

A Survey of Techniques for Price Stabilisation of Cryptocurrencies

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Abstract—Stablecoins are hot in the crypto space. With the 5th largest cryptocurrency and stablecoin Tether, now the subject of a trillion dollar lawsuit, many look to other stablecoins as a safe store of value. The techniques used by these coins vary massively. This survey discusses techniques used by the largest and most promising stablecoins to hold a stable value.

Index Terms—Stablecoin; Blockchain; Cryptocurrencies

I. INTRODUCTION

Centralisation, non-transparency and a trillion dollar lawsuit would normally lead to crypto investors avoiding you like the plague. For Tether however it lead to a market cap of over 4 Billion dollars. With Tether currently being the most the most traded cryptocurrency despite its controversies we are left to wonder what makes a coin that trades at 1 dollar so attractive to investors.

Cryptocurrencies have so far been notoriously volatile in price. Making the assets unsuited for both investments in the long term, and payments in the short term.

Another need for price-stable currencies exists among crypto traders. When the crypto-markets decrease in value, the entire market tends move as a whole. In this case traders want to move their assets out of the volatile “new world” assets and into traditional currencies like the Dollar to wait out de dip in de market. However these transactions are limited by the speed of the old payment networks. A coin that is stable with respect to the US Dollar would solve this problem by allowing traders to change positions between the Dollar and crypto currencies in a quick, decentralised[1] and programmable [2] way.

With Tether having proves the need for a stablecoin, many cryptocurrencies have followed, some solving problems of those who have come before. MakerDAOs DAI [3], currently the 5th biggest stablecoin and the 52th biggest cryptocurrency with a market cap of 103 million USD, aims to be a fully decentralised stablecoin that maintains a value of 1 USD. Dai provides a coin that enables distributed peer-to-peer lending with the stability of the Dollar while having no centralised component.

MakerDAO is part of a bigger movement. The Decentralised Finance movement is an open community of decentralised financial platforms that aims to revolutionise the financial

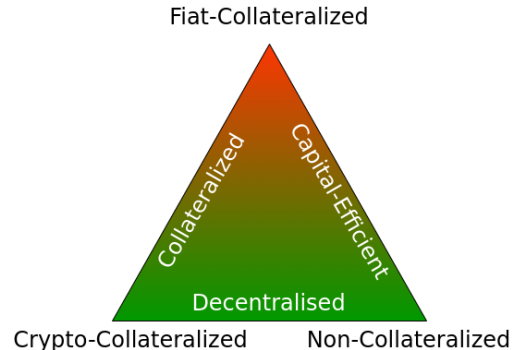


Figure 1. Inherent trade-offs of stablecoins



Figure 2. Taxonomy of stablecoins

world by replacing many of the worlds financial systems. Within this project there are a number of stablecoins and other tokens that are pegged to real world assets that use decentralised techniques for providing financial derivatives.

This survey presents a history of the significant stablecoins and pegged assets invented so far, and classifies and generalises the techniques that are common among them.

First we discuss the topic of the purpose of money, the meaning of value and stability, and some currency pegs used in our traditional monetary system in Chapter 2. We then describe the simplest and most successful stablecoins, namely the centralised coins in Chapter 3. In Chapter 4 we go into the more complex topic of decentralised assets and

their methods for maintaining pegs to real world assets without a central party guaranteeing the peg. We then go deeper into the theory in Chapter 5 where we look at the research into the viability of stablecoins. We then end with a discussion of the research on stablecoins in Chapter 6 and a conclusion of the survey in Chapter 7.

II. BACKGROUND

Before we get to the techniques used for stabilisation some concepts and terms need to be defined. In this chapter we define the purpose and requirements of money. We define what it means for a currency to be stable, and what it means for a currency to be collateralized.

A. The purpose of money and the requirements of a stablecoin

In “On the Origin of Money” [4] Karl Menger describes how people settle on a currency as a method of exchange. He describes that the willingness of people to exchange their goods for a commodity depends:

1. Upon their ability to trade it for goods (demand)
2. Upon the scarcity of the commodity (supply)
3. Upon the divisibility, durability and practicality of the commodity.
4. Upon the development of the market, and of speculation in particular.
5. Upon the limitations imposed politically and socially upon exchange, consumption and transfer from one period of time to another

B. The meaning of value and stability,

An certain configuration of these factors is required for a stable store of value, and need to be controlled by some mechanism in order to maintain a stable price of the commodity.

In the value of money [5] Pigou describes the role of the money supply in the Quantity theory of money and its relation to the price. The quantity theory of money states:

$$M \times V = P \times T$$

Where M is the money supply, V is the velocity of circulation, P is the price of the coin and T are all transactions done with the currency.

This implies that the price of a currency can be controlled by increasing and decreasing the money supply. Indeed this is a technique also currently used by central to prevent deflation of their currencies.

In this survey we will see currencies vary both M and V as a means to keep P at a stable level.

C. Making a market

The easiest way to keep a currency stable is to simply have it derive its value from a different asset that already has the desired stability. This is called pegging.

The pegging of a token to an asset can be achieved by allowing investors to trade the token for the asset at any time. Note that this may involve the trade of a secondary asset as intermediary store of value.

The first pegs were tracking the value of gold. Every unit of a currency could be exchanged for a certain amount of gold. As described in “The Gold Standard” [6] by Cooper, the US dollar has been pegged to Gold for some of its years to maintain the confidence of the public.

The most common way to guarantee an exchange rate is to hold some form of collateral. The most obvious collateral for the token, is the asset it is pegged to, but this can also be another commodity that can be traded for the asset at any time. Of course this requires some guarantees or assumptions about the price stability of this commodity to ensure that all outstanding tokens can be redeemed. If the amount of collateral, or the value of the collateral, is such that less than 100% of tokens can be redeemed for the original asset, the token is considered under-collateralized. This can have large ramifications to investor trust, and might thus undermine the stability of the coin and the viability of the network.

Any entity or system that facilitates the exchange of the token for the collateral is called a market maker. In this survey two main categories of market makers will make an appearance, centralised organisations and decentralised systems.

III. STABILISATION BY CENTRALISATION

With more control over the supply of a currency, the price stabilisation of a currency is significantly simplified. Minting more in times of high demand, though looked down upon, is a powerful way of controlling the value of a currency and preventing runaway deflation. Conversely, reducing the rate of minting slows down inflation of the currency.

Another way of stabilising a currency is to peg it to an already existing currency or commodity. This method brings with it questions about collateralization, transparency, risk, and the meaning of value.

In this section we explore the techniques employed by both central reserve, and pegged stablecoins.

A. The reserve bank stablecoin

Combining the proven success of central banks with the benefits of fast payment systems [7], organisations like JPMorgan [8] and the Libra Association [9] aim to create a stable currency by using their reputation as established financial institutions. So far, no coin has managed to be

stable off of its reputation alone, and whether this will ever happen is yet to be seen.

B. Pegged by currency reserves

Since stabilisation by reputation is often not good enough for investors looking for a safe store of value, a stablecoin with stringer guarantees about its future value is needed. The simplest way to do this is to simply peg the cryptocurrency to another currency and guaranteeing a 1:1 exchange rate by holding enough collateral in order to make any investor whole at any time in the future.

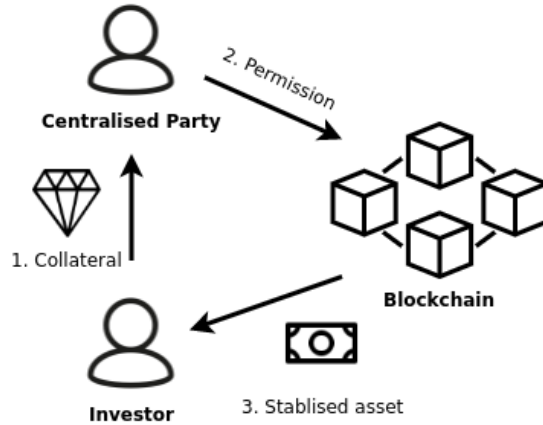


Figure 3. Minting a pegged crypto-asset

Figure 3 describes the general way in which pegged crypto assets are created. The centralised party in the image provides some guarantee about the exchange rate. For this example we assume a peg for 1 stabilised asset to always be worth 1 dollar. In this context, the dollar is provided as collateral for the asset in the following way.

1. 1 dollar is transferred from the investor to the centralised party using traditional payment systems.
2. The centralised party mints 1 stabilised asset and transfers it to the investor
3. The investor is free to use the asset as they please

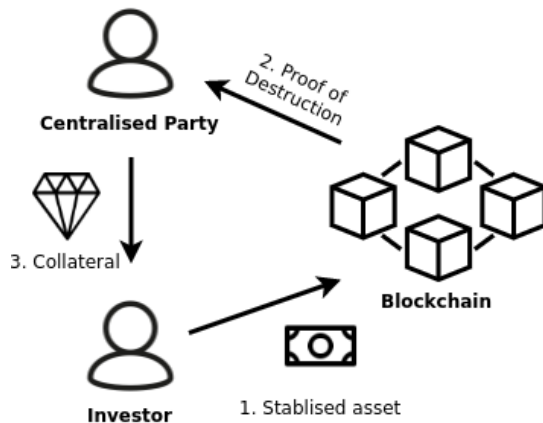


Figure 4. Burning a pegged-crypto asset

Figure 4 illustrates the general way in which pegged crypto assets can be traded back for the original asset.

0. Anyone can obtain the stabilised asset by trading for it on some market or by having one minted by the centralised party.
1. Any investor who holds a stabilised asset can send it to the blockchain to be burned.
2. Upon receiving a proof of destruction, the centralised party will send an equivalent amount of dollars back to the investor.
3. The investor is now out of their position.

By guaranteeing that there is always a 1:1 exchange rate between the collateral and the stabilised asset, the asset is pegged at a 1:1 ratio even in external markets. This illustrated using the following two scenarios.

When the stabilised asset trades for more than 1 dollar on the open market, anyone can make an instant profit by minting more assets, and immediately selling them on the open market. This process will continue to increase the supply of the asset until the price is back down to 1 dollar.

Conversely, when the stabilised asset trades for less than 1 dollar on the open market, anyone can make an instant profit by buying the coins on the open market, and immediately burning them. This process will continue to decrease the supply of the asset until the price is back up to 1 dollar.

1) *Benefits of Centralisation:* Like illustrated in figure 1, fiat-collateralized pegs can not be maintained by a fully decentralised system. The limiting factor is the fact that fiat-currencies need to be held by some party.

Some argue the price guarantees of pegging to a fiat-currency outweighs the sacrifice of decentralisation. The success of currencies like Tether [10], Centres USDC [11], PAXos [12], and TrueUSD[13] illustrate this with their combined market capitalization of 5 Billion USD.

2) *Critiques of Centralisation and solutions:* It goes without saying that having a centralised storage of anything creates a central point of failure and control. Since trust in the crypto space has long been based on what is verifiable, proving the absence of fraud becomes a new challenge. To address the concerns of coin holders the different stablecoin market makers provide different guarantees with respect to the proper storage of collateral. Common ways to improve investor confidence include:

1. Regular audits providing proof of collateral (Tether [10], USDC [11], PAXos [12], TrueUSD [13])
2. Multiple independent collateral trust accounts (TrueUSD [TrueUSD:whitepaper], Stasis Euro [14])
3. Subjecting themselves to established regulations and providing FDIC- insurance. (PAXos [12])

Through these means stablecoin organisations aim to counteract the lack of transparency and the risk of under-collateralization.

3) *Expansions on fiat-currency pegging:* Essentially, a centralised currency-pegged stablecoin is just a tokenised fiat-currency. This concept can be expanded to more than

just traditional currencies. Using tokenisation and central storage it is possible to peg the value of a crypto coin to anything that has value in the real world. As such some stablecoins peg their value to the original form of money: Gold. Today, stablecoins like PAX Gold [15] and DigixDAO [16] hold gold in trust for their crypto holders. Though the gold provides a strong guarantee that the stablecoin will hold its value, the coins are still less stable than the Dollar as there is no central agency stabilising gold.

Expanding even further on the concept of tokenised assets as stablecoins, any collection of assets that is stable on average can provide a stablecoin. Even though the US Dollar is seen as the most stable currency world-wide, it is still dependent on the stability of the United States economy. To address this stablecoins like Globcoin [17] and x8currency [18] aim to create an asset that tracks multiple currencies as well as gold. Thus creating a coin that is “more stable” than the US Dollar. Whether these coins will ever have a mainstream appeal is impossible to predict, but the theoretical value of having a globally stable coin is hard to dispute.

4) *Overview of the largest stablecoins:* To provide a glimpse of the usage of the techniques described in this chapter the table II describes the 8 central stablecoins with the highest market capitalisation and some of their operational aspects:

Some interesting observations can be made from the table.

1. The PAXos company operates 3 of the top 8 stablecoins.
2. 3 of the top 8 stablecoins are operated by exchanges including the second largest stablecoin USDC.
3. Gold based stablecoins still make up a small portion of the market with PAX Gold being the largest with a market cap of 12 million.

IV. STABILISED WHILE DECENTRALISED

Though many centralised stablecoins are becoming more diversified in their collateralization, the organisations that run them remain a central point of failure. The risk of collateral depletion by market maker failure is always prevalent and though some stablecoins store their collateral with bankruptcy remote companies, this just moves the risk to a different central entity.

To protect investors from the failure of any central entity and even the failure of the financial system as a whole, new stablecoins have emerged that remain price-stable in a decentralised manner. These coins come in two main categories:

1. Crypto-Collateralized Stablecoins
2. Algorithmic Stablecoins

This section explains the mechanisms that keep these coins stable, provides a comparison of their advantages and disadvantages, and a general overview of the largest

decentralised stablecoins on the market right now in each category.

A. Crypto-Collateralized Stablecoins

The success of the centralised stablecoins shows that the backing of a stablecoin with 100% collateral is a reliable way to keep a currency price stable.

The main problem with backing a decentralised stablecoin with some type of collateral is that there needs to be a mechanism of exchange between the stablecoin and the collateral. When the collateral is fiat-currency or some real world asset, there must always be a central party that holds the collateral and facilitates the mechanism of exchange.

Crypto-collateralized coins build on the idea that a holder of a stablecoin can always get their share of the collateral back, but in a fully automated and decentralised manner.

Crypto-collateral coins allow the exchange of the pegged currency such that even the organisation that created the stablecoin has no power over the collateral. Initially it may seem like we need a collateral with the following requirements:

1. Stable - to stabilise the stablecoin
2. Decentralised - to avoid central control
3. Fully programmable - to automate the collateral exchange mechanism

The problem here is quite obvious, we are looking for precisely the thing we are trying to create, a decentralised stablecoin. In order to solve this, crypto-collateralized stablecoins choose drop the 3rd requirement and use decentralised but unstable cryptocurrencies as collateral. The way this can still lead to a stable currency is as follows:

Instead of guaranteeing the direct exchange of the stablecoin for the pegged currency, say 1 token for 1 dollar, the system aims to guarantee that an investor can exchange 1 token for 1 dollars worth of the collateral at any time. This leaves a problem, what if, because of the volatility of the collateral, the market value of the collateral drops such that there is no longer enough collateral to back all outstanding stablecoins. This could lead investors to scramble to get their share of the collateral out before its gone, rapidly undermining the price of the stablecoin.

The solution to this is overcollateralization. In order to guarantee that there is always enough collateral in the system for every investor to be made whole, the creation of any stablecoin has to be paired with the deposit of **more** than 100% collateral.

This leads to one final question, what investor looking to hedge against the price stability of cryptocurrencies would lock up their crypto in order to get a token that has lower value than the underlying collateral. They are now neither hedged against the drop in value of their collateral, nor do they have any extra utility with their new token as the collateral was equally decentralised and programmable.

Stablecoin	Market Cap	Pegged asset	Escrow	FDIC-insurance	Launch	Notes
Tether[10]	4 Billion USD	USD	Single organisation	No	2014	Largest Stablecoin, 4th largest cryptocurrency
USDC[11]	464 Million USD	USD	Single organisation	Some exchanges	2018	Created and owned by various crypto exchanges
PAXos[12]	238 Million USD	USD	Single organisation	Yes	2018	Regulated by the New York State Department of Financial Services
TrueUSD[13]	161 Million USD	USD	Multiple independent	Some escrows	2018	Distributes risk with multiple independent escrows
Stasis[14]	35 Million USD	Euro	Multiple independent	No	2018	Largest Euro Stablecoin
BUSD[12]	18 Million USD	USD	Single organisation	Yes	2019	Issued by PAXos for the Binance exchange
USDK	28 Million USD	USD	Single organisation	No	2019	Owned and operated by the oklink exchange
PAX Gold[15]	12 Million USD	Gold (1 ounce)	Single organisation	No	2019	Gold held in custody by PAXos Trust Company

Table I
TODO

The solution to this is found in the concept of a swap. A financial swap is a derivative contract where two parties swap some properties of some underlying assets. In the case of our stablecoin, one party, lets call them the investor, offloads the risk associated with the price instability of the collateral to our second party, lets call them the speculator.

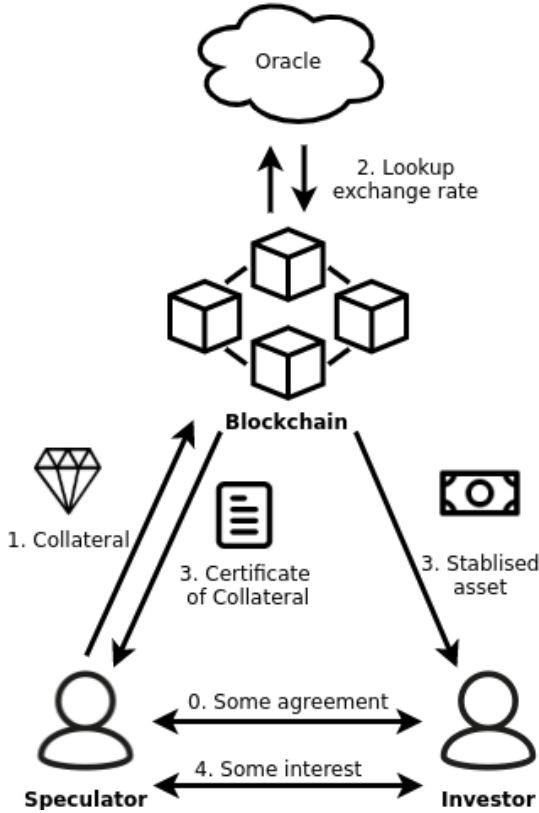


Figure 5. Stablecoin minting through debt creation

Figure 6 describes the process of minting a decentralised stablecoin that uses the swap mechanic:

0. Some agreement is reached between the investor and

the speculator. This might happen on an individual basis, but sometimes the terms of the agreement are pre-defined by parameters of the network.

1. Some crypto, lets say Ether, is sent as collateral to a smart-contract. Some of this, usually 100%, might come from the investor, while the speculator provides the rest of the collateral, lets say 50%, for the stablecoin to remain overcollateralized by some ratio, in this case 150%.
2. A smart-contract checks the price of the Ether in terms of the pegged currency, lets say dollars. Mechanisms for the decentralised lookup of Ether prices vary between systems. We explore these differences later in this section.
3. The stablecoin is minted and issued to the investor, while the speculator gets some proof of deposit for their collateral. Lets call this the debt-contract.
4. Some interest might be paid from the investor to the speculator or vice versa.

The investor might pay interest to the speculator as a reward for providing the capital for overcollateralization and taking on the risk of the collateral dropping in value while the stablecoin is in circulation. On the other hand, the speculator might pay the investor as a reward for providing extra capital for the speculator to leverage their bet on Ether. The direction of interest depends on the design of the stablecoin and sometimes the market conditions.

While the stablecoin is in circulation the speculator is responsible for maintaining the collateral of debt-contract. Should the value of Ether drop, they must deposit more Ether to the smart contract, or risk getting margin called.

A margin call is the automatic closing of a debt contract. A margin call happens when the value of the collateral drops below the minimum collateral requirement of the system. In the case of our example this means there is not enough Ether in the debt-contract to cover 150% of the outstanding stablecoins of the contract. A margin call opens the debt-

position to be closed by anyone, and incentivises this by providing a reward for whoever closes it.

The closing of a contract is the burning of the stablecoin and the recovery of the underlying collateral. The process for this is illustrated in figure and includes the following steps:

0. Some agreement is reached between an investor willing to sell a stablecoin, and a someone willing to close out a debt-contract. This agreement could come be in the form of a speculator simply buying the coins from an investor at market rate, an investor acting on a margin call, or by some other matching mechanism between stablecoin and debt-contract.
1. The stablecoin is sent to a smart-contract, which burns the coin.
2. The oracle is consulted for the current price level of Ether in dollars.
3. The collateral is provided back to the speculator and investor at some defined ratio. Usually 100% of the stablecoin value goes to the investor while the remaining 50% or more goes back to the speculator.
4. Some settlement may be done, this could be the payment of interest between the two parties or some fee to the blockchain.

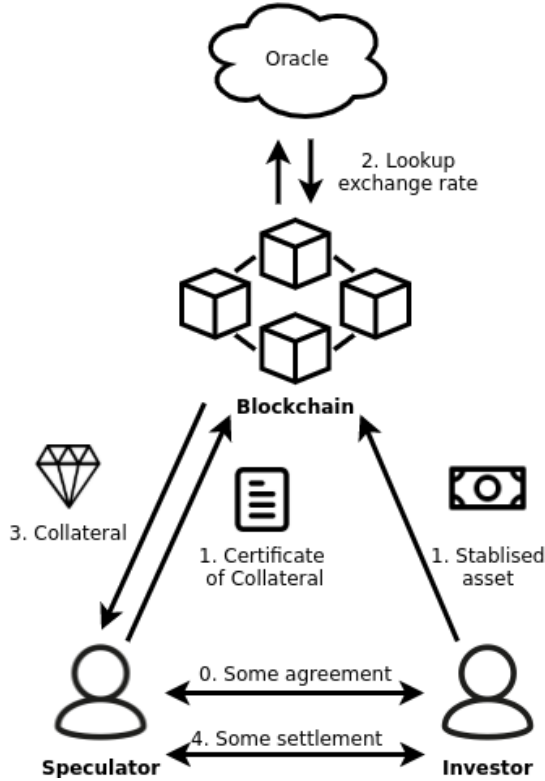


Figure 6. Stablecoin burning through debt-position closure

As an extra line of defence against the falling of the collateral value or some attack against the system, crypto-collateralized stablecoins often have a mechanism for global settlement implemented. In the case of a global

settlement event, the underlying collateral gets returned to the investors without any conditions. All debt contracts will be locked, allowing all holders of the stablecoin to trade in their tokens for 1 dollars worth of collateral. After a period of time, the contracts will be released and return all collateral left back the the speculators.

The triggers for a global settlement differ per stablecoin, but mechanisms include: global collateralization under a minimum ratio, high price instability, a decision by holders of some governance token.

B. Governance

In addition to triggering global settlement in the case of some black swan event, decisions need to be made about the network in general. Examples of this can be parameter tweaking like the collateralization ratio or network fees, as well as network upgrades. For this reason most decentralised stablecoins are part of a Distributed Autonomous Organisation (DAO). Shares in the DAO, or governance tokens, allow the holders some say over the inner workings of the network, as well as some claim of the profits of the network. This ties the value of the tokens to the to the performance of the network, which in turn incentivises the holders of the governance tokens to remain invested in the network and to vote for parameters and mechanisms that improve the utility and stability of the stablecoin.

C. Variations between stablecoins

Multiple stablecoins follow the structure layed-out. The differences can be expressed in a number of parameters. TODO

1) *Minimum Collateralization Ratio*: The minimum collateral required varies between systems. It is the responsibility of the speculator to maintain a collateralization ratio above the minimum requirement, or they get margin called.

The collateralization requirement depends on the volatility of the collateral used. Since the margin call of a contract takes time to find an investor someone willing to close it, there needs to be a buffer for the price of the collateral to fall even further. This buffer is the gap between the minimum ratio and 100%.

This means that network doesn't lose any collateral as long as the collateral doesn't drop to $1/c$ within the time it takes to margin call a contract. Where c is the minimum collateralization ratio.

2) *Mechanism for speculator to investor match making*: Stablecoins that utilise these derivative contracts are usually built with a system that aligns the incentives of the stablecoins within some structure. Variations in these systems leads to differences in features like:

- the direction of interest payments,
- the matching of investor to speculator,
- the amount of collateral put up by each party,
- the mechanism of a margin call.

To explain the variation between the systems we use some examples. We show how differences in the purpose of the system leads to differences in the features, and how the price keeps stabilising.

a) Reserve bank speculator model:

In the first type of system the speculators collectively act like a reserve bank.

The creation and destruction of stablecoins are controlled by the speculator. Anyone can create a debt-contract, deposit collateral and mint stablecoin tokens as long as they remain properly overcollateralized. The contract can also be closed at any time by depositing an equal amount of stablecoins to get the same collateral back.

It is important to know that, in this system, the amount of stablecoins created is determined by the price, in say dollars, of the collateral at the time of minting. This leads to the following incentive structure:

If the market value of the token is higher than 1 dollar a speculator is incentivised to deposit more collateral and mint more tokens. These tokens can then be sold on the market. Increasing the supply, thus dropping the price back to one dollar. The benefit of the speculator here is that they were able to create a debt contract at a favorable rate. If, when they pay back the tokens, the market value of the token is lower than when they sold the coins, they will make a profit.

If the market value of the token is lower than a dollar, any speculator with an open contract can buy the tokens at a discount and close their contract out at a profit given that they bought/sold the tokens at a higher price. This leads to fewer coins on the market, thus increasing the value back up to a dollar.

This creates a “soft peg” as there is no guarantee for the speculator that when they mint a coin they will be able to buy it back again at a lower price. This can lead to the market price of the token rising to a different price level, and the peg can stabilise at a price level that is higher or lower than any collateral held.

The price level of the token is thus determined by what the market believes it is worth. There is some indication however, that the coin will not drop below 1 dollar, since that is the value that is returned to investors in the case of margin calls or a global settlement scenario.

In this scenario, the speculator takes on a certain amount of risk speculating on the value of the collateral and the price of the token. Initially it seems like the speculator gets their value from speculation only. They can, for example, sell their tokens on the market for more of the collateral thus leveraging their speculation on the collateral by some factor.

Usually, the designer intended way for the speculator to make a profit is by peer to peer lending. Instead of selling the tokens on the market, the speculator can lend out the

tokens to make some extra dividends while speculating on the collateral. In this way, the speculator acts as the reserve bank increasing the supply of the token by lending out more.

Irregardless of how the speculator chooses to use their tokens, anyone investing by buying them has some guarantee that they will be worth at least a dollar in the future, thus creating an asset that is more stable than the underlying collateral.

The complete risk acceptance and decision making of the speculator allows for a number of expansions on the already explained concepts. First, since the success of the network is dependent on being properly collateralized, and this in turn is dependent on the market value of the collateral, it makes sense to diversify the collateral. Thus, a multi-collateral system, which improves guarantees for token holders can be created, where the speculators have a choice in what collateral they want to stake. This protects the system against a price crash in one collateral category, as speculators are incentivised to exchange the collateral that is dropping in value for more price-stable collateral.

b) Margin trading:

in: Speculator: short-sells token, longs collateral, wants more exposure
Investor: seeks stability, longs token pre-set:
collateral ratio agree: on price the investor pays, (hopefully 1 dollar)
matches: minimum offers, maximum interest from speculators
matches: maximum offers, minimum interest from investors

investor: sell token on market
speculator: maintain collateral or margin call

out: speculator: buying back from the market (covering a short)
investor: autoliquidate lowest collateral
matches: buy orders from speculator
matches: sell orders from investors

ideal expectation: self-reinforcement of the value

when low: everyone buys bitshares moving the margin up
when high:

reality: low demand pushed price down and undercollateralised

interest:

30 day buyback

inflation of shares

c) Tracker service/speculation market:

(Synthetix)

####To capture:

- Ratio of collateral paid by the investor
- Interest paid from investor to speculator or vice versa

Stablecoin	Peg	Collateral	Min. col.	Match-making	Interest paid	Governance	Details
MakerDAO	USD	Ether (and more)	150%	Speculator to Investor Loan	to Speculator		
BitShares	USD	Bitshares	300%	Margin Trading	to investor		
Synthetix	USD	SNX	750%	Global interest calculation			
USDQ	USD	Bitcoin	200%				

Table II
TODO

D. Oracles

E. Overview

To mention: 1. Global settlement 2. Governance 3. Share of collateral, vs interest 4. BitShares exchange 5. MakerDAO 6. Synthetix 7. Future

V. DISCUSSIONS OF STABLECOINS

Besides the papers describing techniques, some research has been done into existing stablecoins, quantifying their prevalence, and discussing their criticisms.

In [7] Darrel Duffie describes the use of stablecoins for banks aiming to digitise both inter-organisation value transfer and governments wanting to implement a digital currency with the utility benefits of cryptocurrencies and the stability of fiat.

Chohan discusses the difficulties in maintaining a properly collateralized peg in “Are Stable Coins Stable?”[19]. Chohan describes how maintaining a true 1:1 peg leads to funding and scalability issues.

In “The State of Stablecoins”[20] the “blockchain team” present an empirical study of 57 live and pre-launch stablecoins showing adoption, trading volume and market cap. They describe a taxonomy where they differentiate between “traditional” collateralized, crypto collateralized and algorithmic. They describe many pros and cons of these types of coins. The survey is very extensive and describes all 57 currencies in terms of their investors, tech, legal structure and collateral format.

In “Stablecoins in Cryptoeconomics. From Initial Coin Offerings (ICOs) to Central Bank Digital Currencies”[21] Erba discusses the stablecoins in the context of the law in both the united states and Europe. Erba argues for crypto-currencies “fully backed by Central Bank reserves”

In “Stablecoin: Yet Another Layer of Cryptocurrency Complexity”[22] Lee looks at the way that stablecoins can fit into the modern legal system. Lee argues for Bankruptcy Courts to treat stablecoins as a commodity as opposed to a currency.

In [23] Klages-Mundt et al. look at the existing stablecoins through a critical lens and describe some ways in which the currency pegs can be broken. Klages-Mundt build a

generalised model of decentralised crypto-collateralized stablecoins. It describes possible attacks on these systems where the pegged currency is bid up so an extent where collateral starts to get margin-called creating a run-away feedback loop.

VI. CONCLUSION

There is a lot happening in the stablecoin and DeFi space right now. Stablecoins are being tested in a trial by fire in the real-world as we speak. Through this organisations such as MakerDAO and Synthetix are developing completely systems that promise to either revolutionise the world by taking Decentralised Finance to the next level, or they will spectacularly go up in a ball of fire. Only time will tell.

REFERENCES

- [1] R. Fugger, “Money as ious in social trust networks.”
- [2] Martijn de Vos and Johan Pouwelse, “TrustChain.” <https://repository.tudelft.nl/islandora/object/uuid:c51ac99d-3013-44b3-8ddd-fbd951a2454a>.
- [3] The Maker Team, “MakerDAO whitepaper.” <https://makerdao.com/whitepaper/DaiDec17WP.pdf>.
- [4] K. Menger, “On the Origin of Money,” *The Economic Journal*, vol. 2, no. 6, pp. 239–255, Jun. 1892.
- [5] A. C. Pigou, “The Value of Money,” *The Quarterly Journal of Economics*, vol. 32, no. 1, pp. 38–65, Nov. 1917.
- [6] R. N. Cooper, R. Dornbusch, and R. E. Hall, “The gold standard: Historical facts and future prospects,” *Brookings Papers on Economic Activity*, vol. 1982, no. 1, pp. 1–56, 1982.
- [7] D. Duffie, “DuffieDigital and fast payment systems.”
- [8] JPMorgan Chase & Co., “J.P.Morgan coin announcement.” <https://www.jpmorgan.com/global/news/digital-coin-payments>.
- [9] “Libra whitepaper.” <https://libra.org/en-US/white-paper/>.
- [10] Tether Limited, “Tether whitepaper.” <https://tether.to/en/downloads/2016/06/TetherWhitePaper.pdf>.
- [11] CENTRE Consortium, “Centre whitepaper.” <https://www.centre.io/pdfs/centre-whitepaper.pdf>.

- [12] Charles Cascarilla, “PAXos whitepaper.” <https://account.paxos.com/whitepaper.pdf>.
- [13] LLC TrueCoin, “Trust token.” <https://www.trusttoken.com/trueusd>.
- [14] STASIS Foundation, “Stasis whitepaper.” <https://stasis.net/>.
- [15] Charles Cascarilla, “PAX gold whitepaper.” <https://www.paxos.com/paxgold/>, 2019.
- [16] Anthony C. Eufemio, “DigixDAO whitepaper.” <https://digix.global/whitepaper.pdf>.
- [17] Reserve Currency Solutions, “Globcoin whitepaper.” <https://globcoin.io/assets/pdf/whitepaper-Globcoin-v3.1.0.pdf>.
- [18] X8 AG, “X8currency whitepaper.” <https://x8currency.com/wp-content/uploads/X8-Project-TGE-Whitepaper.pdf>.
- [19] U. W. Chohan, “Are stable coins stable?”
- [20] T. B. Team, “The state of stablecoins.”
- [21] M. Dell’Erba, “Stablecoins in cryptoeconomics. From initial coin offerings to central bank digital currencies (cbdc).”
- [22] M. Lee, “Stablecoin: Yet another layer of cryptocurrency complexity,” *American Bankruptcy Institute Journal*, vol. 38, no. 9, pp. 36–37, 64, Sep. 2019.
- [23] A. M. Arian Klages-Mundt, “(In)stability for the blockchain: Deleveraging spirals and stablecoin attacks.”