

Gypsy: A new category of stablecoins

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Abstract

Stable currencies are the bedrock of all human transactions. Since time immemorial, our quest to create tokens that represent the golden triad of: (i) store-of-value, (ii) unit-of-measurement, and (iii) medium-of-exchange has been central to the evolution of stable global economies. Current stable coins are either backed by gold, or pegged to fiat currencies (like USD). Fiat currencies, in turn, are not backed by any underlying asset. As a result, the valuation of stablecoins is inherently subjective, speculative, or governed by scarcity. Currencies built upon speculative or non-existent assets are *unstable* by definition. The quest for a stable, decentralized, and reliable online currency remains an open problem.

This paper presents Gypsy: a brand new category of online currency whose stability is backed by *real-estate* and a *way of life* that revolves around such real-estate. First, pegging a currency to a network of carefully chosen high-value assets that are geographically diverse, smartly upgraded, and whose occupancy is actively managed provides *stability*. Second, creating a *lifestyle* that delivers to its inhabitants the freedom of renting and the financial gains of home-ownership paves way for a new way of life.

In combination, one is able to create a remarkably stable currency that is immune to war, disease, inflation and censorship; all the while being easy to liquidate. Gypsy can be readily implemented on top of existing blockchains that makes it peer-to-peer. Its inherent stability also makes it an attractive choice for yield farming, online payments, remittance, and in general, an alternative form of currency.

Total reinvestment of rental income makes for a powerful long term compounding effect. Regression analysis and statistical modeling reveal the bounding conditions required for Gypsy to predictably appreciate at a robust 15% every year as it consistently beats inflation, survives recession, and outperforms every global currency as a reliable store-of-value.

1 Introduction

What is money? Classical definitions [1] of money involve the triad of: (i) a store-of-value, which must be stable, (ii) a medium-of-exchange, with an implicit promise of liquidity and movement, and (iii) a unit-of-measurement, which allows us to measure the worth of one thing over another. As a species, we are unique in our need to create and circulate money.

From Cowrie shells to gold coins, from government issued fiat to Bitcoin [2], we have increasingly become better at creating forms of money that are great mediums-of-exchange and units-of-measurement. However, our quest to find a currency that consistently maintains its value by beating inflation (think decades) while being universally accessible to all has been hard to achieve.

Most existing currencies are poor stores-of-value because they are *not backed* by any underlying asset or commodity. They have no innate value beyond the belief placed by people using them. Government fiats, no longer backed by gold, are printed at will by central banks. All fiats are sovereign currency—they are issued and backed by the good “faith” and taxing power of the government that issues them. Further, a specific government’s role in trade-practices, war, disease control, inflation, sanctions and instabilities can seriously shake up the store-of-value property of the issued fiat.

Blockchain technologies promise to bring programmable money, or cryptocurrencies, to the masses. Their decentralized nature makes them available to anyone, anywhere; including the unbanked majority. Cryptocurrencies are fast becoming potent mediums-of-exchange: their online nature makes them flow easily across borders without involving banks. Yet, a majority of cryptocurrencies have no innate value whatsoever. Bitcoin, the most popular such currency, is inherently worthless.

Our lives are flooded with currencies that are poor stores-of-value. Yet we depend on them when drawing a salary, planning for retirement, passing generational wealth to our loved ones, remitting money across borders, streamlining peer-to-peer payments online, yield farming, and humanitarian aid, to name a few.

Historically, currency simply used to be pieces of precious metals (gold/silver). Lugging gold around with us became untenable which led us to print paper currency backed by gold. As world economies started to grow, there was simply not enough gold to back all of our currency. The total gold discovered in this world will fit into a cube 28 meters wide [6, 7]. Besides, gold has other fundamental problems: (i) it lacks real utility beyond jewellery and electronics, (ii) it does not generate any yield on it’s own—it’s just a chunk of metal, (iii) it is impossible to produce from scratch, it can only be mined; backing currency by gold places a predominant monopoly on continents where it is found.

At a valuation of \$10 trillion globally, real-estate is the largest asset class in the world. Unlike gold, real-estate has some lucrative properties: (i) it has real utility: people and businesses always need a roof on their heads, (ii) it generates a steady yield by virtue of rents and/or mortgages, (iii) it cannot be “stolen” or transported unlike gold, (iv) while it takes some effort to produce, building homes is a global phenomenon not limited to geographies, and (v) the amount of inhabitable land on this planet is a constant; meaning one cannot produce real-estate unbounded unlike fiat currencies.

The problem with real-estate, however, is that it is highly illiquid and greatly monopolized. Buying and selling homes is an long, arduous process involving many middlemen. In the United States, access to real-estate as an investment class is limited to accredited investors in the form of REIT. Banks are the primary lenders of mortgages, and the government is the primary purchaser of mortgage backed securities (MBS). We aim to break this cycle by creating a programmable currency that is backed by liquid real-estate while being available to everyone.

This paper presents Gypsy: a unique category of programmable online stable currencies that compellingly delivers on the golden triad. Gypsy’s primary benefit is its *store-of-value*, which is able to beat inflation. Gypsy is simultaneously: (i) pegged to the USD, and (ii) backed by a network of yield generating high-value real-estates that are carefully chosen, strategically upgraded, and whose occupancy is closely managed.

1.1 Design Goals

We strive to create a stable currency that brings with it the power of crypto while mitigating inflation and devaluation of fiat(s) that it is pegged to. More formally, our design goals are as follows:

1. **Collateralized “store of value”.** The currency should be an extremely reliable *store-of-value*. All fiat-currencies and most cryptocurrencies today are non-collateralized, meaning they are not backed by anything tangible and have no inherent value.
2. **Stable.** The currency should be stable and hold its value in the short- and long-term, devoid of algorithmic manipulations. While a simple way to do this is to peg it to a fiat, further mechanisms are needed to counter the fluctuations of the underlying fiat itself.
3. **Beats inflation.** Although the token is pegged to fiat to ensure liquidation, the collateralized backing should be appreciate at a rate that surpasses the inflation of the fiat that it is pegged to. Beating inflation is central to the currencies ability to be a stable store-of-value.
4. **Available to everyone.** The currency must be global and available to everyone, including populations that are unbanked.
5. **Alternative investment class.** Currency should democratize access to global real-estate to all of humanity paving the way for people to directly own our inhabitable land without middlemen.
6. **Easy to liquidate.** Maintain a 1:1 backing of liquid fiat at all times. Stake the token to invest in real-estate, which must be easy to liquify at the end of staking.
7. **Transparent.** All transactions in the network must be publicly visible. Further, routine audits of the assets that back the currency be made transparent.

2 Background of Currencies

This section provides a brief tour of current currencies in circulation with a particular emphasis on store-of-value, which embodies stability. We take a closer look at fiats, cryptocurrencies, and stablecoins through this lens.

2.1 Fiat currencies are a poor store-of-value

In the past several hundred years, nation states started to print currencies that were either backed by gold or a promissory debt obligation underwritten by the government. Government issued tenders such as the US Dollar, Chinese Yuan, Russian Ruble, and thousands of other national currencies became our de-facto standard for storing, exchanging, and measuring value. Banks would go on to become the authoritative middle-men in moving money.

We have come to think of such currencies as the ultimate store-of-value. This has turned out to be completely untrue both in the short- and long-terms.

Short term havoc. The three most prominent examples of extreme devaluations are the German Mark (1924), the Zimbabwean Dollar (2008), and the Venezuelan Bolivar (2018).

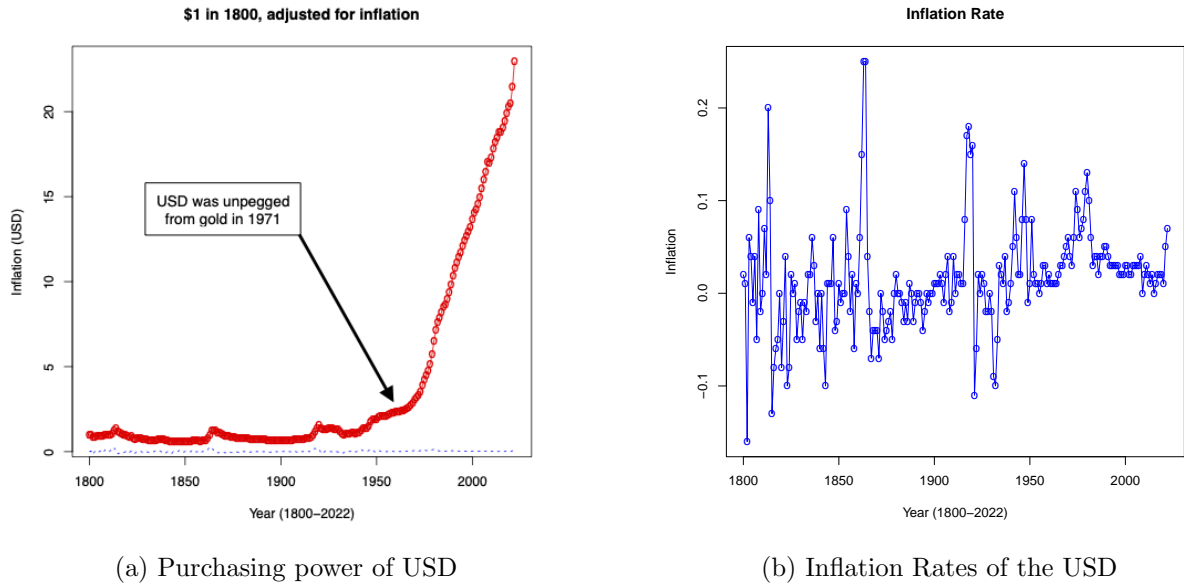


Figure 1: In the past 200+ years, the US Dollar has inflated considerably. Of note is the sharp devaluation ever since the “gold standard” was abandoned (1971 and beyond).

Within a span of 1 year, each of these currencies inflated on a scale of $1 : 10^{12}$. While extreme, they underscore the inherent instability of government currencies.

Long term erasure. At the time of this writing, the US Dollar is the standard bearer of stability and it is often used as a unit-of-measurement for assessing the GDP and/or stability of other national currencies in foreign exchange. While this might be true when assessing the relative health of another currency in a short window of time, how stable has the US Dollar been in the long term?

Figure 6a shows the inflation for the United States Dollar starting 1800. Historically, the USD was backed by gold until 1971 [5]. The dollar exhibited remarkable stability until then, only to spiral out of control beyond 1978. Even in the last decade or so, the inflation has been 1.5x. And all of this is for the world’s most stable currency.

2.2 Cryptocurrencies are volatile

Bitcoin [2] ushered a new form of decentralized, peer-to-peer currency which operates without the need for a central bank. Transactions are recorded on a blockchain, which is an immutable ledger that is seemingly tamper proof. The Ethereum [3] project built upon these concepts to enable cryptocurrency creation accessible to any developer. In just the past decade, there has been an explosion of cryptocurrencies, a majority of which have been built on Ethereum (referred to as ERC20 tokens [4]).

However, the volatility of Bitcoin, Ethereum, and countless others is well documented. In 2010, for example, a programmer purchased pizza for 10,000 Bitcoins — worth roughly \$688M at Bitcoin’s peak in November 2021. On the flip side, any merchant that accepted those Bitcoins at that peak price would have lost more than \$200M by the end of the year. Similarly, Microsoft first started accepting Bitcoin as a payment in 2014, only to put a temporary halt on it in 2018 due to volatility. Online gaming platform Steam was forced to do the same.

Such volatility has created instant millionaires, while also wiping billions of dollars worth of value from exchanges in minutes. Although the emergence of exchanges has enabled cryptocur-

rencies to become great mediums-of-exchange, they are still a far cry from becoming reliable units-of-measurement. Most importantly, they turn out to be terrible stores-of-value. We argue that the inherently weak store-of-value makes cryptocurrencies useless when using them as a unit-of-measurement (e.g., assigning value to an “object” such as a loaf of bread using Bitcoin makes little sense).

2.3 Stablecoins are a fallacy

Stablecoins are a category of cryptocurrencies that are designed to be less volatile. They inherently enjoy the benefits of cryptocurrencies – transparency, security, immutability, and, in some cases, decentralized control – but their value is “pegged” to a collateral or an underlying asset (which is oftentimes a fiat currency). A collection of popular stablecoins is shown in Table 1. This section takes a deep dive into the world of stablecoins as we analyze their strengths and weaknesses.

2.3.1 Fiat-backed stablecoins

The most common and easy to understand type of stablecoins are backed by – or pegged to – fiat. At this time, USD is hands down the most popular, followed by Yuan and Euro.

The basic idea is to back a stablecoin by a fiat at a 1:1 ratio. In essence, a stablecoin becomes a mirror image of a fiat in the decentralized world. So for each stablecoin that exists, there is (theoretically) real fiat currency being held in a treasury to back it up. When someone wants to redeem cash with their coins, the treasury will take out the amount of fiat from their reserve for liquidation. The equivalent number of stablecoins is then “burned” or permanently removed from circulation.

Fiat-collateralized stablecoins are pretty much the simplest structure a stablecoin can have, and simplicity has big advantages. It’s easy to understand for anyone new to cryptocurrencies — which, in turn, can allow for more widespread adoption. As long as the economy of the country the currency of which a stablecoin is pegged to stays relatively stable, the value of a pegged coin shouldn’t fluctuate much either.

However, although issuers of fiat-collateralized stablecoins typically claim that their cryptocurrency is backed by fiat currency at a 1:1 ratio, this is not always true. The stablecoin issuer might place cash reserves in other assets, such as corporate bonds, secured loans, or investments.

Such has been the case with Tether (USDT) and USD Coin (USDC), the most popular USD-backed stablecoins. Both have stirred controversy in recent years as their claims of a 1:1 stablecoin-to-fiat ratio have come under scrutiny. An investigation by the Commodity Futures Trading Commission (CFTC) found that from 2016 to 2019, Tether falsely claimed to have held an equivalent amount of fiat currency for every single USDT. In October 2021, the CFTC ordered Tether to pay a fine of \$41M. Tether’s attestation report shows that only 10% of its reserves were in cash and bank deposits at that time — a far cry from a 1:1 ratio.

A similar controversy surrounds USDC, which is managed by a consortium that includes digital currency company Circle and cryptocurrency exchange Coinbase. USDC’s issuers have claimed that it is “always redeemable 1:1 for US dollars” and fully backed by US dollars held in a bank account. However, Circle revealed in July 2021 that only 61% of USDC reserves were in cash and cash equivalents; the rest comprised certificates of deposit, US Treasuries, commercial

paper, corporate bonds, and municipal bonds. The following month, Circle announced that, going forward, USDC reserves would comprise only cash and US Treasury bonds.

Despite these issues, demand for the two stablecoins remains high — USDT is the third-largest cryptocurrency by market capitalization as of January 2022, behind only bitcoin and ethereum. Some stablecoin issuers have submitted to strict regulatory oversight to help assure their customers of their cash reserves. For example, the Pax Dollar (USDP) and Gemini Dollar (GUSD) are two USD-backed stablecoins that are regulated by the New York State Department of Financial Services. The issuers of the two coins publish monthly reserve audits that are verified by independent accounting firms.

There are numerous other fiat-collateralized stablecoins around the world. In Singapore, payments processor Xfers launched the XSGD stablecoin, which is backed 1:1 by the Singapore dollar. In Europe, tokenization platform Stasis' EURS token is collateralized by the euro.

2.3.2 Commodity Collateralized Stablecoins

Commodity-collateralized stablecoins are backed by other kinds of interchangeable assets. The most common commodity to be collateralized is gold. However, there are also stablecoins backed by oil, real estate, and various precious metals.

Holders of commodity-backed stablecoins are essentially exposed to the value of a real-world asset. These assets have the potential to appreciate — or depreciate — in value over time, which can affect the incentives for trading these coins. Commodity-backed stablecoins are sometimes marketed as a way to open up certain asset classes, like real estate, to smaller investors.

Digix Gold (DGX), for example, is an ERC-20 token (built on the Ethereum network) backed by physical gold, where 1 DGX represents 1 gram of gold. This gold is stored in a vault in Singapore and gets audited every 3 months. The creators of DGX claim they have “democratized access to gold.” DGX holders may even redeem their coins for physical gold — they just have to go to the vault in Singapore to do so.

2.3.3 Crypto Collateralized Stablecoins

These are stablecoins backed by other cryptocurrencies. In theory, this allows crypto-backed stablecoins to be more decentralized than their fiat-backed counterparts since everything is conducted using blockchain tech. To reduce price volatility risks, these stablecoins are often over-collateralized so they can absorb price fluctuations in the collateral.

For example, to get \$500 worth of stablecoins, you would need to deposit \$1,000 worth of Ether (ETH). In this scenario, the stablecoins are now 200% collateralized, and even in the event of a 25% price drop, the \$500 worth of stablecoins are collateralized by \$750 worth of ETH. And if the price of the underlying cryptocurrency drops low enough, the stablecoins will automatically be liquidated. Additionally, they are often backed by multiple cryptocurrencies in order to distribute risk. They can also allow more liquidity than commodity-backed stablecoins, as they can be quickly converted into their underlying asset.

Crypto-backed stablecoins are a relatively complex form of stablecoin and have not gained as much traction as other approaches. The most popular example of a crypto-collateralized stablecoin is Dai. Created by MakerDAO, Dai is a stablecoin that has a face value pegged to USD, but was initially designed to be backed by ETH that is locked up in smart contracts.

Symbol	Mechanism	Current Price
USDT	Fiat-backed	\$0.999
USDC	Fiat-backed	\$1.000
BUSD	Fiat-backed	\$1.001
TUSD	Fiat-backed	\$1.001
HUSD	Fiat-backed	\$1.001
GUSD	Fiat-backed	\$1.006
USDN	Algorithmic	\$0.975
USDD	Algorithmic	\$0.999
UST	Algorithmic	\$0.001
FEI	Algorithmic	\$0.991
DAI	Crypto-backed	\$1.000
MIM	Crypto-backed	\$0.999
LUSD	Crypto-backed	\$1.006
VAI	Crypto-backed	\$0.946
MIMATIC	Crypto-backed	\$0.990
USDX	Crypto-backed	\$0.831
CUSD	Hybrid	\$0.997
MUSD	Hybrid	\$1.004
FRAX	Hybrid	\$0.999

Table 1: A list of popular stablecoins in July 2022. Each of these coins is collateralized by a fiat (e.g., USD), other cryptocurrencies, and/or an algorithm that adjust mint/burn based on supply and demand.

2.3.4 Non-Collateralized Stablecoins/Algorithmic Stablecoins

Like USDC, Dai has become crucial to many DeFi applications. By nature of being decentralized, anyone can generate, buy, or sell Dai. Developers in particular can easily build decentralized apps, or Dapps, on top of the Ethereum blockchain using Dai as a stable medium of exchange. However, Dai is infamous for Black Thursday, a black swan event in March 2020 where a momentary increase in its price (triggered by the confluence of an ETH price crash and a clogged Ethereum network) led to \$8M worth of liquidations for zero Dai. MakerDAO appears to have learned the perils of relying solely on volatile crypto assets. It is now diversifying its collateral base to include stablecoins like USDC and “real-world assets.” For example, French bank Société Générale-Forge has proposed backing Dai with \$40M in bonds.

Confidence in the stablecoin has since rebounded — Dai’s market cap increased by 800% from September 2020 to September 2021, and it remains one of the top five most popular stablecoins globally.

Another crypto-backed stablecoin is Jarvis Network’s jFIATs, which track the price of their respective currencies against the American dollar and are backed by USDC. For example, \$100 (roughly £75) worth of jGBP would be equivalent to 100 USDC. There are several jFIATs, each of which acts as a digital version of a fiat currency, including euros, Canadian dollars, Swiss francs, and more.

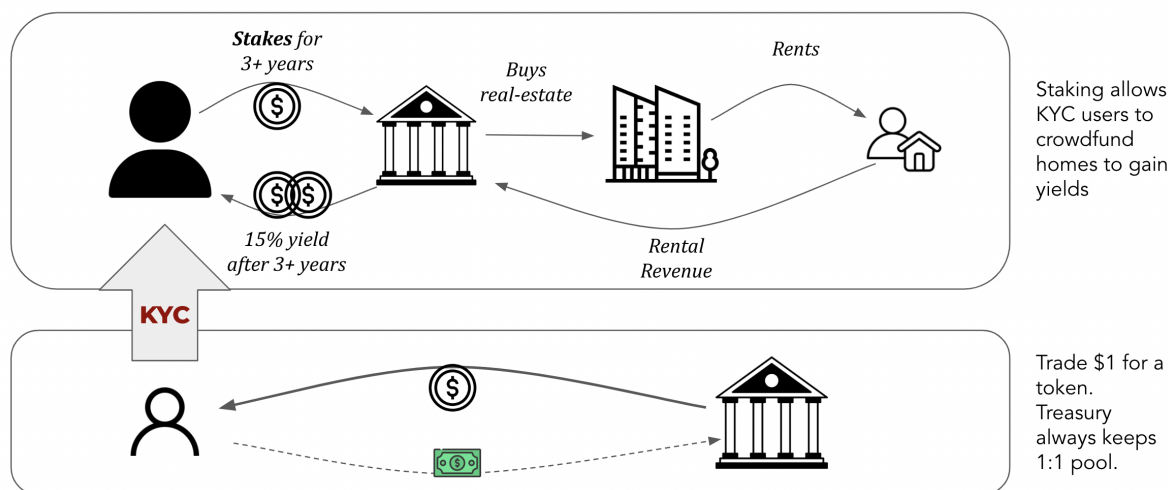


Figure 2: Process begins with users trading a fiat dollar for a token in return. Users can become investors with KYC verification. Investors can stake their tokens for 3+ years, allowing the treasury to purchase interest bearing high-value homes. At the end of the staking term, the treasury returns yields from the asset, which includes property appreciation and rental income.

3 Gypsy: A Stablecoin Pegged to Fiat and Backed by Real Estate

This paper introduces Gypsy: a new category of stablecoins that are pegged to USD while backed by real-estate. This section starts with a high-level overview of pegging and backing that account for the coin’s stability. We then look at generating yields by staking that coin in the network, algorithms for allowing new properties into the networks, caveats and pitfalls of operating at scale, as well as compliance and security issues.

3.1 High Level Overview

The base coin maintains a perpetual and consistent 1:1 backing of cash reserve at all times, while allowing token holders to gain more by letting the token purchase real estate. The architecture of the coin system is shown in Figure 2.

3.2 Always liquid with a 1:1 pegging

The process begins with a user converting USD to a Gypsy token by using a centralized exchange. The Gypsy treasury exposes two simple functions: mint and burn. The only clauses that trigger these functions is the movement of an actual fiat in or out of the treasury.

- MINT generates new Gypsy tokens when a corresponding USD amount is moved into the treasury.
- BURN destroys Gypsy coins when a user exchanges these tokens for USD.

This simple operation ensures a 1:1 pegging—the mint and burn are completely tied to the actual movement of USD in or out of the treasury. In essence there is no algorithmic manipulation of token supply by minting or burning tokens to create scarcity or cause inflation.

3.3 Motivations for backing tokens with real assets

While converting USD into a cryptocurrency brings with it the benefits of security, transparency and immutability, the process of moving fiat back and forth the crypto-sphere is inherently lossy. Most centralized exchanges charge a small transaction fee in addition to the gas fees that must be paid to record these transactions on the blockchain. With excessive back and forth conversion (especially at smaller denominations), the overhead racks up to almost 20%.

Further, the token is now pegged to the fate of the underlying fiat. Inflation of the fiat will continue to erode on the token's store-of-value, rendering it a poor choice for the user.

Our ultimate goal is to create a stablecoin that forever maintains an anchor value in fiat, *while also overcoming inflation and/or devaluation of the fiat that it is pegged to*. To make this happen, we take the next step by “backing” Gypsy with high-value real estate assets which are geographically diverse, strategically upgraded, and actively managed. While there are numerous ways to re-invest the fiat reserve in the treasury, we make a case for using real-estate as the primary source of backing for this currency.

3.4 Why Real Estate?

Fiat's store-of-value is a promissory note from the government. Moving the supply of a currency away from centralized governments will require a token to be backed by a real asset. This collateralization is needed to ensure its store-of-value and fight against inflation, war, disease and governmental policies.

Gold has long been the ultimate asset to collateralize currencies with because of specific attributes: (i) its supply is limited, (ii) it takes effort to mine and cannot be reproduced easily, (iii) it can be molded into jewellery that can be used by the bearer, and (iv) gold is resistant to corrosion from natural elements unlike most metals. These attributes in combination make it an excellent store-of-value. It is no wonder that generational wealth has been primarily passed down as gold for thousands of years.

We argue that real estate has these same properties and is actually able to one-up gold as a tangible store of value: (i) the amount of inhabitable land is a constant, so the supply is limited, (ii) it takes some effort to build homes, but this effort is much easier than mining gold, (iii) homes are a basic survival necessity: while one can live comfortably without jewelry, everybody needs a roof over their head, (iv) it is easy to upgrade/maintain homes to increase their value; in fact, the land on which that home is built appreciates in value because inhabitable land is a constant.

Why has this not been done before? While global real-estate is the largest asset class in the world, it is also the most illiquid. Buying and selling homes is a long drawn out process that involves property search, escrow, title transfer, contracts, due-diligence and mortgages, to name a few. Before the advent of blockchain, tokenization and the promise of decentralization, real-estate continues to be a monolith that is unable to back any currency.

3.5 Gold and S&P-500 beat home-value

If one were to put a \$1000 dollars equally in gold, real-estate and SP 500 a hundred years ago, what would return the most interest? Turns out, S&P 500 index stocks outperform gold and real-estate.

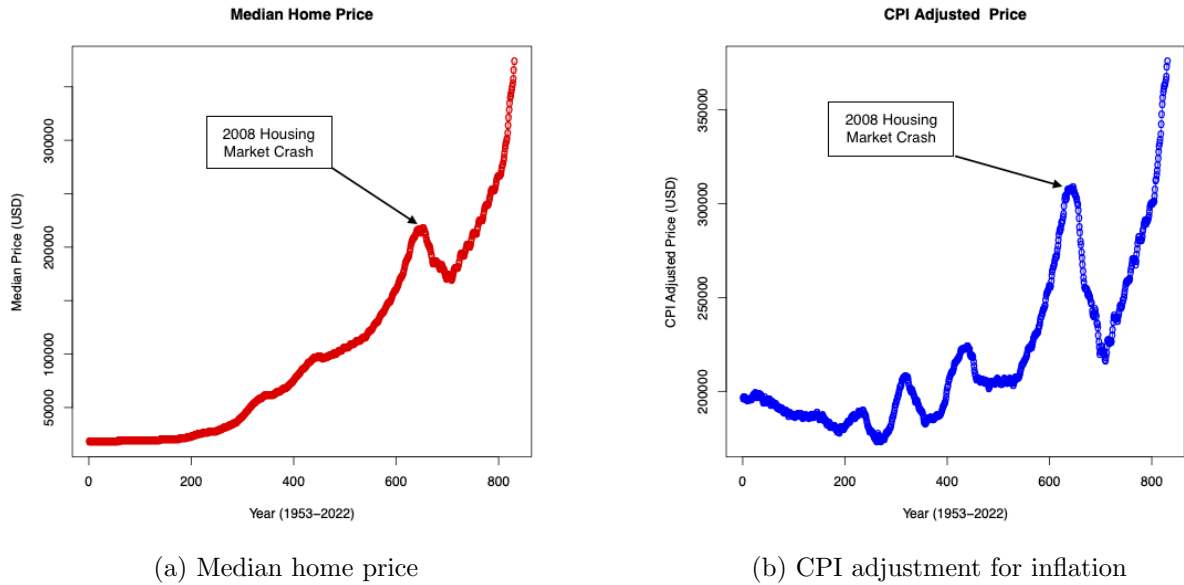


Figure 3: Valuation of real estate in the United States has been on the rise. Of note are periods of dips during the 2008 financial crises. Despite downturns, the overall market recuperates in the long term.

This is only true when the investment amount is used to simply buy properties without actively collecting rental payments or performing upgrades to increase home value. The underlying land often appreciates at 5% every year—a far cry from stocks or gold in a good year.

This motivates the need to perform more than just crowdfund a random series of homes on a marketplace.

4 Staking Gypsy: Backing by Actively Managed Real Estate

We allow users to voluntarily “stake” their tokens in the treasury for a locked in period of time. Such periods can range from 3 years to 30 years, with higher payouts expected the longer the assets are staked. As an example, staking for 3 years can generate 10% yield compounded every year, while staking for 30 years can generate 16% or more annually.

Once a token is “staked”, the treasury moves the fiat collateral to an account earmarked for purchasing, upgrading and maintaining high-value properties with strong occupancy. The account is controlled by an LLC which acts as the vehicle that owns, operates, rents, and/or sells the property on behalf of the ecosystem.

4.1 Staking: High level overview

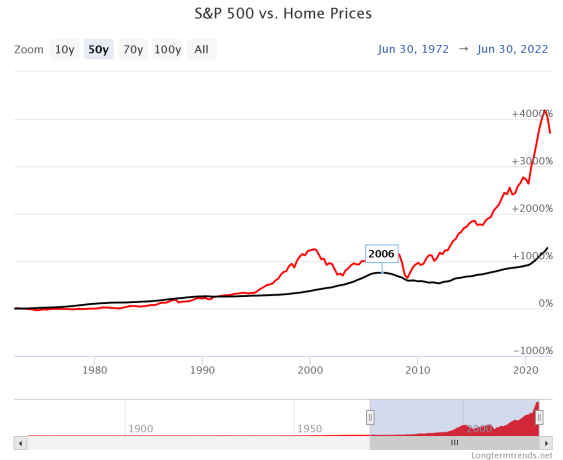
A purchaser becomes an investor by staking fiat-pegged stablecoins for a pre-defined period of years, which can range from a minimum of 3 years to a maximum of 30 years.

During this time, liquidation of staked coins to fiat currency is not permitted. Staking fires a smart-contract that burns the fiat-pegged stablecoin from the treasury and mints a new staked coin (sGypsy) in return. Notice that each sGypsy continues to be backed 1:1 by fiat in the reserve (which is what generated a stablecoin in the first place).

When sGypsy are issued, the treasury moves a corresponding amount of fiat into a special purpose vehicle (SPV), which is legally formed as an LLC, which now proceeds to earmark these



(a) Returns on gold v/s real estate in the past 100 years. Gold outperforms median home prices.



(b) Returns on S&P-500 index stocks outperform median home prices.

Figure 4: Gold outperforms real-estate as long as we only compare property appreciation without rental income or it's reinvestment. Same with S&P, which outperforms median home values not adjusted for inflation.

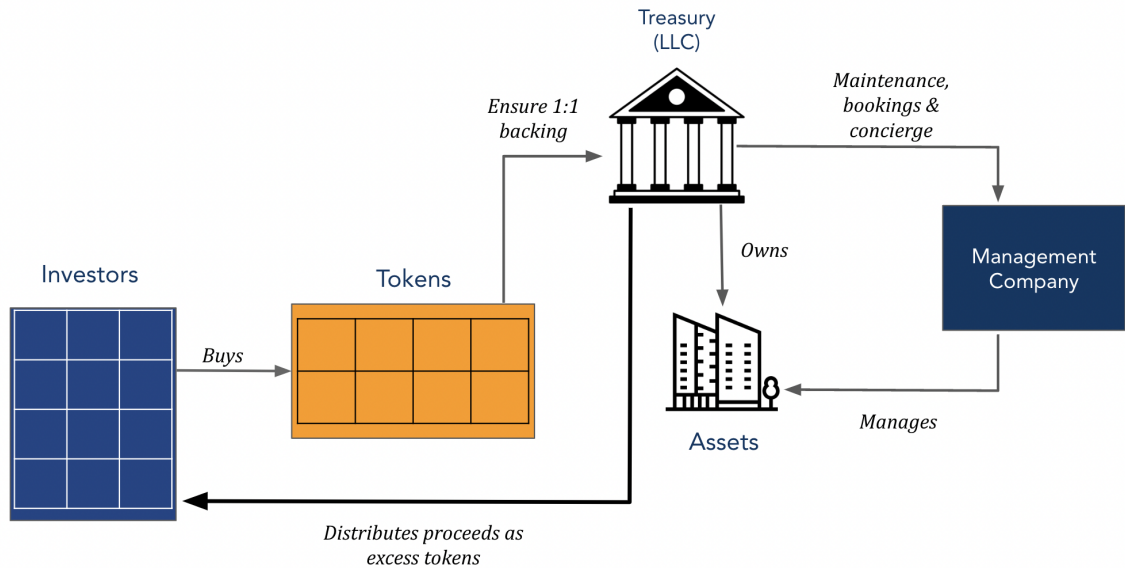


Figure 5: Investors “stake” their fiat-pegged tokens to now back their tokens with real-estate. This conversion allows the treasury to use staked fiat to purchase, upgrade and maintain high-value assets. Appreciation of the asset value and rent generate yields that are paid back to the investor via the staked tokens.

funds for purchasing new properties.

The SPV works with a management company (Gypsy City) to identify, inspect, procure, upgrade and maintain this property. The management company charges an overhead for this operation and employs personnel who are qualified to perform these roles.

The singular goal of acquiring real estate is to maintain yields that are above and beyond a 15% threshold compounded annually. Specifically, the purchase meets these criteria:

- Purchase real-estate in geographically diverse areas to minimize risk
- Perform due-diligence on property to ensure that major repairs are not forthcoming (e.g., roofing, plumbing, HVAC, and structural integrity)
- Upgrade property to significantly enhance quality-of-life for remote workers and/or vacationers who want to stay in the property for long term (more than 3 months)
- Allocate personnel for maintenance and repairs, including concierge services for guests who occupy the property

4.2 Hybrid valuations: AVMs followed by inspection by appraiser

The actual act of acquiring new real estate is based on a hybrid approach of automated valuation models (AVMs) followed by an in-person appraisal of AVM short-listed homes.

The SPV triggers crawlers to periodically identify homes from MLS listings that are suitable for purchase in highly desirable neighborhoods. The algorithm balances market pull (defined by strong desire in target population to live in certain cities) while maintaining geographical diversity to mitigate risk.

Although AVMs are on the rise for mass valuations, we are careful to not entirely rely on them because they are not always reflective of the true picture “on the ground”. For e.g., crawlers will miss key parameters like a recent kitchen upgrade or failing HVAC and instead base decisions on quantitative data that is index-able (e.g., square footage, rooms, baths, proximity to downtown/airport, etc.,).

4.3 Generating Yields: 15% or more

Assume a property wholly acquired and upgraded by the SPV for a round figure of \$500,000. This amount includes title transfer, escrow fees, inspection, and upgrades to make it highly desirable for long term stay.

Property Appreciation. As long as the property is in a highly desirable neighborhood, and that a collection of such properties is globally dispersed to mitigate risk, the associated upgrades combined with land appreciation will safely put the property at a 10% growth compounded annually.

Rental income. The Management Company upgrades every purchase to make it a stellar location for long term stays and remote workers. This includes gig-speed Internet, home-gyms, AR/VR work rooms, 24/7 concierges and more. Assuming a monthly rent of \$4500, of which we earmark \$2500 as payback to investors (in lieu of mortgage), this amounts to \$30,000 in rental income (or 6% gain).

Combining them both gives us a 16% year-to-year appreciation. The sGypsy coins will continue to compound on at this interest rate, all the while being backed by a real property, which can be liquidated into cash without relying on supply/demand manipulations of the currency.

5 Modeling and Simulation

A home left to itself is bound to disintegrate. For the property to maintain (or even appreciate) its value, repairs and upgrades are necessary.

To thwart the entire ecosystem of any yield whatsoever for a given year, we show that the failure rate has to hit an extreme. Even in such cases, insurance, repairs and maintenance is able to fix them within 6 months.

In the end, we would like to highlight that real-estate is a tangible asset that has innate value independent of market fluctuations. People live in homes, businesses operate out of buildings. No matter the conditions, homes have a utility that is far beyond what any modeling and simulation can capture.

5.1 Modeling failure rate

This section stress tests the operations of the proposed stablecoin at scale to understand the performance of the stablecoin in the face of constant failure. We begin by analyzing the failure rate of the system. We use "failure" in the most general term in this section. On one extreme, such a failure could include catastrophes at properties in the network that render it uninhabitable, such as fire or flood (nullifying gains until restoration). Or, it could be the failure of individual components within the home that make it momentarily less desirable (such as a broken modem or HVAC system).

Almost all mechanical systems follow a Weibull distribution of failure rates and times. For a distribution with parameters (α, λ) , the time to failure is defined as:

$$F(t) = \begin{cases} 1 - e^{-(\lambda t)^\alpha} & t > 0 \\ 0 & \text{otherwise} \end{cases}$$

The probability distribution function (pdf) is:

$$f(t) = \frac{d}{dt}F(t) = \begin{cases} \alpha\lambda^\alpha t^{\alpha-1} e^{-(\lambda t)^\alpha} & t > 0 \\ 0 & \text{otherwise} \end{cases}$$

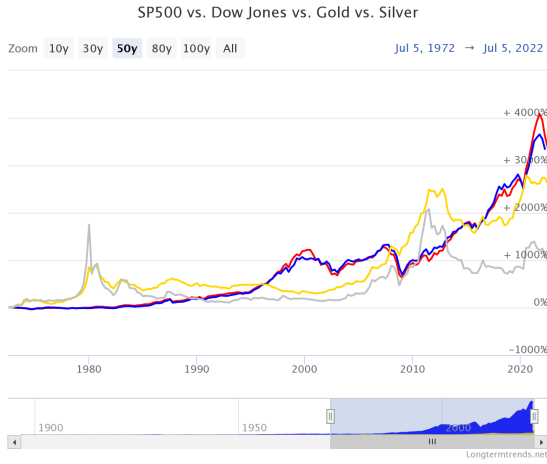
The survivor function is defined as follows:

$$R(t) = Pr(T > 0) = e^{-(\lambda t)^\alpha}$$

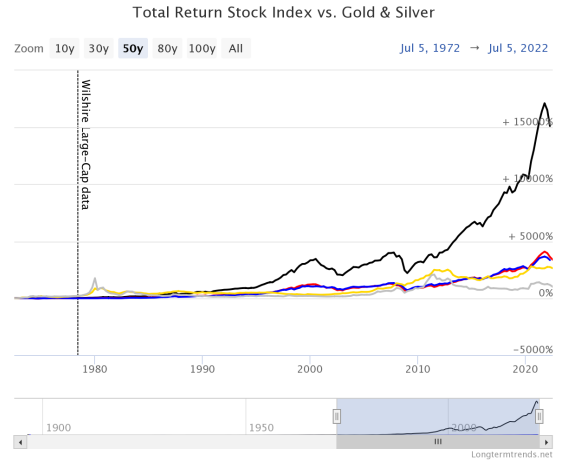
The failure rate function is as follows:

$$z(t) = \frac{f(t)}{R(t)} = \alpha\lambda^\alpha t^{\alpha-1}$$

Finally, we can write out the two most important parameters: mean time to failure (MTTF) and it's variance ($var(T)$):



(a) Of the four categories, S&P outperforms Dow, gold and real-estate



(b) However, staked Gypsy outperforms S&P, Dow, and gold.

Figure 6: Overall, S&P outperforms golds and median home prices. However, total re-investment of rental incomes tends to beat gold, S&P and silver by a big margin.

$$MTTF = \int_0^{\infty} R(t)dt = \frac{1}{\lambda} \Gamma\left(\frac{1}{\alpha} + 1\right)$$

$$var(T) = \frac{1}{\lambda^2} [\Gamma\left(\frac{2}{\alpha} + 1\right) - \Gamma^2\left(\frac{1}{\alpha} + 1\right)]$$

6 Caveats & Pitfalls

Stablecoins have their limitations. The Tether scandal provides an example of how a stablecoin can go wrong. Fiat-backed stablecoins are centralized, meaning they are run by a single entity. This requires trust in that this entity is actually backing up their stablecoins with real fiat.

To solve this trust problem, stablecoins could adopt approaches like providing regular audits from third parties to bolster transparency. Fiat-backed stablecoins are also constrained by all of the regulations that come with fiat currency, compromising the efficiency of the conversion process and the potential efficacy of the digital asset. For example, Facebook’s Libra currency promised a stablecoin backed by a basket of global fiat currencies, thus broadening the coin’s appeal and utility. However, it received so much regulatory blowback that the project’s management dropped its multi-currency aim, distanced itself from Facebook, and rebranded altogether. To this day, the network is still struggling to get regulators to sanction its own stablecoin.

By nature of being more regulated, stablecoins may also have less liquidity than regular cryptocurrencies. This is especially true for commodity-backed stablecoins. If you ever wanted to get your real bars of gold, for example, it could take months and an expensive trip to a physical vault. Moreover, there’s always the risk that the underlying asset crashes in value.

Think about “Black Wednesday” in the UK in 1992, or the 1998 Ruble crisis that occurred in Russia. If such an event occurs to the fiat a stablecoin is pegged to, it would be disastrous for that stablecoin as well. Crypto-backed stablecoins also come with their own set of issues.

Being pegged to other cryptocurrencies makes them much more vulnerable to price instability in comparison to fiat- or commodity-backed stablecoins. They are tied to the health

of a particular cryptocurrency (or combination of cryptocurrencies), which means that if that crypto plummets, the stablecoin ultimately will as well. In the event of a price crash, they will be auto-liquidated into the underlying crypto asset. This is another disadvantage to crypto-collateralized stablecoins: they're difficult to understand, which introduces a much higher risk for people holding them to face unexpected events.

Finally, even where stablecoins may offer the potential to streamline financial services, they will likely face pushback from local governments. For instance, in a country with high inflation rates, the government may look to block stablecoins pegged to foreign currencies in order to protect demand for the local currency.

7 Risks

What would a world run by a stablecoin look like? What if a stablecoin gained so much popularity that it outpaces government fiats and helps streamline financial systems so that entire businesses revolved around on them? Turns out, widespread adoption poses some acute risks.

7.1 Systemic Risk and Loss of Value

A recent US Treasury report on stablecoins discussed the systemic risk that a single stablecoin could pose if it becomes widely adopted. The risk is especially high with centralized coins, such as those backed by fiat and issued by private organizations, as economic power would be disproportionately concentrated on a single entity.

Tether is among the more likely coins to present such a risk, given its current market share of more than 50%. As Tether started failing, it undermined an entire ecosystem of apps, businesses, and consumers that used it. If the economy overheats and the value of Tether's non-cash collateral plummets, investors might try to cash out their stablecoins, only to find that the issuer can't give them back their money on a 1:1 ratio. Scenarios such as these can destabilize not just the crypto market, but also the wider financial system.

The widespread use of stablecoins in payment platforms also presents a systemic risk, according to the same report. The novel operational risks tied to the validation and confirmation of stablecoin transactions can interfere with payment systems. If millions of users can't access money in their e-wallets and businesses can't receive payments, economic activity would be greatly disrupted.

7.2 Threats to Market Integrity and Investor Protection

The ease and speed of transacting with stablecoins is conducive to speculative trading of digital assets, which can threaten market integrity and investor protection, according to the US Treasury Department.

Risks include market manipulation, insider trading, and front running. For instance, coin holders could speculate on an issuer's intention to change or rebalance its portfolio of reserve assets. The holders might buy and sell different assets while also making stablecoin purchases or redemptions in order to front-run their purchases.

A conflict of interest could arise when the stablecoin issuer also plays other closely related roles, such as operating a custodial wallet or owning an e-commerce platform that disproportionately incentivizes the use of their own coin.

There is also a lack of clarity and transparency on how the prices of some stablecoins are determined. In the aftermath of Black Thursday, MakerDAO users claimed they were told they would take only up to a 13% take-rate in a liquidation event. However, many users completely lost their holdings.

7.3 Illicit Activities

Stablecoins may be misused to break laws on anti-money laundering (AML) and countering the financing of terrorism (CFT). They may also help enable other illicit activities. A report by Chain Analysis reveals that much of the cryptocurrency used for illicit activities goes to scams and the darknet market. However, ransomware is an increasing threat — from 2019 to 2020, the amount of cryptocurrency funds lost to ransomware rose by 311

Factors that contribute to the risk of illicit activity include the increased use of stablecoins for cross-border transactions, the lack of global standards for stablecoin providers, the uneven implementation of AML/CFT standards among different countries, and the potential for anonymity when transacting in stablecoin.

8 Conclusion

Online programmable money has the power to rewrite currency as we know it, and pose a powerful alternative to government backed fiat currencies. Our quest to create a currency that is a reliable store-of-value, medium-of-exchange, and unit-of-measurement is vital to the creation of stable global economies. A currency that transcends boundaries, unites humanity, and is universally available to the banked and un-banked alike is a vital step in that direction.

This paper presented Gypsy, a stable currency that is pegged by fiat and backed by high-value real-estate.

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