Stablecoins – Financial Instruments with Low Volatility

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The first distributed blockchain systems were used to power digital currencies (cryptocurrencies) such as Bitcoin, Litecoin, or Ethereum. The value of these cryptocurrencies is given by their supply and demand on the market, thus, giving rise to very high volatility. As the first cryptocurrency launched, Bitcoin (BTC) is a financial instrument recognized for its volatility. This property of Bitcoin has two implications: attracting investors who want to benefit from the increase or decrease in its value in a very short timeframe and deterring investors due to the possibility of recording substantial losses. This paper analyzes several models of digital currencies that aim to maintain a stable unit value. This unit value is expressed in a fiat currency such as the US dollar or the single European currency (euro), also called a Fiat currency. These "stable" currencies are used to allow investors in volatile instruments like Bitcoin to be able to cover their gains or losses. In addition to the usefulness of these currencies as an exchange tool in transactions with traditional digital currencies (Bitcoin, Litecoin, Ethereum, etc.), they can also be used for internet transactions without being prone to government control, as is the case with a traditional Fiat currency.

Keywords*: Blockchain, Cryptocurrencies, Bitcoin, Stablecoin, Algorithmic currencies, Decentralization, Fiat currency*
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1 Introduction

The massive adoption of digital currencies and blockchain technology has brought new, more inexperienced users into this ecosystem. These unsophisticated users are not always adept at a fully decentralized or libertarian financial system like the first followers of the Bitcoin cryptocurrency. Thus, new users require financial instruments that connect the decentralized economy to the real financial one. For easier trading of digital currencies, it is preferable to exchange them with stablecoins. The main advantages are instant transfer, a non-stop work schedule 24/7, and the lack of carrying out a process of knowing the customer [1].

Fiat coins have their terminological root in the Latin word "fiat", which denotes an arbitrary order issued by a government or authority. Where that term refers to currencies, it means that the currency in question has value only because the issuing authority considers it to have value. Therefore, Fiat coins have no intrinsic value [2].

Traditionally, coins were covered by physical goods such as precious metals (gold, silver, platinum). Fiat money has no coverage, and its value is given by the credibility of the government in the issuing countries. For a fiduciary unit to have value, there must be a demand for it from people, investors, and companies. Money that had backing in gold was appreciated precisely because of the appreciation of the value of gold by people. Fiat money has its value from the fact that it is the mandatory trading mechanism in many issuing states. The governments of these states protect the cash emitted from counterfeiting and fraud and encourage its use in all commercial activities.

Fiat money was first used in the tenth century in China during the Yuan, Tang, Song, and Ming dynasties. The main reason for the transition from precious metal coins was the very high demand for money, a demand that could not be met by the amount of gold and other metals that could be exploited. [3]

Fiat coins are not covered by a good such as gold or silver. These are generally considered

claims by the government of a state to the holder of the currency. Fiat currencies are a financial instrument through which governments and central banks can increase the money supply without having to increase the amount of goods and services that cover that economy.

Although transactions in digital currencies are generally carried out on the internet, the prices of goods traded are expressed in traditional currencies issued by central banks. Thus, another utility of stablecoins can be observed: purchasing goods and services online and transferring money cross-border. Initially, some of these goods were sold in Bitcoin, but due to the volatility of the cryptocurrency, traders had to bear significant risks and losses. To mitigate these currency risks, payment processors have launched financial products through which traders can block the price of Bitcoin for a while.

The adoption of digital currencies such as Bitcoin, Ethereum, or Litecoin was robust during periods when they had significant price increases (figure 1). Thus, the price of crypto-assets is strongly correlated with the number of active users.

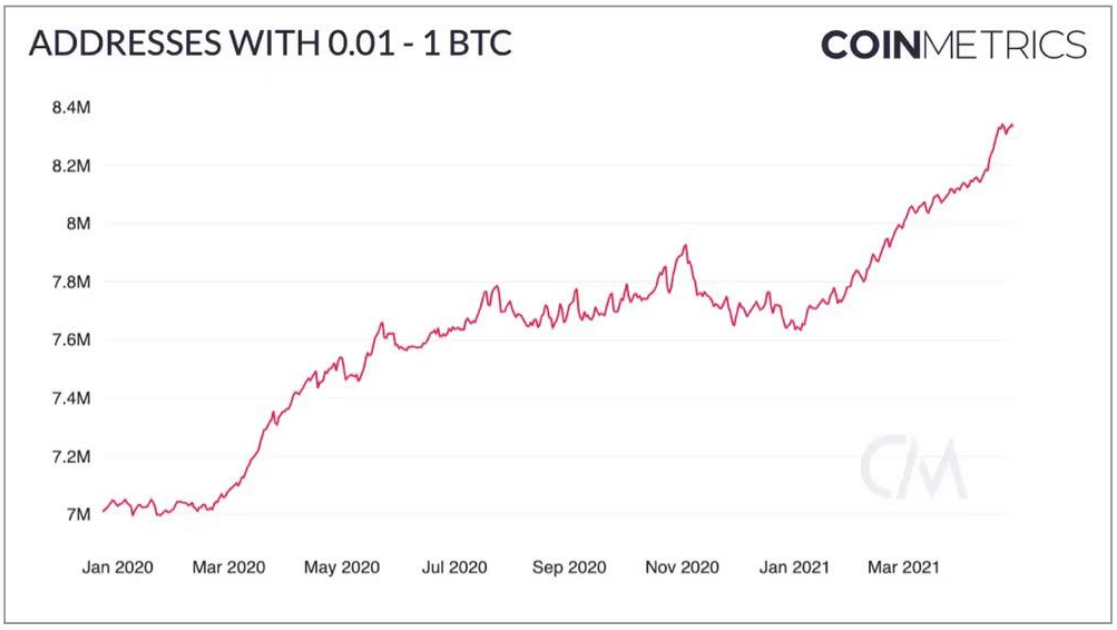

Fig. 1. Accounts (blockchain addresses) with a minimum of 0.01 BTC
Adapted from: https://www.coindesk.com/markets/2021/05/12/bitcoin-adoption-keeps-growing-during-alt-season-blockchain-data-shows/ [4]

2 Stablecoins

Stablecoins are decentralized financial instruments that operate on a blockchain network. These instruments target a specific price, regardless of the supply or demand on the trading exchanges. Stable digital currencies (also called stablecoins) try to connect two different types of economies: the distributed economy launched by the Bitcoin network and the real economy, supported by Fiat currencies, central and commercial banks (figure 2) [16].

Another reason for adopting stablecoins is that users, companies, brokers, and investors can trade these currencies without having to go through a Know-Your-Customer (KYC) process. This avoids the government or tax authorities' ability to tax or restrict certain transactions.

In many tax codes, income from crypto-assets is considered as realized at the time of receiving amounts of money into bank accounts operated by commercial banks. By avoiding banks and trading in stablecoins, capital gains are not achieved.

The first stablecoin that had a degree of mass adoption was the Tether USD (USDT). This coin was launched by Tether company in

2014. Originally released under the name "Realcoin", it has managed throughout its history to maintain its trading value of one US dollar ($1) with minor exceptions. USDT is deployed on several blockchain networks, thus creating a multichain system. The system's purpose is to serve as many users, companies, and projects in various fields or geographical regions as possible. Although they have adopted a decentralized working mechanism, the company is registered and operates as a limited liability company in Hong Kong [5].

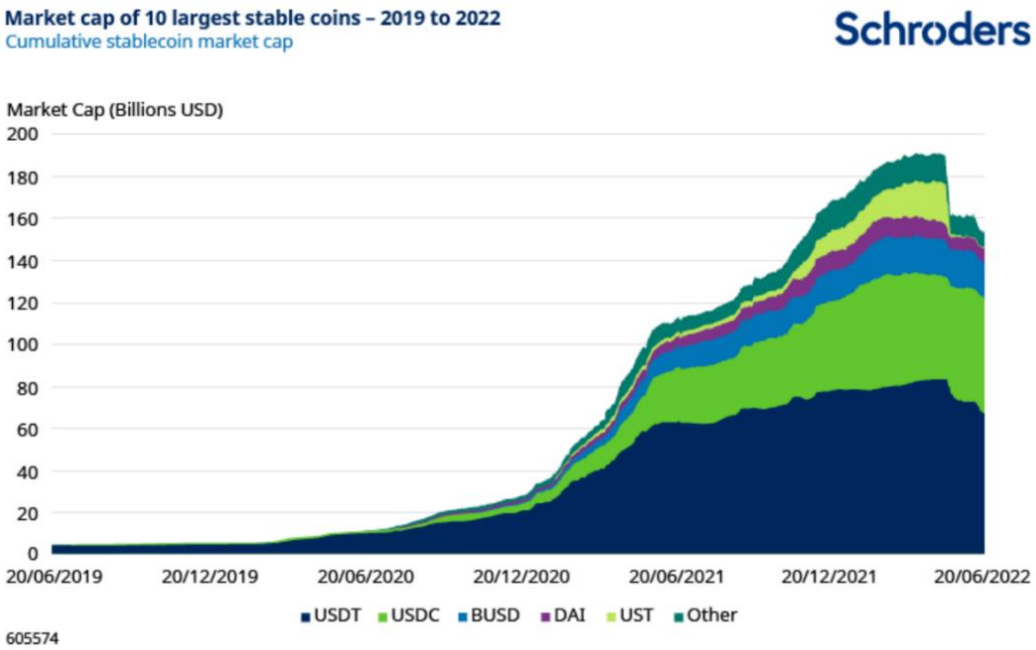

Fig. 2. Adopting stable cryptocurrencies (2019-2022)
Adapted from: https://www.schroders.com/en-us/us/individual/insights/stablecoins--what-they-mean-for-the-future-of-money/ [6]

3 Types of algorithmic coins

Algorithmic cryptocurrencies are divided into several categories, depending on how they keep their value. The purpose of such a currency is to preserve parity with an external fund unit while retaining its decentralized qualities and properties (table 1).

Table 1. Types of stable cryptocurrencies
Adapted from: https://builtin.com/cryptocurrency/stablecoins [7]

Currency type	Examples
Cryptocurrency with Fiat currency coverage	Tether (USDT), USD Coin (USDC)
Cryptocurrency with a hedge in goods	Paxos Gold (PAXG), AurusGOLD (TXAU)
Cryptocurrency with hedging in other cryptocurrencies	GIVE
Algorithmic cryptocurrency	Terra USD (UST), Magic Internet Money (MIM)

Each category of cryptocurrency with stable value has certain advantages and disadvantages. Some aspects are determined only at the theoretical level, while others have actually been experienced in the market through various events. Users of these financial instruments (particularly sophisticated investors) make analyses of these assets to observe both the risk to which they are exposed and the operating mechanisms. An investor is considered sophisticated if he is a professional and has studied in the financial field or if he holds a monetary value (wealth) above a specific limit. The risks associated with the use of a stable currency are of several kinds:

- **Technological.** Those cryptocurrencies are used using a blockchain network. Like any computer system, this network is subject to cyber risks. The risks can be both from the perspective of the infrastructure (nodes operators to defraud the network) and from the perspective of the distributed application (smart contracts) that is executed for the use of digital currencies.
- **Operational.** Stablecoins are issued by legal entities that operate these computer systems. In the case of coins with a hedge in Fiat currency or gold, companies that manage monetary value (Fiat or precious metals) can defraud the system and users by the unauthorized withdrawal of monetary values or by issuing uncovered currency.
- **Regulatory.** Cryptocurrencies are unregulated or poorly regulated financial instruments by the authorities. Thus, with the adoption of the regulation, users are exposed to the risk that those currencies will be considered illegal or not accepted by various entities.

4. Cryptocurrencies with fiat currency coverage

The purpose of these digital currencies is to maintain their unit value with the Fiat currency they represent. Their way of operation is to hold an exact or higher value in the treasury of the company that issues them. Examples of such stable digital currencies with Fiat backing are Tether (USDT), USD Coin (USDC), and TrueUSD (TUSD). Their main advantage is the ease of use, issuance, and withdrawal from the market (figure 3).

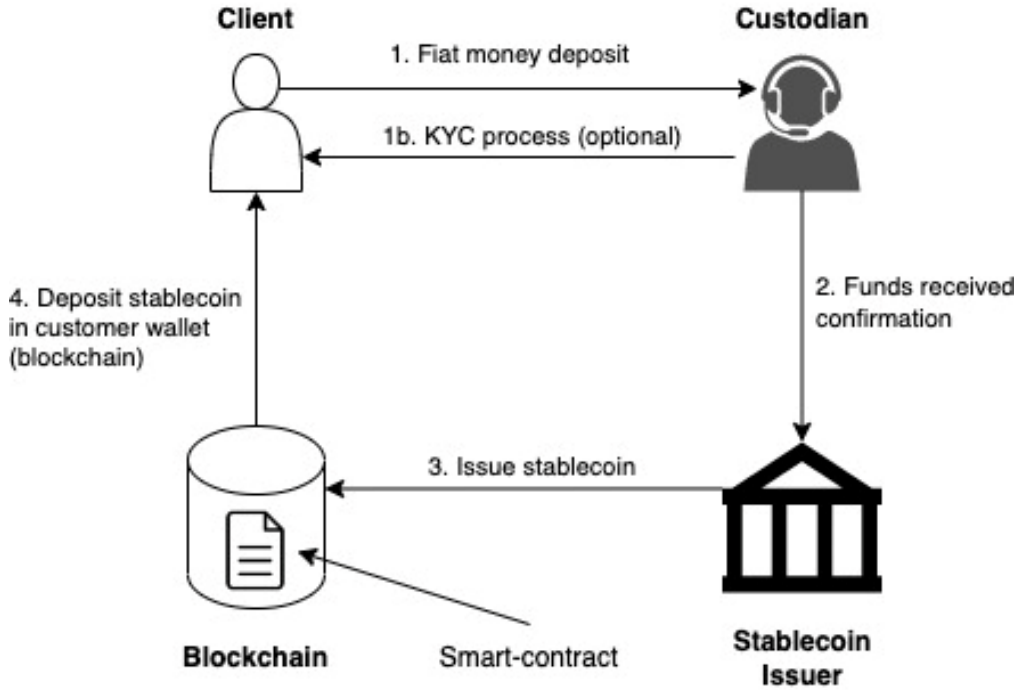

Fig. 3. Stable coin life cycle with Fiat hedging
Adapted from: https://www.ecb.europa.eu/pub/pdf/scpops/ecb.op230~d57946be3b.en.pdf [8]

The theoretical risks to which these types of coins are exposed generally refer to the lack of transparency of the company that manages the currency, and in particular, to the possibility of fraud by issuing unbacked tokens. In order to increase user confidence and meet the requirements of regulators, some companies that manage such currencies have implemented a real-time audit system called PoR ("Proof-of-Reserve"). One company that offers Proof-of-Reserve solutions is Chainlink. It has the ability to aggregate data from banks and financial institutions providing custody for Fiat coins (figure 4).

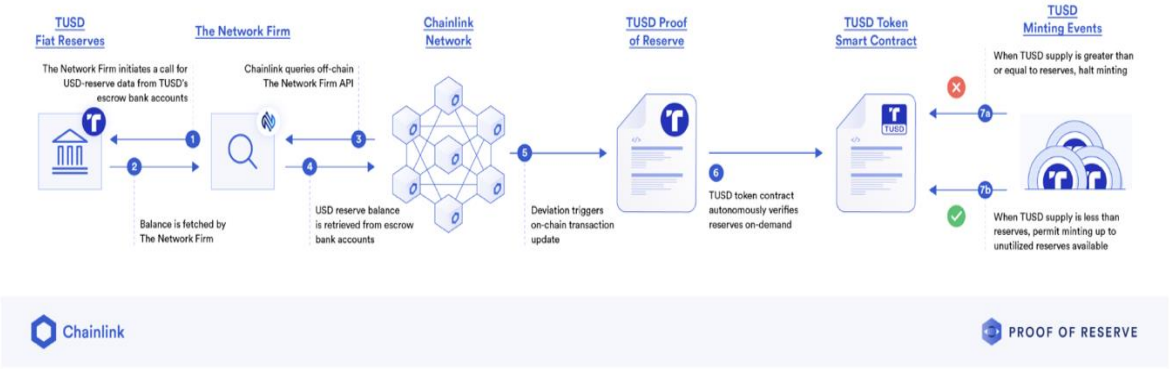

Fig. 4. The "Proof-of-Reserve" process
Adapted from: https://chainlink.com [9]

In the financial world, collateral is an asset that the borrower promises to pay as a guarantee for a received loan. Collateral is used both in the traditional economy through mortgage guarantees and in the digital economy by blocking a value in cryptocurrencies.

The operation workflow of a stablecoin issuer collateralized in Fiat is similar to that of a commercial bank. Thus, as a commercial bank receives deposits and invests money in active instruments, keeping a reserve of about 10% for withdrawals, a stablecoin issuer manages a treasury with various investments, such as government bonds or cash positions.

An important competitor for stable cryptocurrencies with coverage in Fiat currencies is the concept of CBDC (Central Bank Digital Currency). This is a digital currency issued by the central bank, which aims to improve or even replace traditional currencies that operate through the system of commercial banks. The concept of CBDC comes from the growing need and desire of governments and businesses to digitize as many aspects of economic and social life as possible.

In order to come up with an essential advantage over cash, digital currencies issued by central banks must provide both the security and confidence of traditional money and, perhaps most importantly, the privacy elements associated with money and money transfers. In several countries and regions, attempts are being made to limit the use of cash by adopting certain trading limits. The European Parliament has adopted the AMLD6 directive (6th EU Anti-Money-Laundering-Directive), which limits cash transactions to 10.000 EUR. Thus, for any purchase above this amount, it is necessary to use a commercial bank.

The purpose of these laws and directives is to limit the financing mechanisms of terrorism and extremism, as well as the application of restrictions to individuals, companies, and countries sanctioned internationally or under embargo. This draft legislation divides society into two groups: the population that supports these restrictions to protect national security and the population that sees these restrictions

as an invasion of citizens' rights and freedoms. The motivation of the second group is that the money owned and used through the banking system (money transfers, debit, credit cards, etc.) may be confiscated or access to them restricted. One such example is the blocking of accounts and donations received by carriers who organized the blocking of roads between the United States and Canada in February 2022 [10].

The average amount of cash held by an individual is different depending on the region and country in which they are located. For example, looking at figure 5, you can see that Switzerland is the country with the highest use of cash. Since Swiss citizens use cash very frequently, the restriction of its use is a very sensitive matter. Thus, in 2023, a campaign to collect signatures to amend the Constitution gathered the signatures needed to hold a referendum. This amendment protects the status of cash money and its acceptance in any transactions carried out in Switzerland [11].

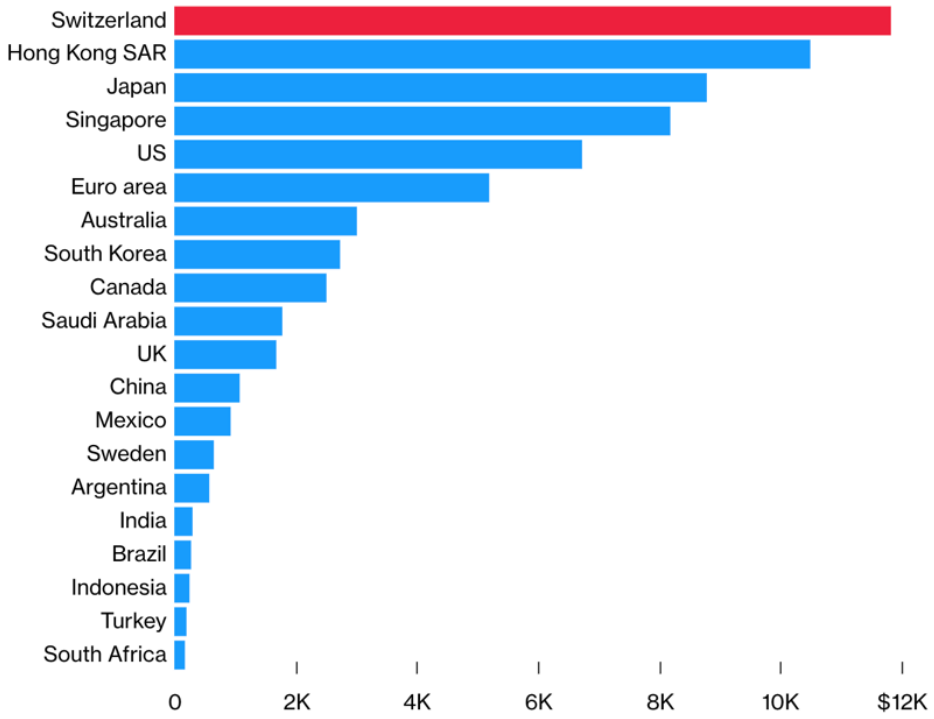

Fig. 5. Cash holdings "per-capita"
Adapted from: BIS – Bank for International Settlements [12]

5 Cryptocurrencies with backing in assets

This type of currency can have two reference prices: the price of a Fiat currency (USD, EUR, etc.) or the price of the asset in which it has backing. Most of these coins follow the price of a precious metal. The operation mechanism is similar to that of coins with Fiat coverage, but companies that manage such currencies use audited deposits and safes instead of banks and monetary units (such as government securities). A few companies that manage and issue such stablecoins are Paxos Gold (PAXG), Tether Gold (XAUt), and AurusGOLD (TXAU).

Gold-backed cryptocurrencies are often compared with investments in physical gold and with other regulated financial instruments that track the value of the precious metal (for example, ETFs). We can notice some advantages of trading a cryptocurrency with gold backing over investments in physical gold:

- The possibility of instant, free and unequivocal verification of the authenticity of the purchased asset (verifying the physical gold is difficult and often expensive).

- The ease of transfer and trading a cryptocurrency over the physical asset. Physical gold trading is done on commodity exchanges, but these exchanges are not global and do not allow trading 24 hours a day.

6. Cryptocurrencies with backing in other cryptocurrencies

Following the operational aspect of digital currencies with backing in assets (especially gold), stablecoins have emerged that are collateralized with units of value denominated in other cryptocurrencies. Unlike the stablecoins that are gold-backed, the crypto-backend stablecoins need to be over-collateralized. The need for over-collateralization is given by the volatility of digital currencies guaranteeing unit value. The most well-known and used currency is DAI, issued by a distributed company called MakerDAO (figure 6).

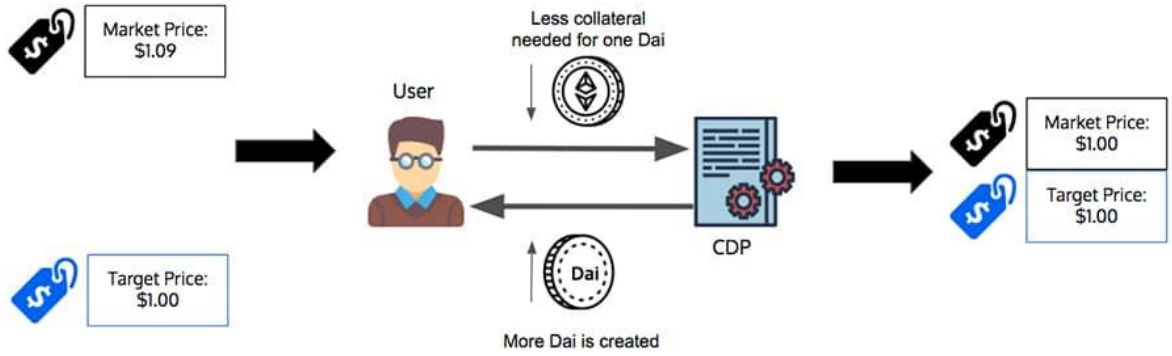

Fig. 6. MakerDAO (DAI) Workflow Process
Adapted from: https://www.coinbureau.com/education/what-is-dai-coin/ [13]

7 Algorithmic stablecoins

Algorithmic stablecoins use a system in which several coins are automatically issued or withdrawn from the market so that they retain their unit's value. A critical component in the architecture of algorithmic currencies is the system of "oracles," which allows access to the price of certain undistributed financial assets (such as the US dollar) in a distributed blockchain system (figure 7). A blockchain network is different from a normal infrastructure because the processing and control power is not centralized or controlled by a single entity. For this reason, accessing data from outside the blockchain network is more difficult and requires an innovative system of "consensus" on the data [18].

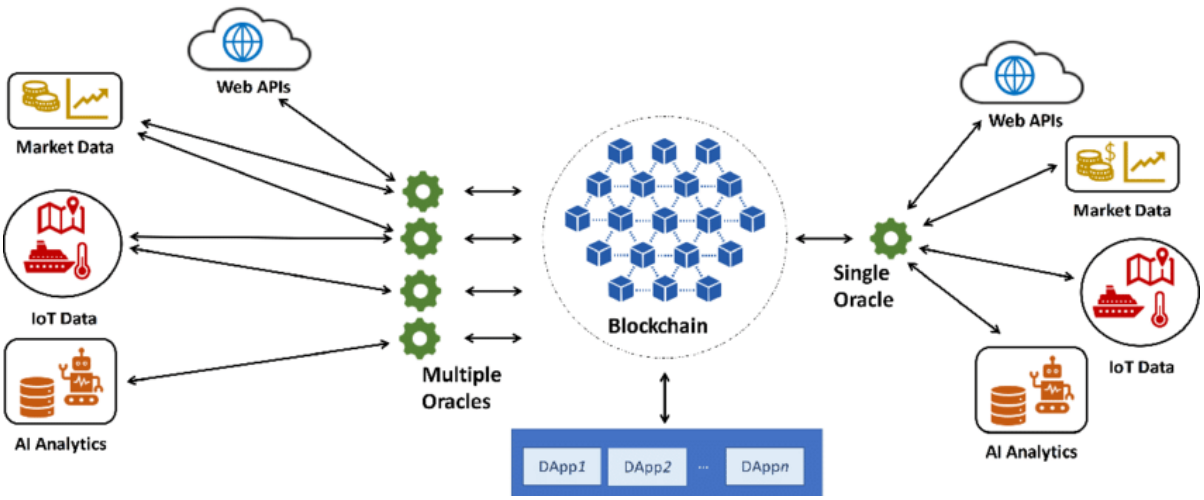

Fig. 7. Blockchain oracle architecture

Adapted from: https://www.researchgate.net/figure/The-role-of-oracles-in-blockchain-ecosystems_fig1_341174793 [14]

Most algorithmic stablecoins use a two-currency system. Through this algorithm, one of the currencies is used to absorb the volatility of supply and demand from the trading market, thus trying to preserve the unit value of the currency. This currency, called the "balancer", is often traded on decentralized exchanges such as Uniswap or Quickswap. For an algorithmic cryptocurrency to function, a high degree of its adoption is required. If the level of adoption decreases, the whole system will fall due to pressure on withdrawals. The risk associated with algorithmic cryptocurrencies is derived from what the European Central Bank (ECB) has called "expectation of future market value" [8, 15].

8 Conclusions

Stablecoins, regardless of their type, are a vital tool in the digital currency ecosystem. Proof of this is their trading volume against other cryptocurrencies. One reason for the popularity of these stablecoins is that in trading the most well-known cryptocurrencies, such as Bitcoin or Ethereum, the possibility of "blocking" a price or being able to cover certain earnings is beneficial. The advantage over the use of traditional Fiat money and the banking system is that the distributed blockchain system that supports these currencies is functional 24/7. Cryptocurrency trading exchanges do not have working hours like traditional stock exchanges, so the use of banks in the clearing process is a disadvantage.

However, there are also many risks associated with the use of cryptocurrencies with stable value, generally related to the possibility of their devaluation due to some actions in the market. The associated risks include the case of fraud by the issuer of the digital currency, the associated technological risks (cyber attacks), or the risks of treasury activity (non-performing investments or loss of client capital). However, these risks are not limited to stablecoins alone. Even securities or funds held in commercial banks are at stake in the event of the bankruptcy of the banking system.

We can conclude that despite the associated risks, the adoption of stablecoins has increased dramatically in recent years. They represent a vital financial instrument for the cryptocurrency economy and the global financial market.

As future research directions in the field of the cryptocurrency ecosystem and blockchain, I believe that it is worth paying special attention to the analysis and management of the resources necessary to facilitate its operation from several perspectives: technological, human, financial, etc. Thus, I believe that an approach to the cloud computing and IoT&IoP paradigms is of interest in the context of the multiple local or global crises that we are facing or that is imminent now [17].

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