Tautrino

A Quasi-Quantum economic simulation

Dmitri Mendeleev, Flashboy

info@tautrino.com

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Abstract. The modern monetary and financial markets are driven by the commonly agreeable equation of V=P*Q, where V represents the Value of a defined concept based on the combination of measurable mathematical variables such as Price and Quantity.

We are thus able to observe the effects of supply and demand to initiate the search of what we ultimately aim for equilibrium or stability in markets. Inflation and Deflation are also two commonly heard concepts that are difficult to be assessed due to usual market cycles lasting in the terms of years and decades.

Most, if not all, modern Fiat monetary system is based on an elastic supply that is dilutive to all users of the system. Usually benefiting a few that gains first-hand access to the new delta of supply. Whether we are talking about currency, stocks, bonds, derivatives, etc.

In 2009, Satoshi Nakamoto proposed a Whitepaper depicting a system which created for the first time the concept of provably fair scarcity in the digital space. The Bitcoin Blockchain is able to produce a limited Fixed Supply of 21 million bitcoins in a globally distributed ledger with non-dilutive ownership.

In 2020, we saw the rise of DeFi or Decentralized Finance, empowered by Ethereum, to allow new concepts to be explored, notably, we saw Amplforth, a new synthetic asset which aims to create an elastic and non-dilutive money supply. Introduced a novel concept of atomic rebase mechanism on the blockchain to adjust supply based on monetary policies on a global scale.

Tautrino aims to create a fixed/elastic quasi-quantum simulation as a base for an experimental currency that pits the extreme effects of hyperinflation and hyper-deflation in a provably fair manner to find equilibrium in the market for the monetary value of Tau.

1.   How Tautrino was named.

First of all, Tautrino is not a word that exists in a manner the world has yet defined. The combination of concepts from two important fields of science and physics known to humanity was chosen and merged to create a new dynamic synthetic asset called Tautrino.

The first part, "Tau", is the 19th letter in the Greek alphabet and represents, in Greek numerals, the value of 300. It is also of vital importance in mathematics and physics.

The second part, "Trino", was derived from Neutrino, a subatomic particle little known to humanity as it is the lightest and one of the fastest particles capable of speed far faster than lightspeed.

Together, the vision of Tautrino or TAU is to become an under the radar currency leveraging game theory with exponentially powerful yet simple mechanisms to find equilibrium by the market forces.

2. Introducing the St.Petersburg paradox

St.Petersburg paradox was introduced by Nicolaus Bernoulli in 1713. It continues to be a reliable source for new puzzles and insights in decision theory. This inspired us to utilize the atomic rebase mechanism to affect the supply side of the currency. By mimicking the compounding effect of the experiment with a slight change in variables, instead of doubling the value of P which is the price or the dollar value of the experiment, since it builds upon the assumption of the game having an infinite supply of P or price, we changed the variable to be double the Q or quantity, affecting the supply of the equation should a winning "coin flip" be produced by the system.

$$EV = \sum_{n=1}^{\infty} p_n 2^n = \sum_{n=1}^{\infty} 1 = \infty$$

Referencing V=P*Q, the supply side equation of Q we aim to produce a more dynamic and unpredictable constant. Since technically the supply is capable of reaching infinity in theory, yet not infinite due to the novel rebase function re-adjusting and returning the entire state of the system to Tau or the numeral value of 300.

The endless perpetual cycle will constantly be in motion regardless of market participants due to the immutable logic of the smart contracts.

3. Simulation of the Binomial distribution via "coin flip" mechanism

The experiment requires the ability to produce a provably fair "coin flip" by mathematical means which gives in theory a 50% chance of winning or losing. We will use the concepts of even and odd whole numbers to represent "heads" or "tails" in the mathematically simulated "coin flip"

$$P(x) = \frac{N!}{x!(N-x)!} \pi^x (1-\pi)^{N-x}$$

From the following sets of single-digit whole numbers.

0,1,2,3,4,5,6,7,8,9

We have 10 units of whole single numeral values, in which we will select the following 5 unit numbers as "heads" which represents a positive win in the system.

0,2,4,6,8

To the opposite effect, we will select the following numbers to represent "tails" which represent a negative loss in the system.

1,3,5,7,9

4. Selection of the numeral variables

In order to produce a set of "randomized" values without running into the possibility of pseudo- randomness using PRNG by software means. We have chosen the use of the USD price of ETH to be set as the source to determine the base variable. We attempt to mimic a True Random Number Generator Function as represented by the following formula.

$$A_{n+1} = (Z * A_n + I) mod M$$

The USD price of ETH is pulled utilizing a data oracle to get a provably fair and approval by the consensus of the system in order to prevent gaming of the variable. ETH is selected due to its large market capitalization which creates a high barrier of entry for price manipulation and thus prevents players from easily influencing the price of variables to benefit and game the system for unfair gains. At least in theory we believe that the value of Tautrino will be significantly low enough to disincentivize any whale activities to manipulate the price of ETH. However, it would be of interest to see the outcome of market incentives should the value of Tautrino rise significantly.

5. Simulation of the "poker game" mechanism

For example, the price of ETH as of writing is $389.26, which we see 5 units of whole numbers shown, 3 "even" numbers and 2 "odd" numbers, this is the first base set of numbers chosen and locked in the system. In the case of the example, even numbers are the majority and thus the system counts as a positive win.

The system is stateless thus regardless of the previous numbers pulled, it will calculate as if it's always the first "coin flip", preventing gamblers fallacy to manifest mechanically.

In the case of calculation event, for example, the price of ETH is $392.11, which we see 5 units of whole numbers shown, 1 "even" number and 4 "odd" numbers, in the case of the example shown, odd numbers are the majority and thus the system counts as a negative loss.

Should the price of ETH increase to $1000.00 and beyond or decrease to $99.99 and below. 6 variable numbers will be chosen in the case of price increase over 5 digits and 4 numbers will be chosen in the opposite case of price falling below 5 digits.

Should there be a chance of "tie" whereas the even and odd numbers are the same and no winner can be determined, the system will decide to remain statically constant, meaning no adjustment or change of supply will be conducted.

6. Rebase/Debase Event

The Rebase event is a system-wide supply adjustment across the entire ledger of the coin holders. The change is applied to all holders of Tautrino at the time of adjusting with zero exceptions. The Rebase only adjusts the number of coins in each wallet proportional to the percentage of the coin supply you own. Users are never diluted by their percentage of the network unless users choose to forfeit the ownership of the network by exchanging or gifting their shares by users' consent.

The system upon a positive win will increase the entire supply of Tautrino by a factor of 2, the base starting supply of Tautrino will be capped at 300. For example, the supply increases from 300 to 600 due to a positive rebase, it will continue to double to 1200 should a subsequent positive rebase occur. The doubling factor is technically reaching to infinity and can only be stopped and reset with a negative loss in the "coin flip".

Should a negative loss occur in the system, a Debase event will occur whereas regardless of the amount of coin supply in the system at the moment prior to Debase, all balances across the entire system return to Tau, or base value of 300. The only constant remaining is the percentage of the network you own.

Rebase/Debase events are calculated triggering the adjustment event to be occurring at each hourly intervals of UTC time, it should occur to the users that the expected number of adjustments is 24 times per 24 hours.

7. Potential effects of sudden Supply Inflation and Supply Shock

For example, player Bob chooses to enter the system by obtaining 3 Tautrino's or 1% of the Tautrino supply at the base value of Tau or 300.

The system goes through a positive rebase, thus the entire supply is now 600 with Bob's coin balance increased to 6 TAU. Should the system double again at the next event, the entire coin supply will be 1200 and Bob owning 12 TAU. This calculation does not account for the fact should Bob choose to move coins during supply expansion.

For example, Bob holding 12 TAU at the time of 1200 total coin supply, Bob decided to transfer 6 TAU to Alice in another address. The percentage of the entire network of 0.5% will be transferred to the new owner Alice, the system goes through a negative debase, thus all coin supplies at the time regardless of their amount, go back to Tau, which is the value of 300. The balance of Bob's wallet will be 1.5 TAU which represents 0.5% of the network and Alice's wallet will be also 1.5 TAU which represents 0.5% of the network.

The potentially infinite sudden sharp supply increase and massive deflation back to Tau, introduces an interesting new dynamic for long-term investors and short-term speculators. It would be difficult to accurately make a prediction of the next "coin flip" thus market participants would have a short amount of time window to decide actions of choice, stay for the opportunity to obtain a 100% increase, or risk the chance of going back to Tau. The player may also choose to leave the game entirely by forfeiting all Tautrinos back to other players via the market at any time. The price of Tautrino would be purely reflected by the actions and choices of the players in the system. We do not yet fully understand the implication of such sudden supply changes in an economic environment.

8. Goals of the experiment

To define via market forces the market value of Tau or 300 via a new dynamic market-driven cryptocurrency governed by mathematics and probability. The study of the price actions and market participants via decision behaviors of the crowd should also be very interesting to observe such phenomena and gain deeper insights into the parabolic effects of hyperinflation and hyper-deflation in an economic system.

9. Tokenomics

The base set amount of Tautrino in supply will always be equal to Tau or 300.

The elastic supply component of Tautrino allows it to theoretically compound at the rate of 2x to reach infinity in supply.
The ticker symbol for Tautrino will be TAU. The entire supply will be split initially as the following.

10% Team | Founder

20% Development | Operations

50% Private Sale | Airdrop

20% Marketing | PR

Private Sale Price to be determined based on market supply and demand.

10. Legal Disclaimer

DISCLAIMER: $TAU token is purely entertainment, not an investment. Purely an experimental GAME. Before purchasing $TAU tokens, you must ensure that the nature, complexity, and risks inherent in the trading of cryptocurrency are suitable for your objectives in light of your circumstances and financial position. You should only purchase $TAU to have fun and to experience this experimental game with us. Many factors outside of the control of $TAU Token will affect the market price, including, but not limited to, national and international economic, financial, regulatory, political, terrorist, military, and other events, adverse or positive news events and publicity, and generally extreme, uncertain, and volatile market conditions. Extreme changes in price may occur at any time, resulting in a potential loss of value, complete or partial loss of purchasing power, and difficulty, or a complete inability to sell or exchange your digital currency. $TAU Token shall be under no obligation to purchase or to broker the purchase back from you of your cryptocurrency in circumstances where there is no viable market for the purchase of the same. None of the content published in this paper constitutes a recommendation that any particular cryptocurrency, portfolio of cryptocurrencies, transaction, or investment strategy is suitable for any specific person. None of the information providers or their affiliates will advise you personally concerning the nature, potential, value, or suitability of any particular cryptocurrency, portfolio of cryptocurrencies, transaction, investment strategy, or other matter. The products and services presented may only be purchased in jurisdictions in which their marketing and distribution are authorized. Play at your own risk and may the odds be ever in your favor.

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