Tikkun Coin

Stability is the Future

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General Overview

Foundation of Money

The purpose of the first cryptocurrency, Bitcoin, was to be a transactional currency where people could pay others in a decentralized way without worrying about issues related to double payment. This original idea remains unrealized as people are now holding Bitcoin as an investment or speculative asset, instead of as money.

To be as useful as money, a cryptocurrency must serve the following primary characteristics of money:

1. Medium of Exchange – This indicates that there are a significant number of merchants who are willing to exchange goods or services for this currency.
2. Store of Value – This is an asset that maintains its value such as gold or stable currencies such as the Dollar.
3. Unit of Account – In order for parties to exchange goods or services for a currency, they need to have a basis for prices. This is a unit of account.

There is an argument that cryptocurrencies are a store of value as the average price of assets like bitcoin have tended to increase yearly. However, the extreme volatility seen by bitcoin prevents bitcoin from being a reliable store of value. The volatility also makes it difficult to price goods and services for exchange since prices would need to be updated frequently to account for the changes in the value of bitcoin.

The high volatility coupled with slow transaction speeds and high transaction costs makes bitcoin a difficult currency to have widespread adoption.

Our coin, Tikkun Coin, aims to focus on solving the issue of high volatility by creating a cryptocurrency which maintains a relatively high level of stability. This concept will be discussed in more detail below.

Definition of Stability

Stability in a currency occurs when the change of value in the currency is sufficiently low and stable in order to not influence the economic decisions of households and firms. Instability in a currency causes people to change their spending habits based on their belief that the value of the currency will change dramatically. For example, in a deflationary environment, the value of the currency increases with time and therefore it is worthwhile for a holder of that currency to delay spending. While in a hyperinflationary environment, currency holders rush to purchase as much as possible before the value of their money is subject to significant decline.

Stability within Fiat Currencies

There is no such thing as a completely stable currency. Even the dollar, which is generally considered stable, experiences changes in its value relative to other currencies as well as a decline in purchasing power due to inflation.

Having a low but positive inflation is considered the ideal state for economic growth. Therefore, this change in dollar value has little impact on day to day decisions of the general population. Stability of a currency is one of the main functions of a Reserve Bank, which is performed by controlling the amount of money in circulation. This is done through a variety of mechanisms such as changing the repo rate, reserve ratio, or through the purchase or sale of government bonds.

Stability within Cryptocurrencies

In the realm of cryptocurrencies, most of these "currencies" are viewed more as speculative assets. Therefore, the majority of people trade them and wait for their value to appreciate. This speculation causes daily wild volatility swings in the market price of these coins which prevents people using these coins as currency to purchase groceries and other day to day items.
Any transaction which is time-related is also infeasible with a volatile currency. For example, an employee who receives a salary every month would not want to be paid in a volatile cryptocurrency as this would lead to risk of not affording rent one month etc.
Loans in cryptocurrency also cannot work as both parties are exposed to significantly high currency risk.

There are currently many attempts to create a stablecoin which fall under the following three broad categories:

- Fiat-Collateralized e.g. Tether, TrueUSD
- Crypto-Collateralized e.g. BitAssets, MakerDAO
- Non-Collateralized e.g. Basis Coin, Carbon

These examples will be further analyzed below with various case studies for each category.

Fiat-Collateralized Cryptocurrency

The general system utilized by a fiat collateralized stablecoin is for every stablecoin in circulation to be backed by 1 unit of a fiat currency, with the US dollar (USD) being commonly used for pegging. The fiat currency is then held by a custodian and in theory should be redeemable to token holders. This system can be seen in the Figure 1 below.

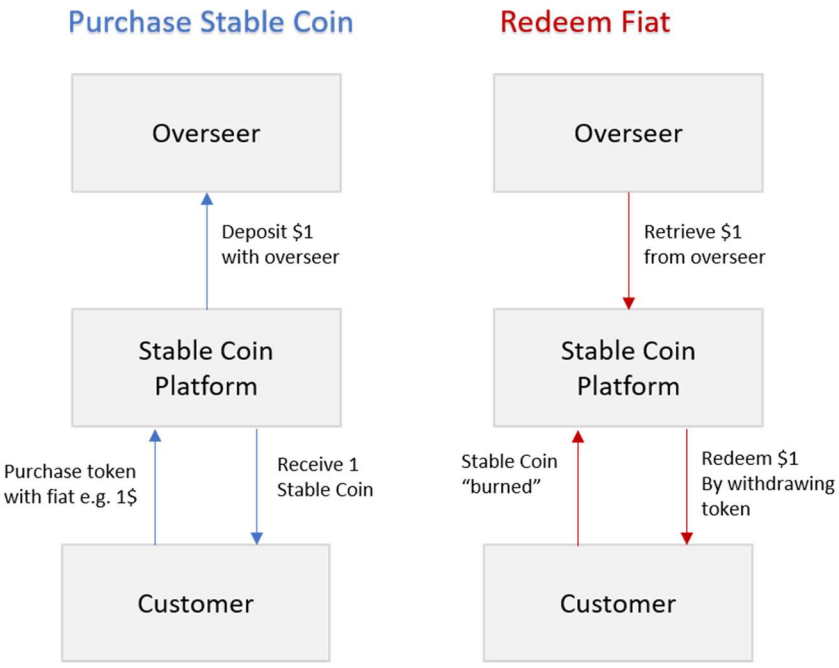

Figure 1: Fiat Backed Stablecoins

This system is easily understood which generates a wide market appeal. However, it is necessary to trust the custodian of the underlying assets which violates the decentralized aim originally intended by cryptocurrencies. In order to retain trust in the custodian, audits of the underlying fiat reserves are necessary which adds additional costs. Another issue with this method is the inability to scale to mass adoption due to the requirement of holding collateral for every token issued.

Case Study: Tether

Tether is a stablecoin that is issued on the Bitcoin blockchain via the Omni Layer protocol. Each tether unit issued into circulation is backed in a one to one ratio with the US dollar. The Omni layer creates and destroy digital tokens, tracks and reports the circulation of tether as well as enabling users to transact and store tether. Tether implements proof of reserve to show that the amount of token in circulation correspond to the currency in their reserve. The USD reserves are held in a Tether Limited's bank account.

Strengths

- Tether has maintained a strong record of stability around the peg of $1.

Weaknesses

- There is no transparency about how many USD Tether holds due to the absence of audits.
- This system has reliance on legacy banking systems and trusted third parties.
- Due to trusting Tether to be the custodian of the dollars, there is a single point of failure if Tether acts unethically.
- It is difficult to redeem Tether for dollars and can only be done through certain exchanges.

Case Study: TrueUSD

Similar to Tether, TrueUSD is backed by a USD at ratio of 1:1. TrueUSD uses the Ethereum blockchain (using the ERC20 standard) to create their tokens and implements a Know Your Customer (KYC)/Anti-money Laundering (AML) check to anyone who wants to buy or redeem their tokens. The USD reserves are held in an escrow account to create trust and allow for auditability.

Strengths

- TrueUSD's Bank account holdings are published on a monthly basis promoting transparency.
- User can transact directly with the trust firm's bank and therefore can purchase and redeem dollars easily.
- There are regular evaluations by trusted third party firms, to ensure best security practices.

Weakness

- If a user fails the KYC/AML check, they can't redeem their tokens or purchase TrueUSD.
- True USD are currently considered securities by Security and Exchange Commission (SEC).
- There are scalability issues associated as the amount of USD held in reserves increases.

Crypto-Collateralized Stablecoins

Crypto-collateralized stablecoins are backed by a cryptocurrency or a basket of cryptocurrencies. By using crypto-assets as collateral, the centralization concerns of fiat-backed currencies are addressed as the audit trail of collateral can be accessed from the blockchain. Therefore, these stablecoins are decentralized and fully auditable on the blockchain. The prime reason for a stablecoin is to provide price stability but in this case the stablecoins are being backed by historically volatile cryptocurrencies. Therefore, this system requires the ratio of collateral to stablecoin to be greater than 1 in order protect the stablecoin value in downturn scenarios. This overcollateralization is capital inefficient which makes this system difficult to scale. There is also the issue that many of the available cryptocurrencies have correlated prices, which makes diversification of risk through a basket of cryptocurrencies relatively ineffective. Many stablecoins within this market rely on complex mechanisms and incentive models to ensure stability which may deter mainstream adoption. A simplified diagram of this system in displayed below in Figure 2.

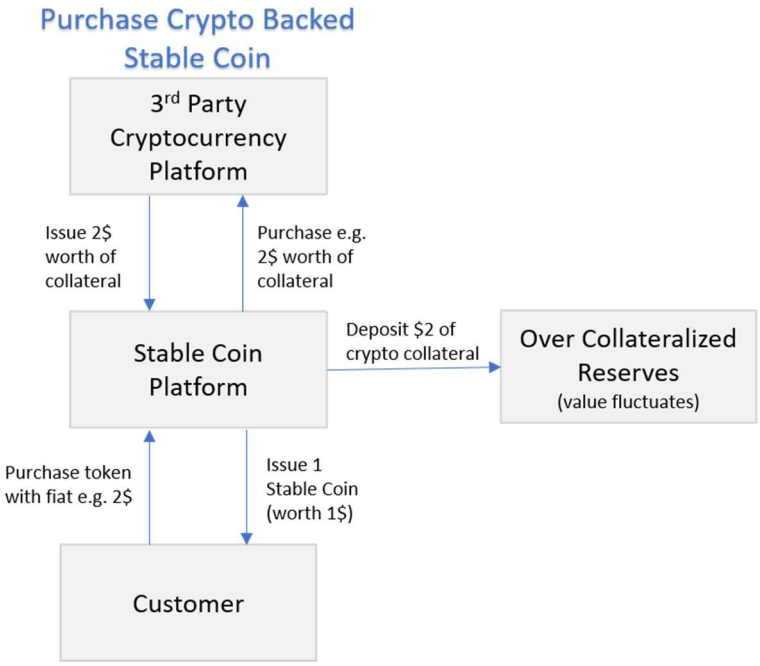

Figure 2: Crypto - Collateralized Stablecoin Mechanism

Case Study: BitAssets

BitAssets is the earliest type of crypto-collateralized stablecoin and was formulated around 2014 by BitShares. The aim of BitShares technology is to facilitate the trade of financial assets and services in a decentralized digital manner with the use of smart contracts and a blockchain-based ledger. BitShares, denoted BTS, are tokens used as a base medium of exchange on this platform. BitAssets are a type of digital assets tradable on this platform that are pegged to their physical world versions and collateralized by BitShares in a ratio greater than one. These assets are also referred to as smartcoins or market-pegged assets. For example, BitUSD is a stablecoin that is always meant to be worth at least 1 USD. BitEUR and BitGOLD are further examples of such assets

that are pegged to the Euro and gold, respectively. BitShares considers stability to be "a predictable price with reduced volatility" (Schuh and Larimer, 2015).

The stablecoin is designed as follows. A user buys BitUSD in exchange for BitShares as collateral in a contract for difference. The value of the collateral provided needs to be more than 100% of the value of BitUSD bought. This should increase public confidence in the liquidity of the contract. If the value of the collateral increases, then no action needs to be taken, although the holder may reduce the collateral. If the value of the collateral decreases below a certain threshold, then a margin call is automatically executed where the least collateralized contract on the network is settled and the BitUSD is exchanged for the corresponding value of BitShares. These margin calls incentivize users to keep sufficient collateral (Stichting BitShares Blockchain Foundation, 2018).

BitAssets are considered to be quite complicated structures for the average end-user, however, the same could be said of fiat currencies which the general public use without a full understanding of the technicalities.

The example in Figure 3 below illustrates how BitUSD can be used. User A achieves stability whether the price of BitShares increases or decreases, while User B recognizes a profit only if the price increases.

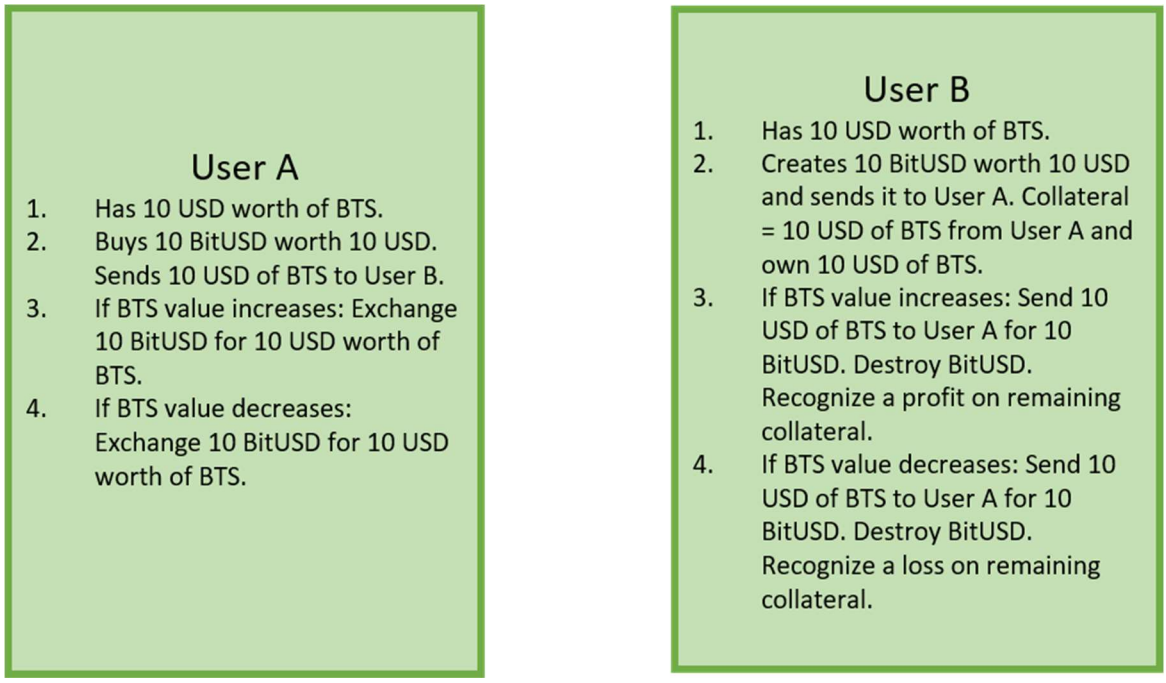

Figure 3: How BitShares can be used

Major drawbacks to the use of BitAssets are:

- It can be over-collateralized with no income being earned on the collateral.
- It is dependent on the stability of the BitShares price. If the price decreases fast enough that the least collateralized position cannot be covered, then all contracts are liquidated.

Moreover, the reliance of these stablecoins on the BitShares network has both advantages and disadvantages.

The advantages include:

- Decentralised global network.
- Auditable and transparent.
- More trustless than traditional financial services.
- Uses a delegated proof of stake algorithm which is faster and more efficient than proof of work.
- Better scalability than bitcoin.

The disadvantages include:

- It requires a smooth running of the platform, especially if the stablecoin is to be used in day-to-day activities.
- Special shareholders called witnesses produce blocks and provide information on market prices.
- Consistent monitoring of price feed is required to ensure that there is no price manipulation.

Case Study: MakerDAO Dai

Dai is a crypto-collateralized stablecoin produced by MakerDAO and is based on smart contract technology of the Ethereum blockchain. It is generated with a smart contract called a collateralized debt position (CDP) which exchanges the Dai for ether as collateral. The ratio of ether to Dai is required to be greater than one. The CDP can be viewed as a securitized loan of the stablecoin to the user who may return the currency at a later time for the equivalent value of their collateral. This platform also consists of Maker tokens which are used to manage fees and incentivize token holders to keep the system stable.

The Dai is kept stable at a ratio of 1:1 to the US Dollar. This is achieved by token holders adjusting the collateral to coin ratio which affects the supply and demand for Dai in the market, and hence enforcing stability. Furthermore, when ether is below a certain threshold, riskier CDPs may be liquidated and the ether collateral may be sold on to another user for Dai.

Additional features of the system include a stability fee which is charged to the borrower of the CDP who needs to pay this with Maker tokens in order to claim the collateral. Also, there is a maximum amount of debt that a CDP can lend which allows for the collateral to be diversified and not concentrated to a specific contract (MakerDAO, 2017).

The advantages of this stablecoin include:

- The platform is decentralized and auditable.
- No fiat currency reserves are required.
- Collateralization ratio and debt ceiling can be used to manage risk.

Some disadvantages of this stablecoin:

- Token holders specify risk elements such as the debt ceiling, collateralization and liquidation ratios through weighted voting. Even with incentives, this needs to be carefully monitored to avoid any manipulation.
- High amount of collateral can be required which could lead to over-collateralization.
- The price of ether backing the stablecoin is still unstable, and so the risk may be transferred but not mitigated.

Non-Collateralized Stablecoins

Non-collateralized stablecoins are based on the quantity theory of money which is the principle used by central banks to implement price stability. The quantity theory of money states that if you have a predefined basket of goods and services which costs 100 USD, and you doubled the amount of money that people have in their bank accounts then, in the long run, that same basket of goods will cost 200 USD. Central banks use expansionary and contractionary monetary policy to create and remove money from the system in order to keep prices stable. An inflationary spiral is characterized by the continuous rise in prices due to higher wages and people having more money to spend. The opposite of this is a deflationary spiral. This occurs when the price of goods drops due to people delaying the purchase of goods owing to the expectation that the currency gains value and strength over time. This drop in prices causes people to put off purchases in the hope that prices will drop even more, which in turn causes the prices to drop even further. The central bank intervenes by decreasing (contracting) the supply of money in the case of an inflationary spiral to bring down the price of goods and increasing (expanding) the supply of money in a deflationary spiral in order to bring prices back up.

To implement this theory in a digital cryptocurrency environment is complex and uses an algorithm to mimic how a central bank increases and decreases the supply of money by buying bonds and selling bonds respectively. By using a transparent and predictable algorithm to control money supply, this technique aims to maintain currency stability. However, as there is no collateral backing the system, if users lose faith in the ability of the coin to buy back bonds in the future, the stablecoin will go into a downward spiral and lose its value. This lack of collateral does make this system more scalable though, as it doesn't need to hold assets backing its value.

A visual representation of a basic system is shown in Figure 4 below.

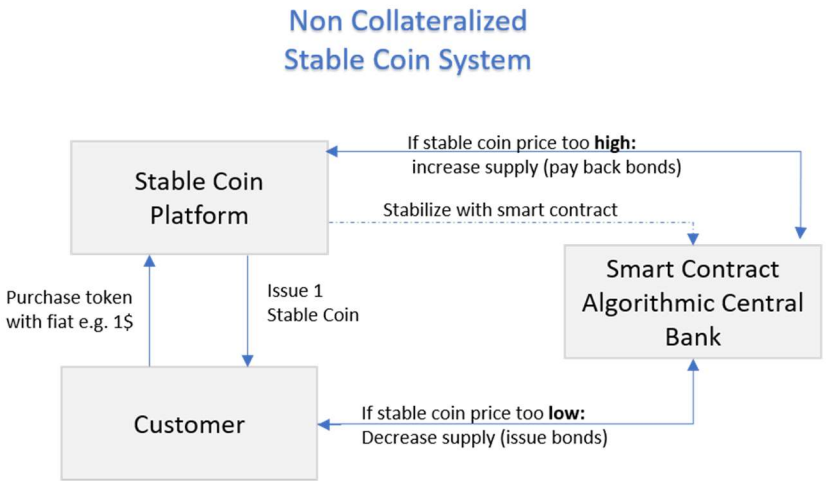

Figure 4: Non Collateralized Stablecoin system

Case Study: Basis Coin

How Basis works: Overview

Basis has three tokens which it uses to expand and contract their supply of their stablecoin Basis i.e. Basis, Bond tokens and Share tokens. Basis is the primary token that is used for exchange. They are pegged to the USD and their supply is contracted and expanded algorithmically in order to maintain the peg.

Bond tokens are auctioned out whenever the supply of Basis needs to be contracted. The bonds are auctioned off for less than 1 Basis and they are redeemed from the buyer for 1 Basis. The bonds can be redeemed when the blockchain is issuing new Basis (i.e. expanding the money supply), the bond has not expired (i.e. it is less than 5 years old), and if all the bonds ahead in the first in first out queue have been redeemed or expired.

Expansion

Bonds are paid in First-In-First-Out (FIFO) order. The number of outstanding bonds is ordered according to when they were purchased, starting with the oldest. The blockchain creates new Basis and converts bonds to basis at a rate of one-for-one. The FIFO order in which the bonds are redeemed and the fact that they expire incentivizes Basis holders to purchase bonds as soon as the auction is opened.

Contraction

To decrease supply of Basis the blockchain auctions off bonds. These bonds are bought for less than 1 Basis and are redeemed at some future point for 1 Basis. Auction participants specify the amount they want to pay for a bond and how many bonds they want at that price. It considers the orders with the highest bids and converts these basis holder Basis into bonds.

Share tokens have a fixed supply and are not pegged to anything. When new basis is being issued by the blockchain, shareholders receive basis pro-rata once all the outstanding bonds have been redeemed.

Case Study: Carbon

In contrast to Basis, Carbon uses a two-token system to implement its price stability, the Carbon Stablecoin (CUSD) and Carbon credit. Like Basis, the CUSD is the primary medium of exchange. Instead of Bonds, the Carbon protocol auctions off Carbon Credit in order to contract the money supply. The Carbon Credits are redeemed when the money supply is being expanded. Unlike Basis, which uses a First-In-First-Out queue for the redemption of bonds, Carbon allows holders of Carbon Credit to sell their Credit in the secondary market. This protocol also requires the active participation of Carbon holders in the market.

The advantages and disadvantages of the non-collateralized system as a whole are listed below.

Strengths

- This method does not require collateral, hence is the most scalable method.

Weaknesses

- This method requires continuous growth of the platform for the protocol to work.
- If the holders of the coin do not believe that the stablecoin supply will need to be expanded, they will not buy the bonds or credit tokens, which will lead to the failure of the protocol.
- More subtle economic issues are not considered as the smart contracts work algorithmically.

Tikkun Coin

Overall Description

Tikkun is translated as to “fix” or “repair” which is based on the concept of repairing the world. This is our mission at Tikkun. We are going to “repair” the cryptocurrency volatility, thereby repairing the original idea of cryptocurrencies as money.

The stable cryptocurrency we are creating is called Tikkun Coin. The underlying system that will be used is to backup all Tikkun coins with a 1:1 ratio of South African Rands i.e. Tikkun coin will be a fiat-backed cryptocurrency. Our audience will be able to purchase tikkun coins by depositing money into the Tikkun bank account which will automatically initiate a smart contract to create tikkun coins and issue them to the buyer. The money received will then be divided into a cash and liquid South African government bond portfolio. This portfolio will have bi-monthly audit reviews to ensure our system is transparent and can be trusted. The Tikkun Coin owners will receive interest on their holdings based on how long the coin is held. A portion of the interest will be kept in order to fund audits and run the portfolio. If a person wants to redeem their Tikkun coins for Rands, the coin supply will decrease as the coins are “burned” and the amount redeemed will be paid into the redeemer’s bank account. This is summarized in Figure 5.

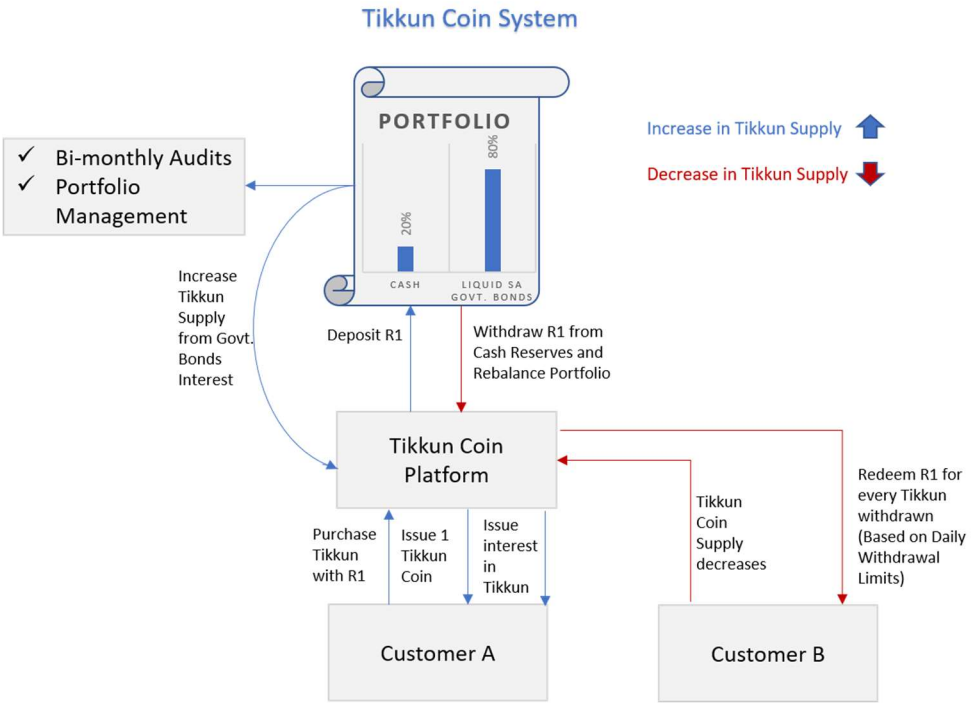

Figure 5: Tikkun Coin’s stability mechanism

Target Audience

Tikkun coin is targeting the tech savvy millennial generation who don't necessarily have an economics background. Therefore, the Tikkun coin is based on the simplest stablecoin mechanism which is easily understood and therefore can also attract people who are more skeptical about cryptocurrencies. Tikkun coins will be pegged to the South African Rand, which allows South Africans to partake in cryptocurrency market with hedging based in Rands to reduce exposure to the rand dollar volatility.

Goals

The main goals for Tikkun Coin are:

- To ensure stability of Tikkun.
- To provide an auditable and transparent portfolio of assets backing Tikkun.
- To encourage people to save their money through receiving interest payments.
- To create a network of partners who accept Tikkun as payment.
- To allow South Africans to get involved in the cryptocurrency space in a safer and practical way.

By achieving these goals, we believe that Tikkun coin will have utility as a way to pay for goods and services and be a platform for other services to become viable on the blockchain, such as loans and other financial services.

Business Mechanism

Income

When a customer buys a Tikkun Coin, the rand value that he deposits will be placed into Tikkun's cash and bond investment portfolio. The investment portfolio will earn yields based on the interest received by the government bonds. A yield of 1.5% on the portfolio will be the main source of income for our business while the rest of the received yield will be reinvested into the portfolio with the corresponding amount of Tikkun tokens being issued to Tikkun holders based on the time they have held their tikkun tokens. For example, if the yield on the portfolio is 7%, 5.5% return will be reinvested into the portfolio with the corresponding amount being issued in the form of Tikkun coins. The remaining 1.5% will be retained to cover expenses. The interest that Tikkun holders will earn will incentivize people to hold onto their Tikkun coins instead of converting Tikkun into money to be deposited into a 0% interest current account. This incentive to hold Tikkun is important as the larger our portfolio base is, the more income will be earned to cover our expenses and increase profitability.

Expenses

Our main expenses will be the cost of audits as well as the transaction fees of buying and selling bonds. Since we will be engaging in an Asset Swap (see Portfolio Management), the fee that the

bank will charge on converting fixed coupon payments to the floating payments and any early termination fees will also be an expense. The transaction costs of portfolio management will be significantly lower through our potential partnership with an asset manager. Another key expense will be the gas costs of calling smart contracts on the Ethereum blockchain.

Portfolio Management

Our Portfolio will initially be divided into 20% liquid cash reserves and 80% South African Government Bonds. One of the key requirements for our portfolio is to have liquidity. This ensures that if many Tikkun Holders want to convert their Tikkuns to Rands, the bonds can be sold to provide the necessary cash reserves. All withdrawals will be taken from the cash reserves before any bonds will be sold. As this is a dynamic market of people buying Tikkun and reclaiming Rands, it will be difficult to maintain strict proportion 20% cash to 80% bonds. Therefore, the cash proportion will work within a band of 17% to 22%. When the level of cash drops to 17%, bonds will be sold to get the cash reserves up to 20% of the portfolio. When customers buy Tikkun and deposit money with us, we will invest the excess cash when the upper band of 22% cash is reached.

Government Bonds are subject to interest rate risk and therefore the value of our portfolio is vulnerable to increases in yields which will result in a decline of our portfolio value. It is vital to keep the value of our portfolio constant because we need to guarantee that there is a 1:1 ratio of Tikkun to our entire portfolio. Therefore, we plan to engage in an Asset Swap Agreement with a bank. This means that we will exchange our fixed coupon payments for floating payments based on 1-month JIBAR. This transforms the risk of our portfolio losing value to the risk that we may receive lower yields. This is an appropriate trade off because the importance of being a trusted overseer requires us to maintain the value of our portfolio.

Our portfolio of bonds will be a combination of short term bonds and long-term bonds. Based on the South African yield curve, bonds with a longer term to maturity have higher yields. A large proportion of the bonds held will be liquid, shorter maturity bonds which generally follow the GOVI index and will be rebalanced monthly. A portion of the portfolio will also be invested in inflation linked bonds to prevent the eroding of the portfolio's value in terms of Rand purchasing power.

Liquidity

One of our major areas of focus is liquidity i.e. the ability to quickly convert our portfolio to Rands and vice versa. The South African bond market settles trades at time t+3 business days which creates a delay in selling and buying bonds. It is therefore infeasible to liquidate our portfolio into cash if there was a "run on the banks" type scenario. To reduce this risk, we will have clear conversion limits about how much a person can convert from Tikkun to Rands in 1 day such as R5000 a day. The amount of Tikkun converted will take t+3 days to transfer to the user's bank account. This preventative measure will help stagger withdraw requests which allows for the bond portfolio to be liquidated in an orderly fashion if there is a sudden desire to convert Tikkun into Rands. By clearly communicating our policies, this delay in converting from Tikkun to Rands will not alarm people.

By maintaining a cash reserve of 20% of the portfolio, day to day conversions from Tikkun to Rands are managed without having to quickly sell off any bonds. This buffer should also create a sense of trust, that people will have access to the Rands backing Tikkun.

Another factor that we need to consider is if there will there be sufficient buyers of our bonds in the situation of liquidating a large proportion of our portfolio. As at 31 March 2017, the market value of all debt listed on the JSE amounted to R2.4 trillion with government bonds accounting for 65.7% of debt issued (Treasury, 2017). We will initially cap our Tikkun coin sales at R1.0 billion so we can sufficiently manage our underlying portfolio and liquidate our portfolio with relative ease. Our portfolio will therefore be dwarfed by the size of the debt market and therefore any sale of bonds will not influence the market yield.

Trust and Auditability

A major concern with a fiat-backed cryptocurrency is that a centralized body governs over the fiat which is backing the coin. It is therefore essential that this centralized body is trustworthy and transparent.

The way Tikkun is addressing this challenge is by linking with other trusted parties such as an accredited asset manager and other financial institutions. These partnerships still need to be finalized before the launch of Tikkun. The names of these companies will only be released once negotiations are completed. Through partnering with an asset manager, we will be able to trade with their Share Asset License and be compliant under the Collective Investment Schemes Control Act (CISCA). Co-operation with regulators and compliance within the regulations is one of our key focuses. We will gain the necessary skills and insight in this regard from our partner asset managers who are well versed in this industry.

Bi-monthly audit reviews will be performed by a trusted auditor such as Grant Thornton. And a full audit will be completed yearly. All audits will be available on our website.

We aim to have a real-time view of our portfolio which shows exactly which bonds are invested in as well as the amount of cash reserves. This will also be available from our website and will allow anybody to view the reserves of Tikkun instantly thereby increasing credibility. This addition to the website is currently under construction and will only be added to the website once we have launched Tikkun and are managing the bond portfolio.

As there have been other fiat-backed stablecoins which have had transparency issues, there is more skepticism with this system. We will focus on building our reputation through being consistent in allowing Tikkun to Rand conversions and by issuing our audit reviews timeously.

Stability Incentives

For a stable-coin to achieve stability, all the incentives need to align correctly. The incentives for the different parties will be discussed below.

Tikkun Holders

For the system to run more efficiently, it is better for Tikkun bought to remain in the system for longer as this reduces how often the portfolio must be reallocated between cash and SA

Government bonds. The interest that people receive by holding Tikkun is the incentive for people to continue to hold Tikkun, rather than converting Tikkun to Rands to go into a non-interest bearing current account. Our long-term view (once we have built our reputation of stability and integrity) is for shops and restaurants to accept payment in the form of Tikkun. This ability to earn safe, reliable interest on their holdings as well as be able to spend Tikkun on day to day items will make Tikkun an appealing second option to current accounts. There is no incentive for Tikkun holders to sell their Tikkun for less than their 1:1 peg on an exchange as this would be equivalent to selling R1 for less than R1.

Tikkun Buyers

As the value of Tikkun is backed by Rands and liquid reserves, there is no incentive to pay more than R1 for a Tikkun as they will only be able to convert a Tikkun into R1.

Tikkun Trusted Portfolio

Our team's personal reputation is on the line if the Tikkun portfolio is not trustworthy, auditable and ethical. This could have long term negative impacts on our future careers and this incentivizes us to be transparent and integrity focused. Since we are not having an ICO to raise funds, all purchases of Tikkun will be based on word-of-mouth and building a strong reputation. We are therefore incentivized to handle our portfolio transparently, so we can grow our investments in SA bonds to a sizeable amount as this is the source of our income stream.

Interest

Since all transactions of Tikkun are on the blockchain, it is possible to track exactly how long a person holds Tikkun and for them to be compensated accordingly with interest. The interest will accrue to holders daily but the issuance of new Tikkun coins as interest will be on a specific day monthly. Therefore, even if you have bought goods with your Tikkun and no longer hold Tikkun, you will still receive interest in Tikkun for the portion of the month that you did hold Tikkun. This is accruing of interest is necessary because if people would only receive interest if they held Tikkun on a specific day (such as having a books close date), it would introduce volatility into the Tikkun price. The interest issued in Tikkun will correspond to the reinvested interest received by the SA Government bonds and therefore will be backed 1:1 to the Rands invested in the portfolio.

The interest received from the SA government bonds will be equivalent to the 1-month JIBAR with a spread and not the coupon amount because of the Asset Swap arranged with the bank. After the 1.5% cut of the interest is retained to manage the business, the rest of the interest is reinvested and Tikkun Holders will receive their proportionate amount of interest. Because of the fluctuation of the yield, the monthly interest issued will fluctuate from month to month. However, this fluctuation in yield receipts enables Tikkun to keep the value of the portfolio stable.

Mechanics of the Portfolio

Bonds

We consider the following South African Government Bonds available as at 31 July 2018. The below table includes the bond code, type of bond, coupon rate, term, maturity date and coupon dates. Type V denotes a vanilla bond and type CPI denotes an inflation-linked bond that is dependent on the consumer price index. The coupon rate is the interest rate per annum paid out semi-annually. The term is the remaining time to maturity as at 31 July 2018, rounded up in years.

Bond code	Type	Coupon rate	Term (y)	Maturity date	Coupon date 1	Coupon date 2	Re-based CPI	Base CPI
R204	V	8.000%	1	2018-12-21	2018-06-21	2018-12-21		
R207	V	7.250%	2	2020-01-15	2019-01-15	2018-07-15		
R208	V	6.750%	3	2021-03-31	2018-03-31	2018-09-30		
R2023	V	7.750%	5	2023-02-28	2018-02-28	2018-08-31		
R186	V	10.500%	10	2027-12-21	2018-06-21	2018-12-21		
R2030	V	8.000%	12	2030-01-31	2019-01-31	2018-07-31		
R213	V	7.000%	13	2031-02-28	2018-02-28	2018-08-31		
R2032	V	8.250%	14	2032-03-31	2018-03-31	2018-09-30		
R2035	V	8.875%	17	2035-02-28	2018-02-28	2018-08-31		
R209	V	6.250%	18	2036-03-31	2018-03-31	2018-09-30		
R2037	V	8.500%	19	2037-01-31	2019-01-31	2018-07-31		
R2040	V	9.000%	22	2040-01-31	2019-01-31	2018-07-31		
R214	V	6.500%	23	2041-02-28	2018-02-28	2018-08-31		
R2044	V	8.750%	27	2045-01-31	2019-01-31	2018-07-31		
R2048	V	8.750%	31	2049-02-28	2018-02-28	2018-08-31		
R212	CPI	2.750%	4	2022-01-31	2019-01-31	2018-07-31	87.36	70.05
R197	CPI	5.500%	6	2023-12-07	2018-06-07	2018-12-07	51.34	41.17
R210	CPI	2.600%	10	2028-03-31	2018-03-31	2018-09-30	70.46	56.50
R202	CPI	3.450%	16	2033-12-07	2018-06-07	2018-12-07	60.63	48.62

Table 1: SA Government Bonds as at 31 July 2018

As the amount of coin issued grows and we are able to buy more bonds, we structure our bond portfolio as shown in the table below. Most of the portfolio is made up of vanilla bonds and about 10% consists of CPI R197 bonds. We diversify the vanilla bond portion such that we have 50% short term (1-5 years), 30% medium term (6-10 years) and 10% longer term (> 10 years) assets. The rate per term segment is the average coupon that we can expect for bonds in that term range.

Type	Term	Rate	Distribution
V	Short (1-5y)	7.5%	50%
V	Medium (6-10y)	10.5%	30%
V	Long (11+y)	8%	10%
CPI R197	6y	5.5%	10%

Table 2: Proposed bond distribution

Note that bonds are usually traded in units of 1 million rand, so we only purchase or sell bonds in multiples of this amount. Furthermore, if the cash value is below 17%, we sell bonds in the given units even if it results in a cash distribution greater than 22%. This ensures that we hold sufficient cash in our portfolio to allow for larger withdrawals.

Interest Received

Depending on the amount and type of bonds we have invested in, we may only receive coupons in particular months. Even with a diversified bond portfolio, there are currently no coupons paid out in April, May, October and November. Thus, we arrange for zero-coupon swaps with a financial institution to swap the fixed semi-annual coupon rates on the vanilla bonds for a floating monthly JIBAR rate. This allows us to distribute interest to coinholders on a monthly basis. The below graph shows the 1-month JIBAR rates at the end of each month in the one year period Aug 2017 to July 2018 and it is fairly stable (JSE, 2018).

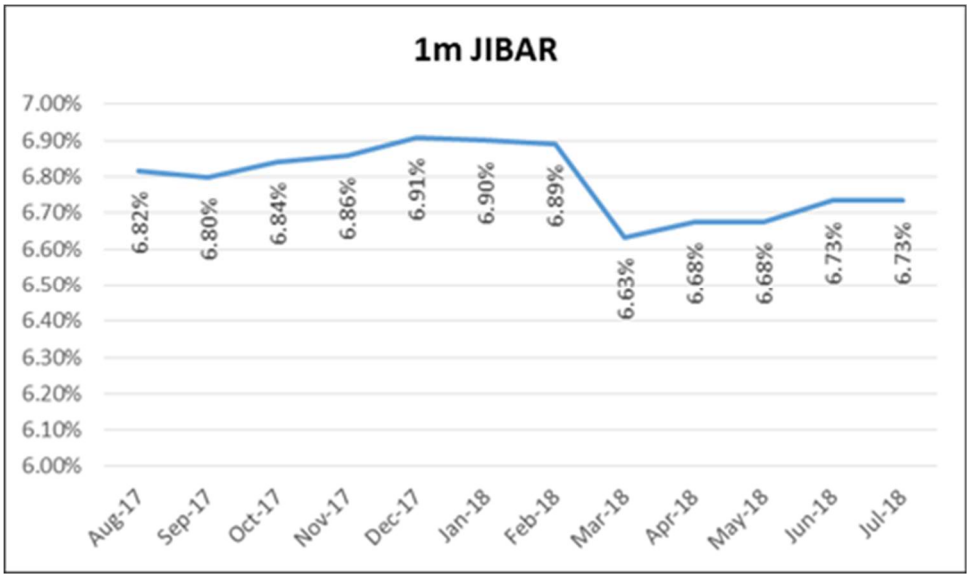

Figure 6: 1-month JIBAR rates from Aug-2017 to Jul-2018

Since the bond coupon rates are generally higher than JIBAR rates, a spread may be added to the floating rate to ensure that the swap is traded at fair value. The floating leg of the swap consists of monthly payment dates defined from the next coupon date back to the effective date. The swap resets in advance and settles in arrears. If there is a front short stub in the profile, then the 1-month JIBAR at effective date is used to calculate the interest received in that period. We consider multiple zero-coupon swaps instead of longer-term swaps so that we can more easily terminate the swap and sell the bond if we require more liquidity. An early termination option is

arranged with the swap, and if this is exercised, a fee would have to be paid that takes into account the present value of the swap.

The next image illustrates an example of a zero-coupon swap for a bond with coupon 8% and 1-month JIBAR forward rates. We pay the bond coupon to the issuer of the swap on the relevant coupon date and in turn we receive interest payments on a monthly basis.

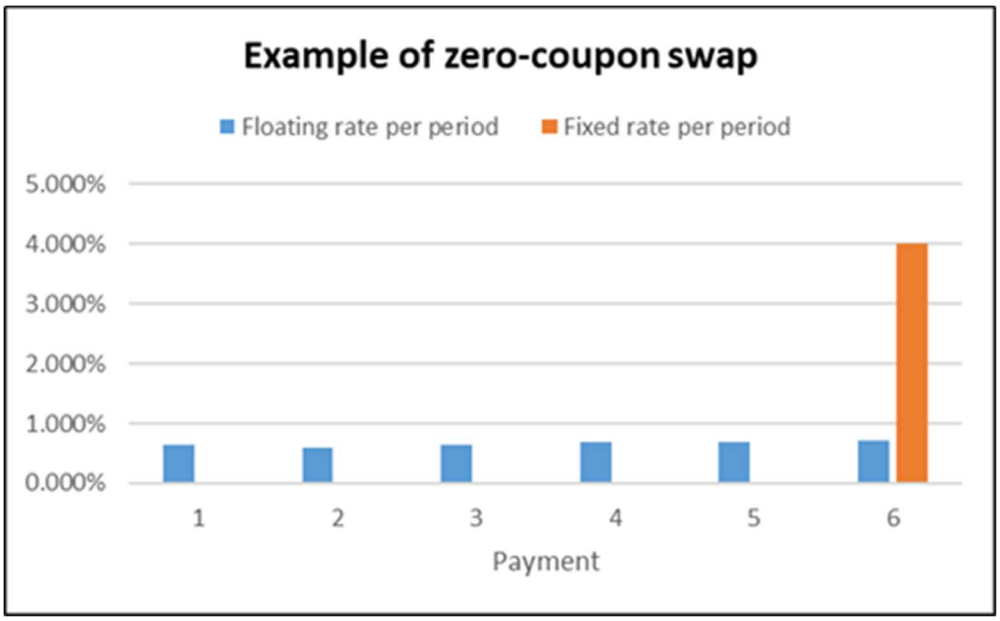

Figure 7: Example of fixed and floating legs in a zero-coupon swap

For the CPI R197 bonds, we receive the coupon semi-annually and this payment is adjusted for inflation. The adjustment factor is the ratio of the CPI at coupon date to the base CPI of 51.34 index points. The CPI at July 2018 is 108.5 index points (Statistics SA, 2018), so any coupon due would be calculated as

$$\left(\frac{108.5}{51.34}\right) \times \left(\frac{5.5\%}{2}\right) \times Nominal\ Amount.$$

Interest Issued

Our net interest in a month is the interest received from the bond swaps deducted by fees and operating expenses. This interest amount is used to determine a coin interest rate that will be applied in the smart contract to distribute interest to coinholders. A user can obtain interest even if they held the coin for only part of the month. So, the coin interest rate should satisfy the following equation

$$Net\ Interest = \sum_{holders} \left(\frac{rate}{12}\right) \times Amount\ Held \times Fraction\ of\ Month\ Held$$

We can determine the interest rate by taking the net interest as a percentage of the total time-weighted coin amount across all coinholders. An example of how to calculate the time-weighted coin amount is shown in the table below.

Transaction	Amount	Day	Time held	Month fraction	Amount X Month fraction
Opening total	10 000 000	0	30	1.00	10 000 000
Deposit	3 000	5	25	0.83	2 500
Deposit	1 000	10	20	0.67	667
Withdraw	1 000	15	-15	-0.50	-500
Withdraw	2 000	20	-10	-0.33	-667
Closing total	10 001 000	30			
					10 002 000

Table 3: Calculation of time-weighted coin amount to determine coin interest rate

If the interest to be issued is 50 000, then the implied coin interest rate is about 6% per annum.

Potential Partners

Tikkun is not doing an ICO because the volatility of the ether price on the ethereum network may cause the amount raised to decline in value before we are able to convert the ether to Rands. This could result in not all Tikkun being backed by Rands and the loss of stability of Tikkun coins.

Therefore, we plan to access the market through strategic partnerships. As mentioned earlier, we aim to work together with an accredited asset manager who will work on our portfolio management. We also aim to work with one of the major Banks such as FNB or Standard Bank. The bank we end up working with will be the custodian of our 20% cash portfolio and will be able to create appropriate Asset Swaps needed to maintain our portfolio value. As we are encouraging saving among the youth, who notoriously have a low savings rate, we aim to also partner with the South African Reserve Bank in order to provide more credibility and trustworthiness to the Tikkun brand and stay abreast of relevant regulations.

As we aim to be a functioning form of exchange where people can purchase goods or services, we aim to partner with various shops and restaurants to accept payment in Tikkun. We will start with shops and restaurants who are more tech savvy and are already accepting payment through channels such as SnapScan. These places are more likely to be forward thinking and able to implement this new payment channel through existing means.

Future Considerations

The blockchain, especially the stablecoin area, is a very exciting space to be in. Because of the constant movement and innovation in this area, we will need to do constant research and stay abreast of regulation requirements as well as general best practice within the industry. Our culture is very forward thinking and we are happy to adapt if necessary. Here are a few areas we are considering in our future development and growth of Tikkun.

- Partner Expansion: Our focus will initially be on increasing our partnership base with retailers and other trusted financial institutions. This is necessary for us to create brand awareness and legitimacy.
- Exchange Listing: We intend to list on a cryptocurrency exchange such as Luno so that our customers have more freedom to trade Tikkun.
- YouTube videos: As our audience may not have a strong foundation with cryptocurrencies, we aim to launch a YouTube channel which explains more about the industry and demo videos to show how to buy/transfer and sell Tikkun. We will use this channel to gain more credibility and to attract customers.
- Simple Front End: Our current front end relies on buyers having downloaded MetaMask and other plugins to transact with Tikkun. As downloading these plugins can deter people from investing in Tikkun, we aim to develop a front-end which allows for simple access to our platform without the necessity of the current downloads.
- Other Blockchains: If the Ethereum blockchain becomes an ineffective or slow platform for our users to transact with, we will consider moving to another blockchain which has faster transaction times and scales better. In the interim, we will continue doing research into other blockchains such as Stellar.
- Mobile Application: We are working on the development of a mobile application for Tikkun. This will enable us to reach more mainstream adoption and make it simpler for our customers to buy Tikkun or redeem Rands.
- Other Tokenization: Once Tikkun has established a trusted reputation through transparency and consistent audit reviews, we will look at the possibility of tokenization of other real world assets within South Africa such as property.

References

Schuh F. and Larimer D., 2015. *BitShares 2.0: Financial Smart Contract Platform*. [Online]
Available at: http://docs.bitshares.org/bitshares/papers/index.html
[Accessed 15 July 2018].

Stichting BitShares Blockchain Foundation, 2018. *The BitShares Blockchain*. [Online]
Available at: https://www.bitshares.foundation/papers/BitSharesBlockchain.pdf
[Accessed 15 July 2018].

MakerDAO, 2017. *The Dai Stablecoin System*. [Online]
Available at: https://makerdao.com/whitepaper/DaiDec17WP.pdf
[Accessed 15 July 2018].

Treasury, N., 2017. *Debt Management Report 2016/2017*. [Online]
Available at:
http://www.treasury.gov.za/publications/other/Debt%20Report/Debt%20Management%20Report%202016-17.pdf
[Accessed 24 07 2018].

Johannesburg Stock Exchange, 2018. *JIBAR Rates Report*. [Online]
Available at: https://www.jse.co.za/downloadable-files?RequestNode=/Safex/mtmdata
[Accessed 02 09 2018].

Statistics SA, 2018. *CPI History*. [Online]
Available at: http://www.statssa.gov.za/publications/P0141/CPIHistory.pdf?
[Accessed 02 09 2018].