency, simplified administrative and tax procedures or the possibility to purchase some physical and/or virtual land in a metaverse under construction. According to official reports, the Sango Coins will be sold in 13 cycles. The price of a coin is \$0.10, but it is expected to rise to \$0.37 over time. The speculative nature of such a policy which encourages the first holders of this cryptocurrency seems obvious.

The time inconsistency (see above) resurrects the age-old question of printing money and the inflationary risk, some issues thought to be outdated, but which are renewed in the current international context. Indeed, during the 1970s and the 1980s, most of the developed economies experienced high inflation rates. One of the main theories put forward to explain this phenomenon was that Central Banks implemented discretionary monetary policies under pressure from the political powers – in particular because of short-term considerations motivated by electoral deadlines –. From the view of most economists, the solution to this problem was to increase the independence (or at least the autonomy) of the Central Banks, in order to reduce political interference in their monetary policy decisions (Alesina & Summers (1993); Cukierman *et al.* (1992); Walsh (2010)). However, this independence has been challenged in the recent years by among others, Messrs Donald Trump in the United States and Narendra Modi in India (Wachtel & Blejer, 2020). De facto, let us note that although the Bank for International Settlements (BIS), the People's Bank of China (PBOC), the European Central Bank (ECB) and the Central Bank of Nigeria are only considering issuing CBDCs Govcoins, the cases of Cameroon, Central African Republic and Venezuela show that this issue is not yet completely settled¹².

As a solution to the problem of the distribution of roles between monetary authorities and the other financial intermediaries for CBDCs Govcoins, the BIS (2021) is proposing the introduction of a two-step system in which the Central Banks would have the task of managing the core, while collaborating with the banking brands and the financial intermediaries. Each banking institution should then identify the cryptocurrency holders. Using a digital identity which offers some guarantees on data confidentiality (recognizing users while protecting their privacy) so as to strike a balance between the protection of personal data and the fight against money laundering may also be conceivable; albeit difficult to implement, even in developed countries. Aglietta and Valla (2021) consider two scenarios. The most futuristic – and unlikely – would be the one where Central Banks directly issue the cryptocurrency on behalf of citizens. As we have already said, this idea poses a problem insofar as it presupposes a gigantic centralisation of information. Indeed, it will be absolutely necessary to identify

¹¹ The launch of the Petro in 2018 aimed to revive public finances in the short term, as well as alleviating the lack of liquidity that was hitting Venezuela. However, its objectives and procedures contain some serious shortcomings and ambiguities that obscure its legality and transparency. Indeed, by using oil reserves as collateral, the Petro would function more like a forward oil sales contract, but without an expiry date. This could attract speculative interest.

¹² During a recent visit to the Paris School of Economics in June 2022, Kenneth Rogoff (former chief economist of the International Monetary Fund from 2001 to 2003) also warned of the current ideological reversal trend which aims at questioning the Central Banks independence.

all the users (citizens) of the cryptocurrencies, as well as their repayment capacity. The other scenario more realistic scenario is the one in which a set of second-tier banks would be allowed to enter a blockchain as “miners”, in order to create new means of payment on behalf of citizens. The cryptocurrencies in question would then be centralised by Central Banks according to their respective issuing areas. Developing such solutions will be a real challenge on the African continent, given the low level of financial development (Gelbard *et al.* (2014); Ntonga Efoua (2019); Alberola & Mattei (2022)), the sectoral dualism (Hugon (1980); Rodrik (2016)) and the digital divide compared with the rest of the world (Sagna (2006); Sajitha (2021)).

Conclusion

The goal of this paper was to reflect on the issues (opportunities and challenges) associated with the adoption of the cryptocurrencies in the African countries. Indeed, the strategies of the regulators, those of Central Banks and commercial banks, as well as governments’ around the world have considerably evolved over the last three or five years. There is an increasingly abundant literature on this issue in the Western and the emerging countries, but very little applies to Africa. The latter, however, serves as an incubator for technological advances and the creation of innovative solutions in the FinTech sector.

From our analysis, it appears that cryptocurrencies are a priori faster and more efficient than traditional means of payment (including mobile money transactions) because of their low cost when transferring funds. Although Africa’s macroeconomic framework (low financial inclusion, poorly diversified offer of financial services) seems generally suitable for their democratization, it should be noted that putting them into

circulation will require many challenges to be overcome; both technological, infrastructural (access to electricity and the Internet), institutional (informal economies) and regulatory (hacking, financing of criminal activities, monetary stability). Furthermore, the widespread use of the decentralised cryptocurrencies (Bitcoin, Altcoins and Stablecoins) could destabilize the financial systems due to pressure on the foreign exchange reserves. The success of the Govcoins projects in Africa also requires a number of prerequisites, the most important of which being the formalisation of the African economies and the reduction of the continent’s technological dependence (as well for equipment and for human capital).

In addition, the African economic policy authorities (Central Administrations or Central Banks) will have to take up another challenge, namely: offering a credible alternative to the mobile money and the decentralised digital currencies in terms of accessibility, security and transparency. With this in mind, some Govcoins projects could serve as a stimulus for the authorities, insofar as they give the said authorities an umpteenth opportunity to propose some real solutions to the causes of the delay in the development of the African continent, particularly in terms of access to infrastructure; at the risk of seeing the latter miss out an opportunity (technological leap) that would open the doors to tomorrow’s world which will undoubtedly be digital.

Ethics and consent

Ethical approval and consent were not required.

Data availability statement

The data for this article consists of bibliographic references, which are included in the References section.

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