Cybiont Technologies

Project PAN-GEM ASC

WHITE PAPER

DRAFT VERSION 6

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Prologue

“Human salvation lies in the hands of the creatively maladjusted.”
-Martin Luther King Jr.

“Here's to the crazy ones, the misfits, the rebels, the troublemakers, the round pegs in the square holes... the ones who see things differently -- they're not fond of rules... You can quote them, disagree with them, glorify or vilify them, but the only thing you can't do is ignore them because they change things... they push the human race forward, and while some may see them as the crazy ones, we see genius, because the ones who are crazy enough to think that they can change the world, are the ones who do.”
- Steve Jobs

When countries are starting trade wars, political wars, and ideological wars, for the few who will benefit, and we see the economy built on such illusions start to falter and crumble. And we see the very financial institutions we are supposed to trust reaping the rewards of the havoc who do we have to turn?

This is for those who see the need for unity in our world, who recognise that we are all a father, a mother, a sister, a brother, a daughter, or a son. For those who recognise that we need a symbol for this unity that is independent from any government or bank. To prove that we have the capacity to survive anything that comes our way as a united world, as humanity.

The vision of PANGEM is to create a global currency not pegged to any currency, that will not be at the mercy of any country or bank. A currency that will not be affected by trade wars, political wars, and ideological wars. It will be a currency that only needs to rely on the global citizens that use it, and itself, to create and sustain its own stable value.

This vision is for the creatively maladjusted, the crazy, the misfits, the rebels, the troublemakers, the round pegs in the square holes, who understands the need to fight the current status quo of our current world and push the human race forward. Who realise the need for a world currency that is independent of the follies of the few.

Introduction

To create a cryptocurrency that will be considered a real currency.
This will be achieved by appropriating the qualities that makes fiat currency stable.

The first step is to change the HOLD mentality.
All cryptocurrencies suffer from the fact that they are treated as assets.
Buy Low - Hold or Hodl - Sell High.

However unlike normal assets crypto assets are subject to large fluctuations in value since cryptocurrencies do not have any intrinsic value like gold.
Except for bitcoin where the intrinsic value lies in the virtue of the being the first of its kind. Something that will never change.

Then all other cryptocurrency projects try to install some sort of intrinsic value by linking them to business or social applications/platforms. That is still not enough as the value of the crypto coin then relies on that specific business or social application/platform.

Other coins come close to providing an intrinsic value that stem from virtues of the coin itself. These are mainly privacy related coins.
In the case of Ethereum, its value lies in the platform that it has created. However with advances in technology the future of such a platform cannot be guaranteed forever.

In the end the value of all current so called crypto currencies (except bitcoin) rely on a specific business or social application/platform.
And all crypto coins are still nevertheless assets and not comparable to current fiat.

Why PANGEM Coin and GEGold coin?

A 2 tier decentralised and centralised crypto coin.
GEM Coin will be decentralised and GEGold Coin centralised.

Bitcoin will forever be the pioneer that brought forth something new that is changing the world. Through blockchain it created a digital currency that cannot be counterfeited.
It also brought decentralisation thus making it separate from geography, politics, and race.

For all the good that Bitcoin has brought it has shortcoming that comes from being the first of its kind. The creator was focused on the proof-of-concept and decentralisation. Only in hindsight can we see some of the shortcomings of Bitcoin from:

The concentration of computing power deterring the decentralisation of the system.
The limited room for growth in transaction speed and in total amount of coins.

Many other coins have been created trying to solve the issues arisen from Bitcoin, from using POS to a hybrid POS/POW system, to having a coin that burns itself from use, etc.
A few have tried to bring true utility to their coins by creating a new platform that will utilise their coin/token.

But the more they try to more centralised their coin becomes.
To have a coin truly decentralised it has to have a growth and decay system of its own that is influenced by those who use the coin itself.
Like the value of a coin that appreciates if someone wants to pay more for it.
A decentralised coin should be able to reduce itself when its use is low and create more of itself when its use increases. After all, if a coin was a sentient being then its survival would lie in the widespread use of itself which means either increasing its value or increasing its numbers.

The true revolution for a decentralised crypotcurrency lies not just in the technology but also in its concept.

Almost all cryptocurrencies and their creators strive to increase the value of the coin itself. The focus on the value of the coin causes volatility in its price. However the true aim for any decentralised coin, and hence its greater adoption, should be its ability to create stability in value.

To achieve such value stability, it is not the value of a coin that should increase but rather the supply of the coin. Rather than having 1 coin that increases in value from 1 USD to 100 USD, I should have 1 coin valued at 1 USD and receive an extra 99 coins when the utility of the coin increases. Ideally a mixture would be better, receiving 79 extra coins and having each coin valued at 1.25 USD, so 80 coins would make 100 USD.

Thus to achieve such price stability and therefore a widely used decentralised coin I put forth a different concept when it comes to cryptocurrency.

GEM coin stands for Universal Currency. Its purpose is to be a symbiotic entity in cyber space that can only live with us and grow by the very action of us using the coin. This first iteration will be a social experiment to lay the groundwork for future coins that can be truly decentralised and have dynamic growth from its use.

How would or should GEM work?

The USD M1 supply USD 10.5 trillion dollars. And its money velocity is approx. 5.5 per quarter. That means that in 3 months 1 dollar has changed hands 5.5 times.
M1 money supply refers to hard cash or very liquid monetary assets. A velocity of 5.5 is considered a low figure. The velocity of money is calculated as:

$$MV=PQ$$

Where:
M= money supply,
V= velocity of money,
P= average price level of goods,
Q= index of expenditures (such as the total number of economic transactions)
PQ = nominal GDP

Chris Burniske and Vitalik Buterin have their own versions of the classical equation to fit the crypto world.

My own view is that the velocity is not so important as achieving stability.

Velocity can be used as a tool to gauge how a currency is utilised and may be a very indicative tool for fiat currencies since there is a lot of data to study from.

Those concepts can be applied to cryptocurrencies to produce a stable coin. The important thing is to achieve a balance between the increase or decrease in value of the coin and the quantity of the coin, in savings, in circulation, and in velocity.

So any cryptocurrency to achieve such recognition and usage as the USD in M1 money supply, in cryptocurrency terms since cryptocurrency should be a very liquid asset, would mean that the coin should have a similar velocity. This is speaking very roughly but the main point is that a currency has to be used MORE than its actual supply to prove its worth.

The problem is that all cryptocoins circulating have an average daily utilisation rate of about 3.56% (this includes the USD tether which is at 106%). That means that out of 100 coins that are available for circulation only 3.56 coins are traded/used in any day. When we calculate that to 3 months we get 3.56 coins per day for 90 days making 320.4 coins. 320.4/100 is a velocity of 3.2. It points to the fact that it is not widely used.

This signifies that cryptocurrencies are used more as an asset or store of value than as a means of payment.

Therefore to increase the use (the velocity) of the cryptocurrency it has to be designed in such a way that it rewards for the use of the currency whether it is actively using it or actively storing it as in savings.

Governments actively control the value of money by changing many factors from interest rates to the rate at which they print and destroy money. The problem with that is that some governments cannot be trusted with setting interest rates and the printing of money. Some governments have too much overhead and thus print more money to pay for their debts at the expense of its citizens.

But for a truly decentralised cryptocurrency to be effective as a means of payment and currency it has to provide stability. That means that it has to be able to self regulate to produce more coins when needed and destroy them when the supply is too great.
It also needs to produce more coins if the value of a coin is too strong so as to spread the value.

The problem with almost all current crypto currencies is that they focus on how the crypto can be used in such and such application, with the aim in creating value in holding the crypto for the expectation of increased utility in their system. But without any sort of regulation that can stabilise prices it will only end up being an asset open to speculation.

That is the greatest problem of Bitcoin. It is finite in quantity so it is compared to gold.
But as a currency it fails because 1 Bitcoin could be valued at USD 10,000 and the next month valued at USD 20,000. The circulation of the coin only spikes abnormally when the price also jumps because there are people taking profit, and others buying due to FOMO.
There is no mechanism that can double the amount of Bitcoins to keep the value of 1 Bitcion as USD 10,000. Nor is there any other mechanism that would reduce the amount of Bitcoins by half if the price should to USD 5,000 to keep 1 Bitcoin valued at USD 10,000.

PAN-GLOBAL ECONOMIC MODEL (GEM) Autonomous Self-regulating Currency

Let's start by getting a few concepts defined.

Total Supply Cap is the maximum number of coins that can be minted.

Total Supply = Sta**K**ed Qty + **S**avings Qty + Ci**R**culation Supply
T = K + S + R

Total Transaction Volume is the total amount of coins used in transactions.
Total Transaction Vol**U**me = U

Total Number of Transactions is the sum of individual transactions.
Toal **N**umber of Transactions = N

Velocity (V) is the number of times one coin is used. So it means U / (R+S)
V = (U / (R + S))

'Currency Utility Index' follows the concept of purchasing power and shows the value of the cryptocurrency by measuring U / N. Which is how many units coins are needed to make a purchase.

Summary

T = **T**otal Supply
K = Sta**k**ed Qty
S = **S**avings Qty
R = Ci**r**culation Supply
U = Total Transaction Vol**u**me
N = Total **N**umber of Transactions
V = **V**elocity of the Coins in circulation.
CUI = U / N

Quantity Theory of Money

“The most basic ‘classical’ transaction motive can be illustrated with reference to the Quantity Theory of Money. According to the equation of exchange MV = PY, where M is the stock of money, V is its velocity (how many times a unit of money turns over during a period of time), P is the price level and Y is real income. Consequently, PY is nominal income or in other words the number of transactions carried out in an economy during a period of time. Rearranging the above identity and giving it a behavioural interpretation as a demand for money we have

$$M^d = P\frac{Y}{V}$$

Hence in this simple formulation demand for money is a function of prices and income, as long as its velocity is constant.”
- Wikipedia.

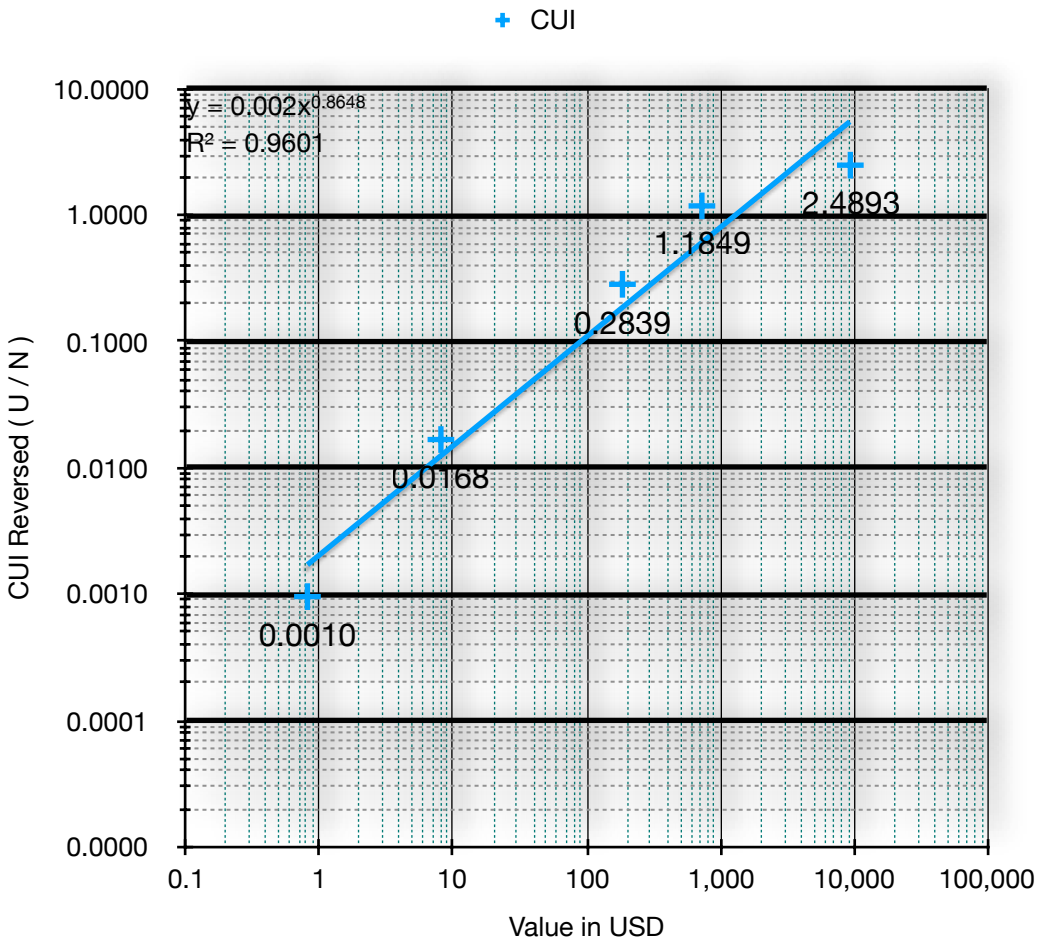
Crypto Utility Index

The inspiration for the Crypto Utility comes from the “Quantity Theory of Money” and from the concept of “Purchasing Power”.

This is an index that can be calculated by comparing U and N.
For purposes of calculation we use U/N.

But for visual purposes to show the relationship between U and N we use (N / U , reversed CUI, rCUI) because it shows an upwards slope which is visually easier to understand when considering potential.

The Closed Orders in the order books for Bitstamp and Binance was collected for the following currencies for a certain time period: BTC, ETH, LTC, BNB, XRP.



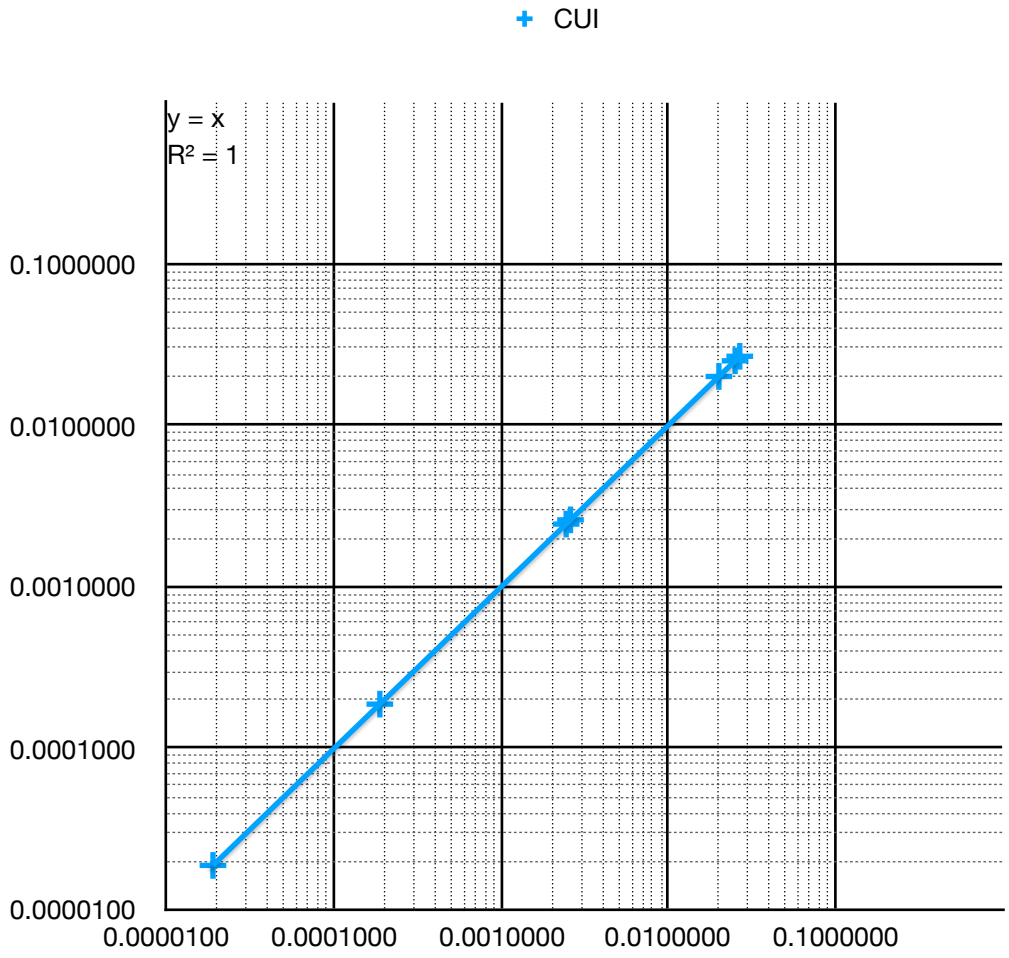
The Reversed CUI shows a clear relationship in a log log graph which is understandable because if you have USD 10,000 then the number of coins you can purchase is proportional to its value.

When applied to real world economics it is the same.

For example let's take the value of a barrel of crude brent as USD 50.
The value of 1 barrel of crude brent in different currencies, and the value of 1 unit of currency in brent barrels:

37.5 British Pounds per barrel.	1/37.5 barrels per unit of currency.
40 Euros.	1/40 barrels per unit of currency.
50 USD.	1/50 barrels per unit of currency.
386 Norwegian Kroner.	1/386 barrels per unit of currency.
410 Swedish Kroner.	1/410 barrels per unit of currency.
5,335 Japanese Yen.	1/5335 barrels per unit of currency.
53,125 South Korean Won.	1/53125 barrels per unit of currency.

If we use that 1 transaction per currency and create the same graph as above we get:



When 1 transaction is done to purchase 1 barrel of brent using whatever currency then the cost of 1 unit of currency in terms of brent is the same as the ratio of N/U, that is the number of transactions divided by the quantity transacted, in this case 1 transaction over the cost of 1 barrel of brent.
When we compare the 'trend line' of both graphs we can see that they have similar R^2 values.

It shows that the relationship between the qty of the currency used in relation to the qty of transactions are the similar for both cases. Or in other words, the average purchase value per cryptocurrency is similar.

What does it signify?

So far we have linked the value of the cryptocurrency to the USD and EURO. To make the cryptocurrency independent of USD but still use USD as a reference point we can observe US household spending and calculate the ratio of U to N. The reason to use US household spending is because we can study the value of a category of goods in relation to USD and obtain a value relationship. Household income is total expenditure which can be used as transaction volume ‘U’.

On the next page is the 2013 US household spending.
The number of transactions per year was unavailable so reasonable figures had to be assigned. In the future if actual number of transactions can be obtained then a more accurate index reference can be achieved.What the table shows is that the Utility Index of (U / N) is 41.6 Meaning that the buying power ratio of USD is 41.6.

Therefore if we do likewise and collect the U and N data for the use of GEM then we can arrive at a ratio. Then we can assume that the closer the ratio is to the USD ratio of 41.5 then the closer the value is to USD.

The Crypto Utility Index (CUI) then provides a reference point to measure the value of the cryptocurrency.

So when using this index an estimation can be made on how much the value of the coin is growing. Hence it can be used as a measure to control various aspects of the cryptocurrency itself in relation to goods and services.

In other words if the CUI of a cryptocurrency is 41.6 then that means that the amount of units used to buy certain goods and services are the same as USD.

2013 US Household Spending

Expenditure Category	Annual Average Cost	% of Budget	Avg Cost	# of Transactions per year
Housing	$10,080	16%		1
Transportation	9,004	14%		24
Taxes	7,432	12%		12
Utilities and Other Household Operational Costs	7,068	11%		50
Food	6,602	10%	5	1320.4
Social Security Contributions, Personal Insurance and Pensions	5,528	9%		18
Debt Payments or Savings	5,252	8%		24
Healthcare	3,631	6%		12
Entertainment	2,564	4%		12
Cash Contributions	1,834	3%		20
Apparel and Services	1,604	3%		6
Education	1,138	2%		8
Vices	775	1%		10
Miscellaneous	664	1%		10
Personal Care	608	1%		6
Total	63,784			1,533.4
Utility Ratio U / N	41.5965			
Reverse Utility Ratio N / U	0.0240			

When GEM equals to 5 USD.

GEM to USD	5	Population	50,000,00(		
	Avg Price in GECs	Avg Price in USD	Factor 1 Frequency	# of Transactions	GECs
Housing	2,016.00	10,080.00	1	50,000,000	100,800,000,000.00
Transportation	75.03	375.17	24	1,200,000,000	90,040,000,000.00
Taxes	123.87	619.33	12	600,000,000	74,320,000,000.00
Utilities and Other Household Operational Costs	28.27	141.36	50	2,500,000,000	70,680,000,000.00
Food	1.00	5.00	1320	66,000,000,000	66,020,000,000.00
Social Security Contributions, Personal Insurance and Pensions	61.42	307.11	18	900,000,000	55,280,000,000.00
Debt Payments or Savings	43.77	218.83	24	1,200,000,000	52,520,000,000.00
Healthcare	60.52	302.58	12	600,000,000	36,310,000,000.00
Entertainment	42.73	213.67	12	600,000,000	25,640,000,000.00
Cash Contributions	18.34	91.70	20	1,000,000,000	18,340,000,000.00
Apparel and Services	53.47	267.33	6	300,000,000	16,040,000,000.00
Education	28.45	142.25	8	400,000,000	11,380,000,000.00
Vices	15.50	77.50	10	500,000,000	7,750,000,000.00
Miscellaneous	13.28	66.40	10	500,000,000	6,640,000,000.00
Personal Care	20.27	101.33	6	300,000,000	6,080,000,000.00
			Total	76,650,000,000	637,840,000,000
Crypto-Utility Index	8.3215				

When GEM equals to 1 USD

GEM to USD	1	Population	50,000,000		
	Avg Price in GECs	Avg Price in USD	Factor 1 Frequency	# of Transactions	GECs
Housing	10,080.00	10,080.00	1	50,000,000	504,000,000,000.00
Transportation	375.17	375.17	24	1,200,000,000	450,200,000,000.00
Taxes	619.33	619.33	12	600,000,000	371,600,000,000.00
Utilities and Other Household Operational Costs	141.36	141.36	50	2,500,000,000	353,400,000,000.00
Food	5.00	5.00	1320	66,000,000,000	330,100,000,000.00
Social Security Contributions, Personal Insurance and Pensions	307.11	307.11	18	900,000,000	276,400,000,000.00
Debt Payments or Savings	218.83	218.83	24	1,200,000,000	262,600,000,000.00
Healthcare	302.58	302.58	12	600,000,000	181,550,000,000.00
Entertainment	213.67	213.67	12	600,000,000	128,200,000,000.00
Cash Contributions	91.70	91.70	20	1,000,000,000	91,700,000,000.00
Apparel and Services	267.33	267.33	6	300,000,000	80,200,000,000.00
Education	142.25	142.25	8	400,000,000	56,900,000,000.00
Vices	77.50	77.50	10	500,000,000	38,750,000,000.00
Miscellaneous	66.40	66.40	10	500,000,000	33,200,000,000.00
Personal Care	101.33	101.33	6	300,000,000	30,400,000,000.00
			Total	76,650,000,000	3,189,200,000,000
Crypto-Utility Index	41.6073				

When GEM equals to 0.5 USD

GEM to USD	0.5	Population	50,000,000		
	Avg Price in GECs	Avg Price in USD	Factor 1 Frequency	# of Transactions	GECs
Housing	20,160.00	10,080.00	1	50,000,000	1,008,000,000,000.0
Transportation	750.33	375.17	24	1,200,000,000	900,400,000,000.00
Taxes	1,238.67	619.33	12	600,000,000	743,200,000,000.00
Utilities and Other Household Operational Costs	282.72	141.36	50	2,500,000,000	706,800,000,000.00
Food	10.00	5.00	1320	66,000,000,000	660,200,000,000.00
Social Security Contributions, Personal Insurance and Pensions	614.22	307.11	18	900,000,000	552,800,000,000.00
Debt Payments or Savings	437.67	218.83	24	1,200,000,000	525,200,000,000.00
Healthcare	605.17	302.58	12	600,000,000	363,100,000,000.00
Entertainment	427.33	213.67	12	600,000,000	256,400,000,000.00
Cash Contributions	183.40	91.70	20	1,000,000,000	183,400,000,000.00
Apparel and Services	534.67	267.33	6	300,000,000	160,400,000,000.00
Education	284.50	142.25	8	400,000,000	113,800,000,000.00
Vices	155.00	77.50	10	500,000,000	77,500,000,000.00
Miscellaneous	132.80	66.40	10	500,000,000	66,400,000,000.00
Personal Care	202.67	101.33	6	300,000,000	60,800,000,000.00
			Total	76,650,000,000	6,378,400,000,000
Crypto-Utility Index	83.2146				

It can be observed how the quantity of GEMs used differs when the value of GEM to USD differs.

And with that the CUI changes. Because the number of transactions will not change for consumption as consumption is pretty much steady. That is also what can be observed in the ‘cryptos and crude brent’ example. Though the value and quantity changes the relative demand seems constant and similar.

Cryptoeconomics

Before we talked about "Quantity Theory of Money" and "Purchasing Power".

MV = PY, where M is the stock of money, V is its velocity (how many times a unit of money turns over during a period of time), P is the price level and Y is real income. Consequently, PY is nominal income or in other words the number of transactions carried out in an economy during a period of time. Rearranging the above identity and giving it a behavioural interpretation as a demand for money we have:

$$M^d = P\frac{Y}{V}$$

Continuing for the previous example we can postulate that the Crypto Utility Index is the demand for money (in an inverse form). Or rCUI (reverse of the CUI) is the demand for money.

Because PY = N (number of transactions)
Velocity = V = (U / T)
Then M^d = N / (U / T) = NT / U

So in classical economics the demand of money equals to the Total number of Transactions multiplied by the Total supply, and then all divided by the volume of transactions.
But we want to find out the Total supply of cryptocurrency needed so:

T = (M^dU)/N
or
T/M^d = U/N = CUI

Okay so the Crypto Utility Index calculation is a ratio between the Total Supply and the demand for money or transaction volume and transaction quantity.

We don't need to know exactly what T or M^d is because we have actual numbers. As the US household expenditure has shown we have a concrete number of 41.6 than can be used as a measuring stick of equilibrium between the total supply of money and the demand for money.
So if CUI > 41.6 then it means either the demand for money has decreased or the total supply has increased.
If CUI < 41.6 then it means the demand for money has increased or the total supply has decreased.

Cryptocurrency fiscal management

To clarify things so far, when explaining cryptoeconomics total supply was used. However for GEM the total supply is not used in calculations. Only circulating supply will be used.

That is because in the current model for GEM the stability of the value is managed by the flow of coins between 3 areas:
Staked Quantity
Savings Quantity
Circulation Supply

And the Velocity and CUI are based on the Circulation supply.
The velocity affects the rate new coins are minted.
CUI affects the total supply of coins.

Recap
T = **T**otal Supply
K = Sta**k**ed Qty
S = **S**avings Qty
R = Ci**r**culation Supply
U = Total Transaction Vol**u**me
N = Total **N**umber of Transactions
V = **V**elocity of the Coins in circulation.

$CUI = U / N$

$R = T - K$

$V = U * (1/ (R+S))$

Spending rewards: $= \int(U / (R + S) = \int(U / (T - K))$
Reward is based on velocity calculation.
The more that is staked and spent, the higher the spending reward. Meaning that the lower the circulation of supply and quantity saved, and higher spending, will mean higher rewards.

Savings equation: $= \int(S / (K + R))= \int(S / (T - S))$
Savings are based on the relationship between Savings and the rest of the supply. The higher quantity in savings the lower the returns. So the more that is staked and in circulation the higher the savings reward.

Stake rewards: $= \int(U / (K + R))= \int(U / (T - S))$

Stake rewards is based on a modified velocity where Savings is replaced with Staked quantity. The more is saved and more coins are utilised the higher the reward for staking.

Since each method produces rewards each method will be in demand. The interlinking between each method of earning rewards means that an equilibrium will be created.

	Conditions				
Method	Reward	U	Staking	Saving	Circulation
Spending	Maximise	High	High	Low	Low
Saving	Maximise	-	High	Low	High
Staking	Maximise	High	Low	High	Low

The above table demonstrates that to maximise rewards would mean affecting factors that would cause other methods to become favourable.

Spending rewards
Since spending rewards are dependent on the velocity of the coins, it means that the more users save, the less coins are available to add to the velocity. The less is staked the bigger the quantity in circulation and therefore the more effort is needed to increase the velocity.

Saving rewards
Saving rewards are dependent on the ratio of Quantity in saving compared to the Total Quantity. So that means the less quantity in savings the greater the reward that can be obtained when creating a Savings account.

Staking rewards
The reward for staking is shared by all stakers. Since the staked amount is a constant it means that the reward is determined by how low the circulation quantity is or by how high the savings quantity is, and by the total transacted volume.

Velocity and minting of new coins

Velocity is based on circulation supply.
Coins are minted through transactions when the velocity is on the positive scale.
If the velocity increases and goes into the negative scale transactions then instead of minting new coins, transactions will cause coins to be destroyed.

Velocity then controls the rate new coins are minted.
It works much like interest earnings from spending, saving, and staking.

Velocity is important because it indicates how fast the money supply is circulating. The faster it circulates the higher the liquidity and therefore it can react better to fluctuations in the quantity in circulation (to avoid a Mt. Gox proxy sell-off scenario, they claim they did not cause it…. perhaps not directly).

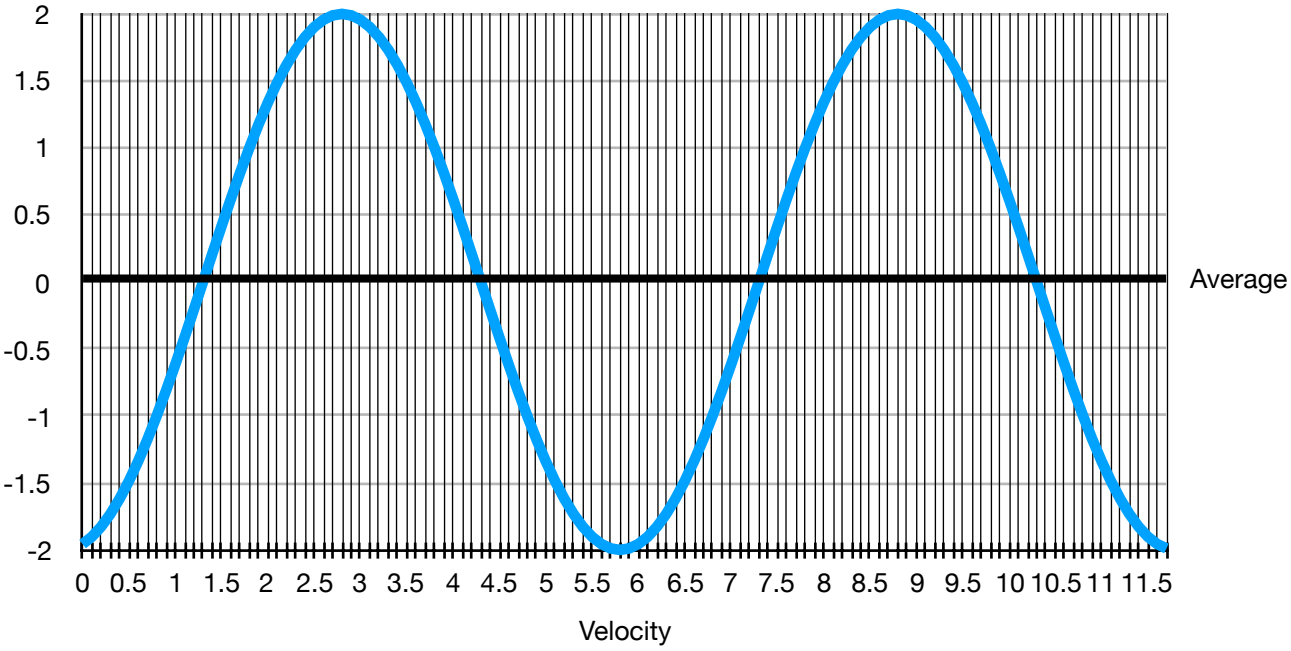
Also having the rewards tied to the velocity gives incentives for people to use the coin.
However minting of new coins will only occur up to 90% level of the Total Supply cap. When 90% of the Total Supply Cap is achieved only Stakeholders and Savings will be able to mint new coins. Coin destruction protocols remain unchanged

Additionally the rate of minting new coins will be affected by the Total Supply Cap left.
Example. 50% of the Total Supply Cap is still left. Current minting rate is 1%
Then the minting rate is increased by 50%.
So 0.01 * 1.5 = 0.015. The new rate is 1.5%

Cryptoeconomics of GEM

GEM is designed to decay and multiply depending on several factors. The CUI controls the total volume and the velocity controls the rate of coin minting.
In normal operating circumstances too low or too high a velocity will cause coins to be destroyed to reduce the circulating supply.
When in the goldilocks velocity zone the supply is increased.
This will create a collective incentive to stabilise the coin to increase its supply and provide wealth in the quantity of coins held rather than in the value of 1 coin.

The above graph is based on a sine wave and is the basis in calculating whether a coin should be increased or decreased in supply. The use of a sine wave is in hopes of bestowing GEM coin a means to achieve equilibrium. When the velocity is below approx. 1.2 it would signify that there is something seriously wrong with the coin. The three most likely scenarios are:
A/ The coin has little value because of no demand or free falling value. Loss of confidence.
B/ Excess of supply. Value of the coin may drop.
C/ Too many holders hoping the price will increase further. Does not signify any loss in confidence. Rather it signifies that the value is good but a higher value is anticipated.



In all three cases it is better if the supply of the coins decrease and the Emergency Monetary Purge (EMP for short) is activated, causing a negative growth factor to be applied to ALL coins (except those in cold storage). A decrease in supply should increase the value of the coin kickstarting its use. For scenario “C" a danger in losing coins when value does not increase immediately would encourage speculators to not hold onto coins.

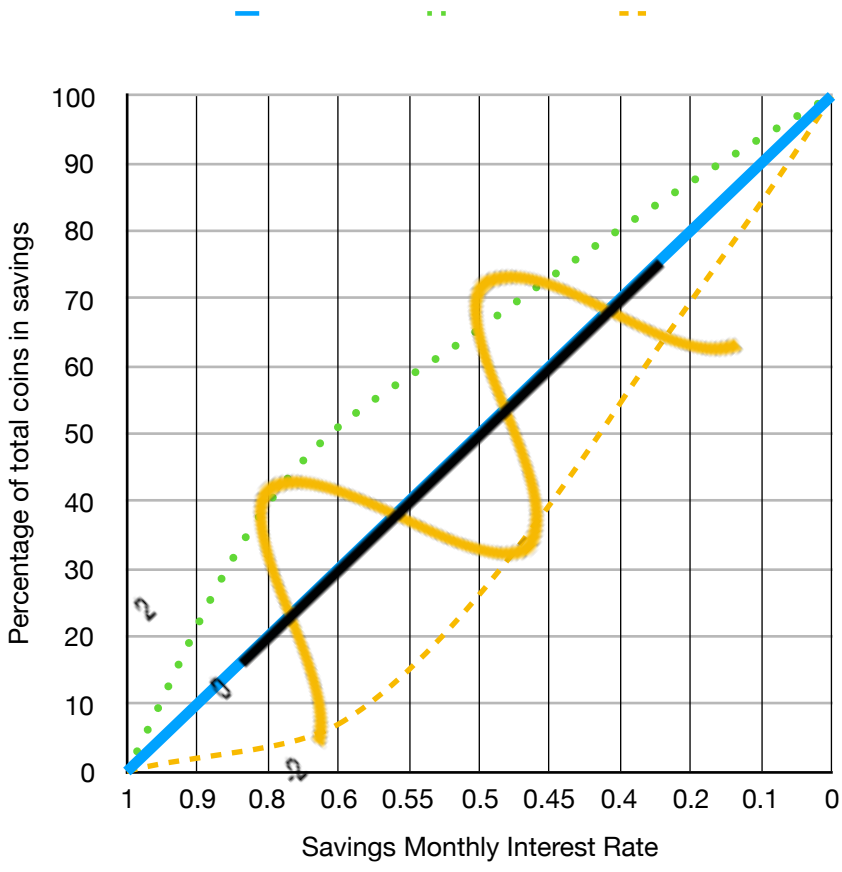
When the velocity is above 1.25 and below 4.25 it signifies that the coin is circulating healthily and more coins are produced per transaction as a result to encourage positive growth. Coin production peaks at a velocity of approx. 2.75.
When the velocity is between 4.25 and 7.25 it may indicate demand is being fuelled by speculation in prices and that price is surging too fast. Therefore transaction costs are imposed to cool down the speculative market.

In case the growth in velocity is due to legitimate increase usage and demand and it surpasses 7.25 it will enter a cycle of coin growth.
The pattern continues indefinitely to account for infinite growth.

It is hoped that equilibrium will be achieved between the -0.5 and 0.5 bands by collective market forces at its corresponding velocity level.

Wallet Savings Mechanism

Another factor to help in the stability and equilibrium of GEM are savings accounts.
Definitely any proper currency should have a savings account. Also, a savings account is vital in ensuring that value is created by increasing the quantity of coins and not the value of 1 coin itself.



Savings interest earnings will have an inverse correlation with the percentage of the total supply of coins. The more coins in savings the smaller the return. This percentage is also affected by the velocity of the coin. When the coin is on a positive cycle savings accounts will also provide more a better return. On the other hand when the coin is on a negative cycle savings return lower interests.
Again the logic behind this is stability.

When the coin is in a positive cycle more people will be utilising the coin due to the rewards. This may cause the value of the coin to increase dramatically due to speculation. Increasing the earnings from savings will help prevent against speculation as people may feel it is safer to put their coins into savings.

When the coin is in a negative cycle coin holders would be loath to use their coins and so would be inclined to put their coins into savings. If that were to happen then the transaction costs incurred during the negative cycle would be negligible. Therefore to reduce the creation of more coins during such periods the saving returns have to be much lower.
Ex. If 50% of all coins are in savings and velocity is in equilibrium then that would produce a return of 0.5%. When the velocity is on the first positive cycle that return would increase to 0.6%
If the velocity was on the first negative cycle (the beginning of the sine wave) then the return would decrease to approx. 0.42%
The returns for the savings do not change dynamically but are locked when entered into a contract. The saving percentage will update every hour. Those who wish to save at a certain percentage need only to just the amount. The amount and rate are locked providing returns until otherwise.
The interest rate may not seem like much but it is a monthly interest rate.

CUI and the Total Supply of coins

The problem with cryptocurrencies is that the total supply and circulating supply of coins is very rigid. There have been no attempts to create a system where the total supply can react to the value of the coin.
However having a coin refer to its price at some internet address makes it reliant on an external system increasing the danger of the coin being “hacked”.

GEM through the CUI aims to resolve the rigidity issue of total supply that all cryptocurrencies have. It does this because CUI is internally calculated thus allowing GEM to assess its own value and act accordingly.

When certain thresholds in the value of the coin are surpassed then the Total Supply Cap will be increased. However negative movements below thresholds will result in a reduced Total Supply Cap.
If the Total Supply Cap is smaller than the Total Supply then no new coins are minted.

Instead what happens is that when a transaction occurs coins will not be all destroyed. Half of the coins for destruction will be given to ONLY stakeholders as rewards.
Also all savings account will stop generating new coins as rewards.
Rewards are given until the circulating supply meets the total quantity. When all coins have been issued then the rewards situation will be as above with only stake holders receiving rewards.

Minting of New GEM coins

Transactions reward all parties involved with a certain percentage of the transaction and divided equally. This percentage is calculated the previous day.

Only transactions conducted by a smart contract count in rewarding the buyer and seller. That is, an actual transaction must have occurred. Ex. Buying or Selling GEM with/for Fiat or another Coin. Actual purchase of a good, so an exchange of GEM for goods and services.
To prevent people from abusing the implementation of such a system, a payment system protocol will be implemented (named Advanced Monetary Payment Logistics Enabler or AMPLE for short) that will provide merchants with a special merchant wallet that allows for such smart contracts to take place. Such merchant wallets will only be provided to verified merchants through KYC data. If necessary and to facilitate faster merchant adoption, AMPLE can be licensed/contracted to third parties in specific regions. Aforementioned 3rd parties will be in charge in making sure merchants are bona fide and verified. Furthermore the system will alert all wallet holders when suspicious trading activities are detected; namely when a large portion of a merchant account's incoming coins seem to occur only when the velocity cycle is positive.
If the managing entity for that merchant account fails to make a public notice within good reason regarding the nature of the merchant and that it is not someone abusing the system POS-locker nominees will have the authority to ban the merchant account.
Also in case a merchant colludes with a consumer through a third party by transferring coins this would be considered money laundering and or embezzlement or any other financial crime and would be subject to the attention of financial authorities involved in financial crimes. Verified merchants have to submit financial statements to financial authorities so it would be hard for them to abuse the system.

When AMPLE is utilised the reward is divided in three, a third goes to the customer, a third to the merchant, and the last third goes to AMPLE (or the managing entity for that merchant/region).

- In the case of a Crypto exchange the rewards are equally divided between buyer and seller. (Since exchanges charge fees anyway).

Transfers between accounts do not provide rewards.
Pure transfers will incur a very, very small transfer fee that is included in the reward given to POS-lock nominees.

Wallets and POS-lock system

GEM Wallets have special sub-wallets.
An option for cold storage will be implemented with a minimum lockup period of 1 year.
This is because all GEM in cold storage will not receive any rewards or penalties.

Type of Sub-wallets
POS-Locker: This wallet is utilised to bid GEM coins for the purpose of obtaining a nomination. 2 days before the end of the month, the nomination for the new POS-lock list starts. At the end of the two days (so at the end of the month) all POS-lockers (sub-wallets) are locked and the top 500 POS wallets are nominated for the following month's POS-lock distribution system. The wallets that do not make the list of 500 are unlocked and funds can be moved out of them. The incumbent 500 POS wallets have a one day overlap with the new nominees to increase the security and integrity of the data and after the day is over the funds can be moved out of them.

During the 2 days when nominating the new POS-lock list, only the top ten positions are revealed in real time to give an idea on the amount of UNICs that are being allocated to the wallet. In common terms the POS-lock list is run in a sealed-bid auction style but where the top ten positions are known and the top 500 are picked.

Only after the nomination is closed the whole list is made public.

Since all nominees receive the same reward a sealed bid auction would prevent the annoying step gain increases and bid fighting that occurs. Also it makes it fair since reward is not allocated by staked percentage.

However this system would mean that there would be those who would utilise multiple wallets to achieve a larger payout. But managing multiple wallets is a dangerous and time consuming endeavour. It's not so easy to manage multiple wallets and the amounts needed to achieve the top 500 threshold since it is a sealed-bid auction style.

By preventing a monopoly on the payout it also ensures that no one entity can control the POS-lock.

Also the overlap in POS-locker is on purpose. The release of your GEM coins will happen when the nomination is over. This prevents the same people from monopolising the system and allows many more people to participate in the POS-lock nomination.

Savings wallet: Every hour the savings rate is displayed on the wallet.
You can immediately transfer coins to your savings wallet.
Whenever you choose you can lock the wallet at whatever savings rate is displayed to lock the amount and the rate.
Only two Savings account will be allowed per wallet.
The first savings account will offer the full savings rate.
The second savings account will only offer half the savings rate.

All coins (except those in cold storage) are affected by the Emergency Monetary Purge or EMP for short.

Reasoning and security for such a POS system

Only those that have downloaded the complete wallet, which means also downloading all the transaction data, will have the option for the POS-locker. Transaction data will increase over time and individuals should be rewarded by the ledger using their hard disk space.

Having 500 nominees means that there is a large pool to ensure that any attacks are thwarted. An 80% majority of connected POS-lockers is utilised for confirmation purposes. That means 400 out of 500. So any hacker would need to control 400 of the POS-locker accounts to do anything at all. And they would need to control it within that month. Only accounts connected to the internet and hence the network are eligible for the rewards and are counted.
If for some reason half of the POS-locker accounts are not connected to the network at any one time the GEM wallet will alert ALL previous nominees within 12 hours in a sequential random manner, giving them the opportunity to be an emergency nominee. The stake amount will be designated as the smallest currently staked amount from a POS-locker *connected* to the network. This will be strictly on a first come first serve basis.
The term for the emergency nominees will be the remainder of the month plus the next month (UTC standard time, that's GMT for some of us).

Ex. On the 25th of August half of the current nominees located in India, China, and South Korea are cut off from the internet due to a cryptocurrency ban preventing their computers from accessing the network.
The GEM wallet alerts all previous nominees on a random sequential manner. Emergency nominees are elected in a first come first serve basis to ensure the integrity of the system. These emergency nominees will end their term not on August but on September. This ensures a quick recruitment process

as the amount to be staked is designated as the smallest currently staked amount from a POS-locker connected to the network and these emergency nominees have the added bonus that their POS-locker will be carried over into the next month at a very reasonable stake amount. The randomness of the alert will prevent any planned abuse from any cartel or group to create a shutdown in hopes of benefiting from becoming an emergency nominee ***since***…. all rewards are equally distributed between POS-lock nominees. So if the nominees from India, China, and South Korea were to return to the system then the rewards would be distributed between 750 nominees for the remainder of the month. Certainly not a pleasant prospect.

This should further help discourage anyone from undermining the system and would hopefully make any POS-locker nominee more mindful of their computer and internet connection.

Since POS-lock nominees overlap it ensures that there are at least 1,000 computers available in the pool. Enhancing the flexibility and safety of the system.

One important aspect of GEM is to have the number of nominees grow or reduce with the current total amount of coins. The current idea is to have 500 nominees minimum that increase by 500 per velocity level.
So at a speed of 1 and below 500 nominees are chosen and will be the minimum.
A speed of 2 makes 1,000 nominees.
A speed of 2.5 makes 1,250 nominees.
The number of nominees to appoint will be calculated per quarter period.

Supernodes

Entities involved in the managing the AMPLE system will also operate as supernodes.
Supernodes will ensure transaction speeds and in case of emergencies can act in lieu of POS-locker nominees; ex. if the minimum 500 nominees to maintain integrity cannot be met, or a consensus cannot be reached by the nominees (due to future cyber attacks that may cause unforeseeable problems)

In case a consensus cannot be reached by the nominees it will require only a supernode majority of 51%.

If the problem is not regarding data or blockchain history but requires some sort of vote then voting will be done by the rules of 1 coin = 1 vote. Voting will be done through a voting system to be implement on the official wallet.

Advantages of GEM

GEM is alive, it changes as its use changes, it changes along with its users. A decentralised coin that can actually be used as a currency should be able to dynamically change without any singular person creating or destroying coins. It needs to be detached from such manipulation and have dynamic change in order to survive.
GEM tries to achieve just that.

2nd-tier coin - GEGold coin

A year after the implementation of GEM coin, the next move is to create GEGold coin.
GEGold coin is a limited, lightweight, inert, centralised coin that has zero transaction costs and has almost instantaneous transfers. Since GEGold coin is centralised, the coin itself will only contain a month long transaction history. While the whole history will be kept by GEGold.org and kept strictly confidential and have several backups in place.

Only 500,000 GEGold coins will be created. A GEGold coin can only be bought with GEM coins at a rate of 1,000,000 GEM for 1 GEG at a GEGold exchange that will be created at Uxcoin.com. GEG can only be bought or redeemed in whole numbers but are divisible by 10 for practical transactional and transfer purposes. So you can send 0.1 GEG to someone, but they can only redeem their GEG if they have 1 GEG in total.

The 1,000,000 GEM are placed in cold storage and can only be redeemed after the minimum cold storage period of 1 year has passed. The GEM wallet will be able to store both GEM and GEG.
The advantage and purpose of GEG:

1/ Large currency movers who do not want to influence the GEM value when dealing with large amounts of GEM. And are not concerned with accruing rewards for POS-lockers or transactions. The GEG system allows swift large transactions backed by actual GEM in cold storage and accessible within a reasonable time frame (since they are in locked cold storage for a minimum of 1 year).

2/ For long term investors who do not want to concern themselves in managing smaller amounts of GEM and want the security of a centralised system, and if they so want, Uxcoin.com can also keep the GEG in cold storage for free.

3/ Since the GEG system is centralised it has the power to correct any errors/bugs or hacks that have occurred. So any loss of SYGs for whatever reason can be reversed by reverting to previous blocks or by more intrusive means.

4/ GEGs will have a very short transaction history within them making them lightweight. Also only a month worth of transaction history will be stored in the GEG, used for syncing and verification.
Transactions themselves are not made available to the public
And will be encrypted at all times.
It will provide security to firms wishing to protect trade secrets, agreements and partnerships.

5/ Naturally due to KYC rules all those utilising GEGs will have to be verified and transactions involving GEGs into and out of GEGold.org are visible in the public register. But GEGold.org will act as a dark pool in the sense that who gives how may GEG to whom is not visible.

- However the above features may be subject to change depending on how regulations evolve and other technical details.

Purpose of a 2-tier decentralised and centralised system

The purpose of a 2-tier system is to bring greater stability to the GEM Coin. When GEM Coins are too abundant causing downward pressure to its price but the circulation rate is still large enough that transaction costs does not occur then a purchase of GEGs will remove GEM Coins from circulation hereby reducing the supply, hopefully increasing the value of the coin, and as a result simultaneously causing a larger increase in the velocity, which will either cause more transactions and increase the value due to the rewards or push the velocity into a negative cycle causing transactional fees.

A 1 minimum year cold storage period of the GEM used to buy GEG will mean that the GEM will not be brought back into circulation anytime soon and the GEG themselves will be circulated as means of payment or used as a store of value and traded for its equivalent market value.

When the value of GEM increase by a lot it would create an incentive for GEG holders to cash out, however a 1 year minimum period would prevent immediate cash outs.
When a GEG is changed into GEM and the GEM are brought into the market it will cause the coin supply to increase. Subsequent sales of GEM would lower prices.
But the pressure on prices would lead to a drop in trade for GEM.
A drop in transactions along with an increased supply of coins would dramatically lower the velocity hence incurring transactional costs should further sales of GEM occur.

Thus the daily price of a GEM coin would be affected by pure micro market forces with the GEG coins producing a macro effect on the overall flow.

The aim is to create stability in the value of GEM coins, with new value created not from the appreciation of the coin but from the increase in supply of the coin.

So rather than owning 1 coin that is worth 10 apples.
It is better to own 10 coins worth 10 apples.

Thus GEM strives to create and environment were instead of having the value of 1 coin increase it would rather have the value stay the same but instead provide more coins.

Hence the true utility of GEM is protected by having a stable value.

Relationship Case-study between Stakes, Savings, and transactions

By using a CUI of 41 ± 4 as a starting point and the following assumptions we can conclude outcomes as in the below table.

Assumptions:
1. All coin users are rational consumers and will try to maximise their wealth by minting new coins.
- That is, demand for the coin is created due to the rewards that can be obtained from utilising the coin.

2. Users are aware of the system and therefore crowd dynamics will cause tacit collusion.
- That is, users will come to the conclusion that having a stable value is beneficial to all since wealth can be created from minting of coins. And a stable value means more transactions can occur.

CUI	Total Supply Cap	Velocity dependent	Staking	Saving	Transactions	Outcome
> 45	<= Supply	All Negative	Receives rewards	No Saving returns	Coin burn	Inclination to stake more. Coin burn increases transaction costs. Less supply and less willingness to spend causes upwards pressure on value.
> 45	> Supply	Normal	Normal	Normal	Normal	Although coin is undervalued rewards are given out as normal until Total Supply Cap is equal to or smaller than Total Supply Cap
< 37	> Supply	Normal	Normal X modifier	Normal X modifier	Normal X modifier	When value is high and Total Supply Cap is larger than supply then all rewards have a modifier bonus to increase coin minting.

Equilibrium can be set for a value range of CUI between 37 and 45.
This will give the coin leeway to change in value until it becomes too overvalued or too undervalued.
The reason in using a range is to provide stability in the system when the value suffers from fluctuations. This will however depend on the time frame used to calculate the CUI. The smaller the time frame the larger the fluctuations and perhaps greater control of the value is possible. But that may cause too many changes in the total supply and other parameters bringing instability to the system.