

Token Accumulators: A Protocol that Systematically Captures Market Inefficiencies

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December 24, 2021

Abstract

This paper explains a new protocol that is designed to systematically capture market inefficiencies and translate it into tangible value for all its users. The goal is to allow users to accumulate more of a chosen underlying asset simply by holding the protocol's accumulator token. The protocol is inspired by Decentralized Finance 2.0 (DeFi 2.0), but is redesigned from the ground up to solve a couple of fundamental issues that plagued DeFi 2.0. The mechanics are explained in greater detail below.

1. A brief history of DeFi 2.0

DeFi 2.0 was championed by Olympus DAO with its native currency OHM. It is a novel concept of a currency that is backed, not pegged. Though each OHM was backed by 1 DAI to start with, OHM was allowed to trade freely above its backing value. To support the premium price, Olympus DAO introduced other important concepts such as bonding to grow their treasury, and high emissions to stakers through a term called rebasing.

2. Core issues with DeFi 2.0

The biggest issue plaguing DeFi 2.0 is constant selling pressure. While bonding is beneficial to the protocol, selling is not. Unfortunately, in practice, bonding is often paired with the selling of the protocol's token, producing a net negative result for the system. This is because bonding is often more profitable than simple staking, which incentivizes existing users to repeatedly sell their protocol tokens in order to purchase bonds. Assuming no new users, the net effect is all selling with no buying.

The other core issue is the unreliable backing value. Arguably, the backing value is the most important financial factor to the users as it puts an absolute floor to the token's worth. If the backing value can decrease, it puts into question whether the token can hold its worth. Unfortunately due to how DeFi 2.0 is designed, the backing value per token will decrease under a variety of circumstances.

In the absence of new money, these core issues will inevitably lead all DeFi 2.0 projects down the same unfortunate path; this happens due to the constant selling pressure. If the protocol continues to sell bonds and push emissions, it will erode the backing value per token even if the treasury is completely filled with stablecoins. This results in the backing value trending towards zero, rendering the protocol's token worthless.

3. Welcome to Token Accumulators

We consider Token Accumulators to be an evolution to DeFi 2.0; DeFi 2.1 perhaps. On a high level, DeFi 2.0 projects capture value when its token price trades above or below its intrinsic value. Token Accumulators retain this same fundamental concept, but without its flaws. As these flaws were inherently baked into the DeFi 2.0 design, Token Accumulators had to be entirely rewired. While the redesign does not feature the spectacularly high yields that some DeFi 2.0 projects offer, Token Accumulators promise that its *backing value will only ever increase*.

4. Key components of Token Accumulators

A) A volatile underlying asset

The protocol captures values via market inefficiencies between the underlying asset and the wrapped asset. High volatility means a higher probability of these inefficiencies occurring. This is why having a volatile underlying asset allows for the best result. In theory, stablecoins should work too as they do move a little. However, the protocol will not be able to capture as much value.

B) A wrapped version of the underlying asset

The underlying asset and the wrapped asset will always have a 1:1 backing. However, the wrapped asset is free to trade in any direction. The difference between the two prices is how the Token Accumulator will accrue value for its users. The difference in price may happen due to a change in the underlying asset price, the wrapped asset price, or both.

C) A distribution mechanism

We propose the elegant solution of an Accumulator Index. When profits are made, the protocol increases the Accumulator Index accordingly. Users can realize their profits by downgrading their accumulator tokens back into wrapped assets which will result in them having more wrapped assets than before.

Wrapped Treasury + Accumulator Treasury = Total Treasury

Total Treasury	
Wrapped Treasury	Accumulator Treasury
The Wrapped Treasury is what backs the wrapped assets. Wrapped assets are backed 1:1 with the underlying asset. For example, if there are 100 wrapped assets, there will be 100 underlying assets in the Wrapped Treasury.	The Accumulator Treasury is what backs the accumulator tokens. All profits will go into this treasury increasing the backing per accumulator token. This is the distribution mechanism and this is how accumulator token holders accrue more of the underlying asset over time.

D) An inefficiency capturing mechanism

If the wrapped token price is greater than the underlying asset price, the protocol should sell discounted wrapped tokens to incentivize users to purchase from the protocol directly. If the wrapped token price is lower than the underlying asset price, the protocol should use its treasury to purchase the wrapped tokens from the market then burn the acquired tokens. Either action will accumulate more value per token.

5. Dynamic Profit Distribution

DeFi 2.0 projects have a target emission value and will mint new tokens based on that value. In the unfortunate event where the combined backing value of the new tokens minted exceeds the profits generated through bond sales, the backing value will fall. If the protocol continues to mint without income, the dilution will eventually corrode the backing value entirely.

This is where Token Accumulators are different; they are designed to issue rewards only when the protocol makes a profit so the backing value always increases. In addition, it distributes the profit immediately as opposed to the 8-hour timer that most DeFi 2.0 projects use.

We call this system Dynamic Profit Distribution (DPD).

“Dynamic” because it issues the profits immediately when made, and “Profit Distribution” because it is purely a profit distribution mechanism. The DPD is the heart of Token Accumulators and is the key mechanical difference between DeFi 2.0, and DeFi 2.1.

Examples

Accumulator Token Supply		100	
Accumulator Index		1.50 UA	
Scenario A: Bond Sales		Scenario B: Buyback	
Bond Price	1.2 UA	Wrapped Asset Price	0.9 UA
Bonds Sold	10	Wrapped Assets Bought	2
Profit per Bond	= Bond Price - WA Price at Par = 1.2 UA - 1 UA = 0.2 UA	Profit per Wrapped Asset	= WA Price at Par - WA Price = 1 UA - 0.9 UA = 0.1 UA
Total Profit	= Bonds Sold x Profit per Bond = 2.0 UA	Total Profit	= WA Bought x Profit per WA = 2 x 0.1 UA = 0.2 UA
Profit per Accumulator Token	= Total Profit / AT Supply = 2.0 UA / 100 = 0.02 UA	Profit per Accumulator Token	= Total Profit / AT Supply = 0.2 UA / 100 = 0.002 UA
New Accumulator Index	= Accumulator Index + Profit per AT = 1.50 UA + 0.02 UA = 1.52 UA	New Accumulator Index	= Accumulator Index + Profit per AT = 1.50 UA + 0.002 UA = 1.502 UA

AT = Accumulator Token

UA = Underlying Asset

WA = Wrapped Asset

6. Solving DeFi 2.0's issues: Unreliable backing value

The DPD replaces the old target emission mechanism that DeFi 2.0 projects use. Because the Token Accumulator emissions are fully based on the protocol's profitability, emissions in DeFi 2.1 will never cause the backing to decrease.

The other scenario where the backing might decrease is if the treasury drops in value. In DeFi 2.0, it is common for projects to keep their own tokens in their treasury. Unfortunately, this means the treasury will drop if the token price drops. Therefore, each Token Accumulator project should have its treasury purely composed of the underlying asset it is trying to accumulate.

These two tenets ensure that the backing value will never decrease.

7. Solving DeFi 2.0's issues: Constant selling pressure

The constant selling pressure can be traced to one factor: The selling of the protocol's token to purchase discounted bonds.

In our Token Accumulators, there will be a delay for the user to downgrade their accumulator token into the wrapped asset. This is akin to putting a delay for unstaking in DeFi 2.0. This feature alone should eliminate the majority of the selling pressure as most users are invested for the high yield.

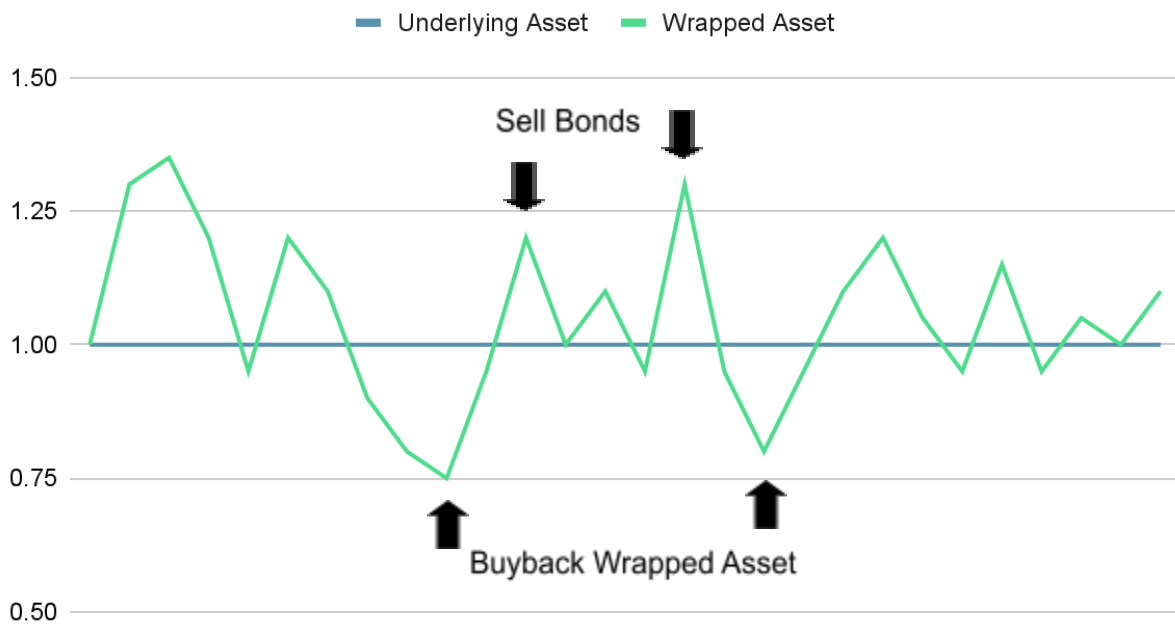
Since there is a delay to convert their high-yielding asset to a non-yielding asset, users are unable to immediately use their high-yielding assets to purchase bonds. For these users, they will have to use fresh funds if they wish to purchase attractively priced bonds immediately.

There is however, a smaller subset of users who may choose to ignore the high-yielding asset. Assuming a constant token price, since bond prices are discounted users can profit by buying bonds and selling the non-yielding asset. This cycle can be repeated indefinitely. The net result will be the slow degradation in price. While this will break DeFi 2.0 projects, it is not an issue for DeFi 2.1.

Unfortunately for DeFi 2.0, there is no natural catalyst for the price to move once touching the par value. This means the project will stall. However since DeFi 2.1 utilizes volatile tokens as the underlying asset, there should always be opportunities for some deviation in pricing. If the wrapped asset price is higher, bond sales can resume. And if the price is lower, the protocol can buy its tokens back from the open market.

In summary, Token Accumulators reduce the selling pressure greatly, but do not eliminate it. Token Accumulators need not eliminate the selling pressure as the protocol will still work well even if the underlying and wrapped assets trade at par; this is because the volatility should still create inefficiencies. By design, the protocol will apply selling pressure when the wrapped asset price is higher than the underlying asset price, and it will apply buying pressure when the reverse happens; through this mechanism, Token Accumulators constantly accrue value for all its users.

Wrapped Asset Pricing Relative to Underlying Asset



8. Closing Thoughts

Market inefficiencies are commonplace throughout history. Some of these inefficiencies are easy to capture, while others are not. Some exist momentarily, while others persist for lengthy periods of time. Some are risk free such as arbitrage, while some demand extreme risks to be taken. However, the common thread is these inefficiencies have value; so much so that entire empires have been built specifically to capture them.

DeFi 2.1 is particularly exciting because it is a straightforward but profoundly powerful protocol. Having something that systematically closes inefficiencies on its own while accruing tangible value may be trivial when applied to small systems, but a complete force to be reckoned with if applied in a large one. While this concept is born as a small experiment in the crypto world, it has the potential to be replicated virtually anywhere where market inefficiencies are present; albeit with some modifications.

In our Token Accumulators, we use this power to help the masses; Every user can grow their wealth simply by holding the accumulator token. But this concept in the wrong hands can also wedge the wealth gap wider. For this reason, we do have mixed feelings about releasing this paper to the world, but we also believe that knowledge should be shared freely; And ultimately, we believe in the collective ingenuity of humanity that it will continue to create new solutions for new problems.

May we continue to innovate fearlessly.