

# Algorithmic Monetary Policy for a Stabilized Token

John P. Conley  
Vanderbilt University  
and  
Geeq.io

**Macro.wtf**  
**San Francisco**

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# Tokenomics vs. Monetary Policy

Tokenomics is about the initial state.

Monetary policy is about what happens to the tokenbase after the initial tokens are created.

Tokenomics is driven primarily by the role the token plays on the platform, the business model of the platform developers, and the expectations and preferences of the potential token buyers.

On the other hand, crypto and fiat currencies follow the same basic macroeconomic/monetary rules.

There are two things that fundamentally drive token value.

# Quantity Theory of Money

As you all know, the QTM is an accounting identity:

$$P = \frac{D}{MV}$$

M = Money supply (number of tokens)

P = Price of tokens in terms of dollars.

V = Velocity of the token (number of times a token is transacted per day).

D = Dollar value of total transactions per day

# Efficient Market Theory

Again, as you all know, EMT is an arbitrage condition that is enforced by self-interest:

$$P_t = E(P_{t+1})$$

Today's price must equal tomorrow's expected price or else profits can be made by selling or shorting the token.

# What Drives Token Price?

Token price (P) is higher if:

- Large numbers of tokens are staked or locked since this slows velocity (V).
- The token finds lots of use on the platform (transaction and smart contract fees, for example) since this increases as the dollar value of total transactions per day (D).
- The token has use off the platform such as micropayments, larger exchanges of value, or even as a store of value.
- Fewer tokens exist because they were never created or are destroyed (M).
- Future token price is expected to go up ( $P_{T+1}$ ).
  - Induces hodling or use as a store of value.
  - Induced by expected future increases in on or off platform token use.
  - Induced by expected future decrease in token numbers or circulating tokenbase.

## Why do we Care?

Economics is a positive science, even macroeconomics.

Deciding what “good” macroeconomic policy might be is a normative question and so is not one that economists are qualified to answer.

Someone needs to supply the primitive of what the policy objective is:

- Raise as much money as you can?
- Maximize the utility of the token?
- Maximize the value of the tokenbase?
- Create a token with a stable value?
- Help implement some platform function such as incentivizing good behavior or providing liquidity for on-chain markets or services?
- Something else?

Let's consider what common monetary policies do.

# Premining

Premining means creating a fixed number of tokens at the beginning and never creating tokens again.

- Premining generates a degree of certainty about  $M$ , which is probably good, all else equal.
- If a platform holds back tokens from circulation that are premined, then this certainty is diminished.
- Premining is non-responsive to expectations or the amount of token use on or off the platform.

Note that token value is **free floating** and **unsupported** once tokens are issued.

## Mining or Scheduled Token Release

Mining creates a predictable, addition to the supply of tokens as blocks are built to pay validators for their services.

Scheduled token releases do the same thing, but new tokens go to some other use (usually the platform or investors).

- This creates a degree of certainty about  $M$ , which is probably good, all else equal.
- This approach is non-responsive to expectations or the amount of token use on or off the platform.
- This approach lowers expectations about future token prices, all else equal.
- This approach is an inflation tax on current token holders. If it is too extreme, it can crash token value.



## Stablecoins and Currency Pegs

A stablecoin is a token that is supposed to have its value pegged to a fiat currency, a commodity such as gold, or the value of a basket of fiat and/or crypto currencies.

In the real world with fiat currencies, this is difficult to do.

Every historical attempt to peg a fiat currency to another currency or to a commodity like gold or silver has ended in failure.

Why?

Consider the gold standard.

It is just too tempting to issue more gold certificates than there is gold.

The currency ends up being only fractionally backed.

Some speculator shorts the currency and demands gold until the central bank runs out or gives up and the value of the currency crashes.

# Currency Pegs

Pegging one currency to another, the pound to the dollar for example, is more complex, but encounters the same basic issue.

The Bank of England would never even consider holding enough dollars to fully collateralize such a policy.

To support the peg, central banks have fiscal tools that can help.

In particular, they can issue bonds at above market interest rates in local currency.

The hope is that this will cause speculators to stop selling pounds for dollars, which exhausts the fractional dollar reserves that the Bank of England holds, and instead buy pound denominated bonds.

## Currency Pegs have a Sad History

The problems with this are:

- Raising interest rates has negative impacts on tax payers and the domestic economy.
- People may worry that the central bank will default and demand ever higher interest rates to compensate for the risk, which increases the risk of default...
- People know that the central bank can pay off the bonds with newly printed fiat currency, which is inflationary, lowers the effective real interest rate the bond holders receive, which makes them demand a higher interest rates.....

Ultimately, no such peg has survived.

Speculators know that central banks will either give up because raising interest rates has too high a social and political cost, or markets will lose confidence in the bonds and will stop buying.

George Soros made his fortune this way at the expense of England.

# Stablecoins

Crypto has one advantage in this respect over fiat:

It can commit to a policy through a smart contract and does not have to answer to politicians or worry about the welfare of citizens.

An array approaches for non or less than fully collateralized stable tokens have been proposed.

- Seigniorage shares
- Futures sold at market price but redeemed for more than parity latter
- Bonds that do the same
- Proportional burning of tokens (even tokens owned by users) until parity is achieved.
- Taxing of transactions or egress when a token is below parity.
- Other complicated derivatives or smart contracts.

## **I'm Very Sorry, Please don't Hurt me**

Non-fully collateralized approaches work, until they don't.

First, if people believe that a token is worth a dollar, and will continue to be worth a dollar, so it shall be forever and every, Amen.

Money is trust, and this is just as true for fiat as it for crypto.

## I have a Wife and Two Lovely Children

Second, if a token drops below parity, the promise to pay more than parity (through a bond, a derivative, a smart contract, or anything else) relies on people believing the promised value will be delivered.

These promises are only feasible if:

- The platform has not exhausted its collateralized reserve of fiat or crypto.
- The future delivery of native token will be worth more than parity.

If trust is lost in the future value of the token, then any promise of future value is empty once the collateral cupboard is bare.

# I Coach Little League and Recycle

This does not mean that trust will always be lost and the promises always tested.

If trust is not lost, then the token can indeed be stable.

It does mean that there are always reasonable equilibria supported by reasonable beliefs where non fully collateralized smart contract based stable coins will collapse.

Again, very sorry, no offense intended, I don't make the rules, talk to my manager

Fiat currencies are no better in this respect. A fixed pegged has never survived.

The stablecoins in popular use today are all 100% collateralized (or claim to be), which suggests there is no free lunch in crypto either.

## Stablecoins with Full Backing

Issue one token for each dollar paid by users and put it into escrow.

Return the dollar in exchange for the token on demand and burn the token.

In principle, this could absolutely work.

Problems:

- Token selling generates no net revenue for the platform.
- Usually requires costly KYC/AML and other compliance measures.
- Platform expenses must be supported by transaction fees or interest float.
- Requires trust in the platform and introduces a central point of failure.
- Requires the continuing cooperation of banks, governments and courts.



# Implications

Unsupported tokens:

- Values are volatile are largely driven by expectations.
- Expectations can change quickly, and small buy or sell orders can have a disproportional effects if markets are thin.
- Speculators and price manipulators can influence token value at low cost.
- Utility tokens that have real use on the platform make it more difficult for speculators to influence token price (and the same is true for security tokens that return real value to holders).

# Implications

Stablecoins:

- non or partially collateralized tokens are risky and have poor track records in both fiat and crypto environments. It would be awesome in both environments if it were otherwise.
- Fully collateralized tokens introduce trust and centralization in what should be a trustless decentralized environment.
- Requires compliance and other costs and fees just like the existing banking and payments networks.

However:

Tether has not failed, it has a token cap of \$4B, and had a 24 hour transaction volume of \$35B yesterday (a daily velocity of 9!).

The market wants and accepts a fully(?) collateralized stablecoin.

# Volatility is Bad

The market wants and accepts a fully(?) collateralized stablecoin. Why?

Volatility in token value is bad because:

- It makes long term, token-based smart contracts risky for users.
- It limits the use of a token as a store of value.
- It increases velocity → decreased token value.
- It undermines confidence in otherwise good platforms → decreases platform and token use → decreases token value.

Volatility is a vicious circle.



## Stabilized Tokens

- A fully collateralized stablecoin has its use, but it is not trustless, decentralized, or have low transactions cost.
- Free floating tokens are extremely volatile, especially in a platform's early stages.
- What is a boy to do?

Take the middle path.

- Design a monetary policy that seeks to stabilize token value and reduce volatility instead of pegging token value.
- Implement this policy algorithmically and transparently.

# An Algorithmic Monetary Policy

Initial conditions: Fixed tokenbase and some market determined token price (base price).

1. If token price initially drops, lower the base price.
2. When the token value starts go up, issue a predetermined number of tokens at each price increment. (For example, issue 100k new tokens for each \$.01 that token value goes up.)
3. Put some or all of the proceeds in escrow in a Fiat Stabilization Reserve (FSR).
4. If token price starts to fall, use fraction of the FSR to repurchase tokens at each price increment and place them in escrow (and therefore, out of circulation) in a Token Stabilization Reserve (TSR). (For example, if price reaches \$5 use .2% of the FSR to buy tokens at each \$.01 cent price interval.)

## Continuing the AMP

The highest price a token has ever reached is called the high water price. If a token's value fluctuates, but stays below this price then:

- Spend an equal fraction of the FSR to repurchase tokens at every price interval as token value drops
- Sell an equal fraction of the tokens in the TSR at every price interval as token value increases.

If token value goes above the old high water price, start issuing new tokens again.

## What does the AMP Accomplish?

- Automatically makes the tokenbase responsive to the actual needs of the users on the platform.
- Provides a predictably and certain demand for, or supply of, tokens at every price point.
  - Reduces the price impact of low volume, low information trading.
  - Makes it more expensive for speculators to manipulate the token price since they must buy through the AMP's demand for tokens (or sell through the AMP's willingness to supply tokens).
- Provides a shock absorber, but does not fix or peg token price on either the up or down sides.
- Allows the underlying token utility and platform use to play larger roles in determining token value.



## Details

- This does not require an oracle, just standing bids and asks at each price increment. These will be exhausted before any tokens are purchased or sold at the next price increment or else an arbitrage possibility exists.
- You can put this in a smart contract, sort of.
  - Bids and asks can be calculated and deployed on exchanges using smart contracts.
  - Fiat paid to sellers or collected from buyers cannot live on the blockchain. It must be held by the exchange, or in a bank. This means some human or set of humans has to authorize, control, and be responsible for this fiat.
- If the institution or human responsible for the FSR does not do what he is required to by the AMP, he could be sued or otherwise sanctioned.
- Therefore, a stabilized token AMP requires a degree of centralization and trust.
- This trust/centralization only relates to the stabilization policy, not any other aspect of the platform. If the trusted agent fails in this duty (maybe courts or regulations prevent him from doing so), the result is a free floating token, not a failed stablecoin.

## Conclusion

I suggest that the design goals of crypto monetary policy should include:

- Reducing volatility in token value.
- Making token value less subject to manipulation by speculators.
- Thickening markets at all price levels to prevent low information, low value trading from having disproportional effects on token value.
- Letting the tokenbase automatically adjust to meet the actual demand for tokens on the platform.

More fundamentally, the token should have a significant and serious use on its platform such as staking, payment of fees, purchase of platform services, or facilitating markets with an on ledger unit of account (this is more like good crypto fiscal policy).

Stabilized token AMPs meet these design goals, and can be further specialized to meet the needs of specific platforms.

**Thanks very much!**

More details can be found on my webpage:

<http://www.jpconley.com>

or at the Geeq Project web page:

<https://geeq.io/>