



Amplifying Consensus With Blockspace Capital Markets

Creating Composable DeFi-Native Staking Products

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Section 1

Blockspace

What is Blockspace?

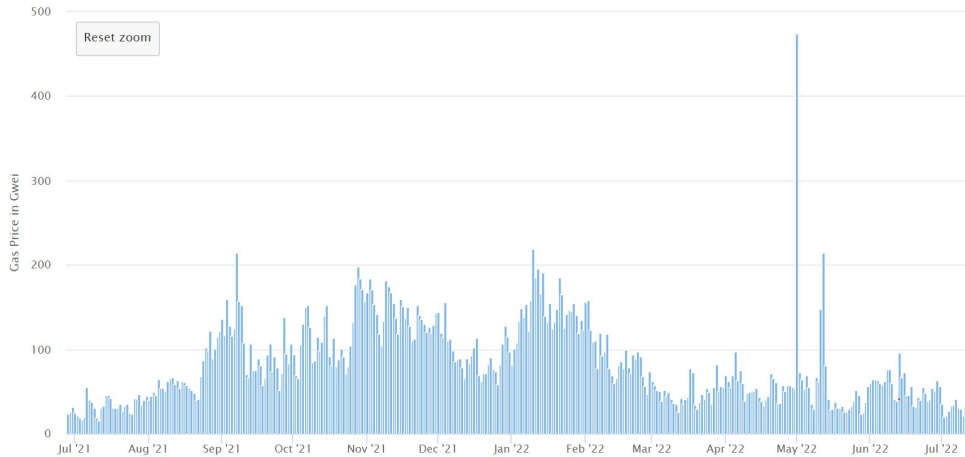
All transactions depend on the settlement of blockspace.

As users demand space on the blockchain for the mutability of storage / execution of transactions, they reserve “blockspace”.

As blockspace demand scales, it is met by blockspace producers, largely stakers & miners.

Ethereum Average Gas Price Chart

Source: Etherscan.io
Click and drag in the plot area to zoom in



Blockspace Demand

Blockspace demand is fueled by the desire to process transactions in an expedient manner.

Blockspace demand then scales with the demand for unique transactions as well as competition for mutually extractable opportunities, leads to volatile levels of blockspace demand.

This competition primarily includes:

- NFT auctions
- Arbitrage
- Liquidations

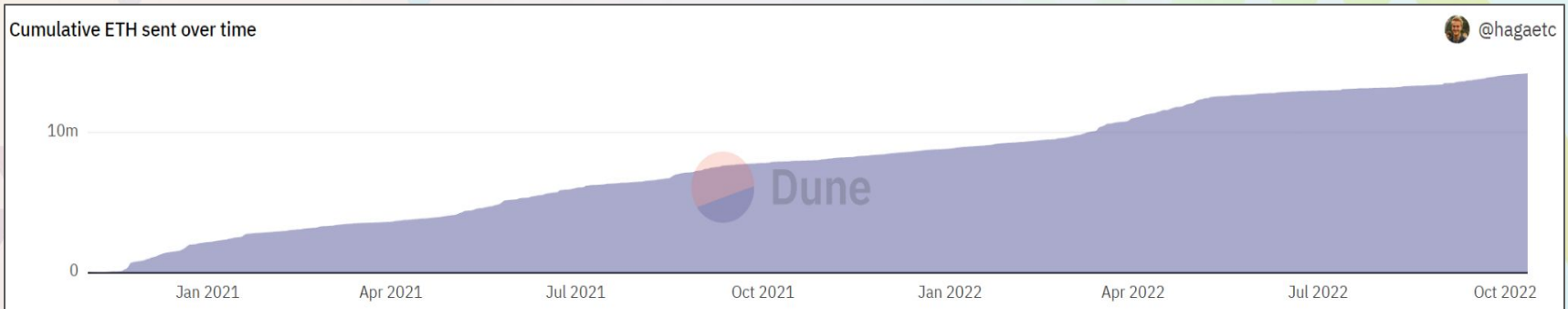
Blockspace Supply

Blockspace supply on the other hand is relatively static, in most cases depending solely on the number of validators (or hashpower of miners).

Further even as the number of validators expand, the space available in each individual block remains static.

That said, assuming supply depends on the number of validators, blockspace supply depends on:

- Time & Validator Pool Size
- Validator Yields
- Slashing
- Composable Use-Cases



Pricing Blockspace is
HARD

How do you price & trade blockspace?

Given there are numerous variables that influence blockspace demand as well as supply, it is important to break down both into their components.

Once broken down, we can make estimates as to blockspace value and begin to create composable products that address staker pains, as well as amplify blockspace supply.



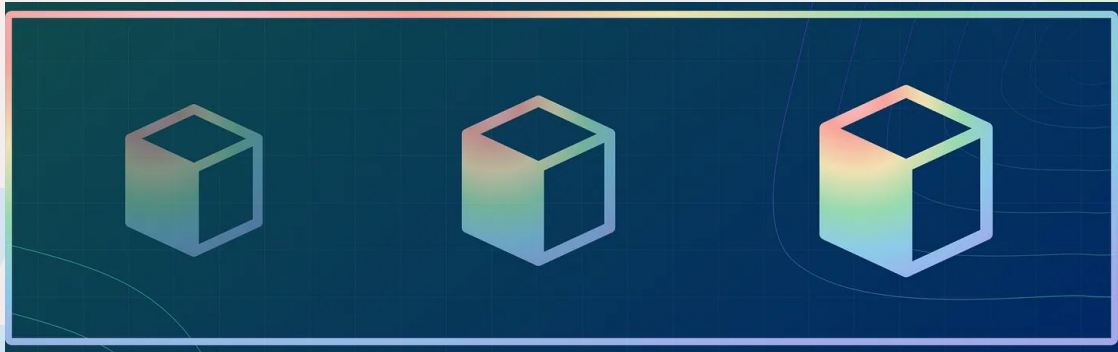
Section 2

Pricing Blockspace

Validator Incentivization: Base Rewards

The base reward is a relatively static ETH reward that is distributed to the validators of each block, regardless of whether any transactions are processed.

The base reward ensures validators are sufficiently incentivized, even in times of low blockspace demand.



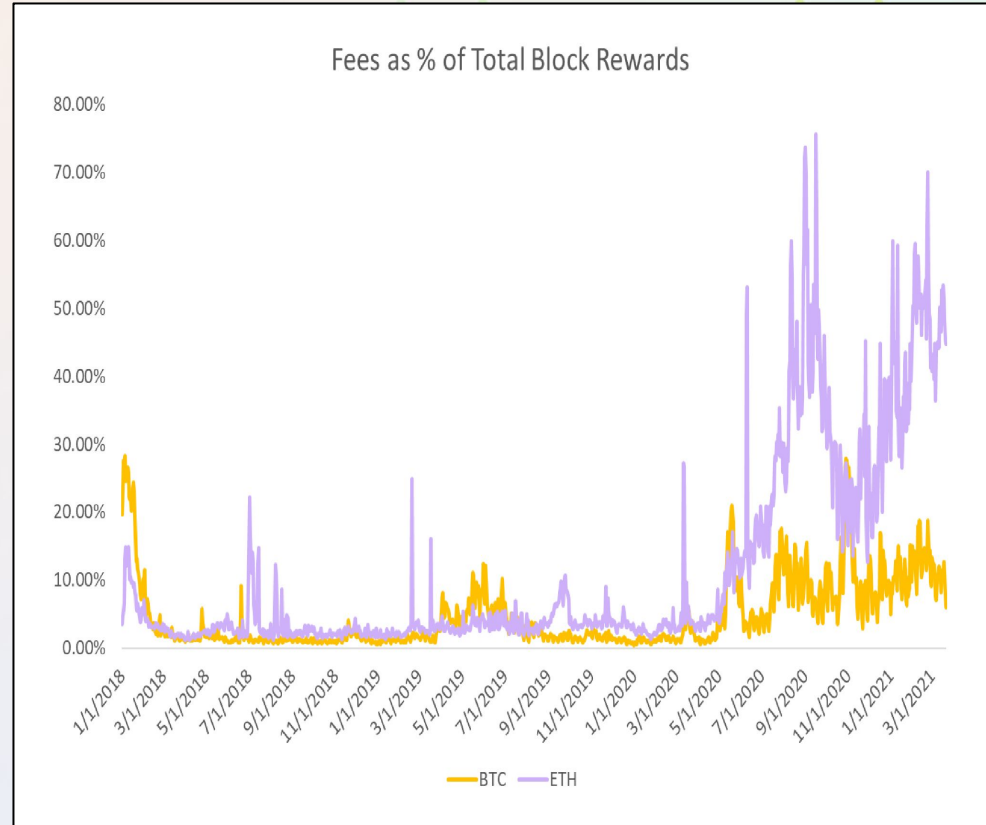
Validator Incentivization: Priority & Max Fee (mempool tips)

Base Fee:

- Determined by the network rather than users or validators
- Targets 50% full blocks, with the current base fee dependent on previous block congestion

Priority Fee:

- Generally referred to as the “Gas Price”
- An amount of Ethereum paid per unit of computation to expedite transactions



Validator Incentivization: Private Relays & MEV

As an alternative to the traditional mempool, users can also send transactions directly to validators through private relays.

Further, validators can also identify mutually extractable opportunities and capture them directly.

Direct Tips:

- Private Transactions

Validator MEV:

- No validators seem to partake insofar

Recent blocks

Delivered blocks sorted by slot.

SLOT	RELAY
<u>4794508</u>	Flashbots
<u>4794507</u>	Flashbots
<u>4794506</u>	Flashbots
<u>4794504</u>	Flashbots
<u>4794500</u>	Flashbots
<u>4794498</u>	Flashbots
<u>4794497</u>	Flashbots
<u>4794495</u>	Flashbots
<u>4794493</u>	Flashbots
<u>4794491</u>	Flashbots
<u>4794490</u>	Flashbots

Slashed Validators	Slashed by	Age	Reason	Slot
🚩 3280	↓ 420864	2 hr. ago	Attestation Violation	4,759,015
🚩 3281	↓ 366016	2 hr. ago	Attestation Violation	4,758,974
🚩 3268	↓ 298901	2 hr. ago	Attestation Violation	4,758,973
🚩 3308	↓ 298901	2 hr. ago	Attestation Violation	4,758,973
🚩 3264	↓ 43144	2 hr. ago	Attestation Violation	4,758,956
🚩 3267	↓ 238068	3 hr. ago	Attestation Violation	4,758,923
🚩 3306	↓ 59358	3 hr. ago	Attestation Violation	4,758,872
🚩 3282	↓ 328326	3 hr. ago	Attestation Violation	4,758,798
🚩 3283	↓ 32104	3 hr. ago	Attestation Violation	4,758,791
🚩 3285	↓ 168754	3 hr. ago	Attestation Violation	4,758,786
🚩 3305	↓ 185094	3 hr. ago	Attestation Violation	4,758,782
🚩 3203	↓ 185094	3 hr. ago	Attestation Violation	4,758,782
🚩 3216	↓ 9807	3 hr. ago	Attestation Violation	4,758,778
🚩 3204	↓ 311394	3 hr. ago	Attestation Violation	4,758,777
🚩 3309	↓ 157345	3 hr. ago	Attestation Violation	4,758,774
🚩 3215	↓ 157345	3 hr. ago	Attestation Violation	4,758,774
🚩 3266	↓ 276355	3 hr. ago	Attestation Violation	4,758,744
🚩 3284	↓ 423647	3 hr. ago	Attestation Violation	4,758,729
🚩 3214	↓ 426015	3 hr. ago	Attestation Violation	4,758,723
🚩 3307	↓ 426015	3 hr. ago	Attestation Violation	4,758,723

Validator Risks: Slashing

As a blockspace producer in Ethereum your primary role is the validation of transactions.

If a block producer fails to properly validate transactions, their deposits may be slashed.

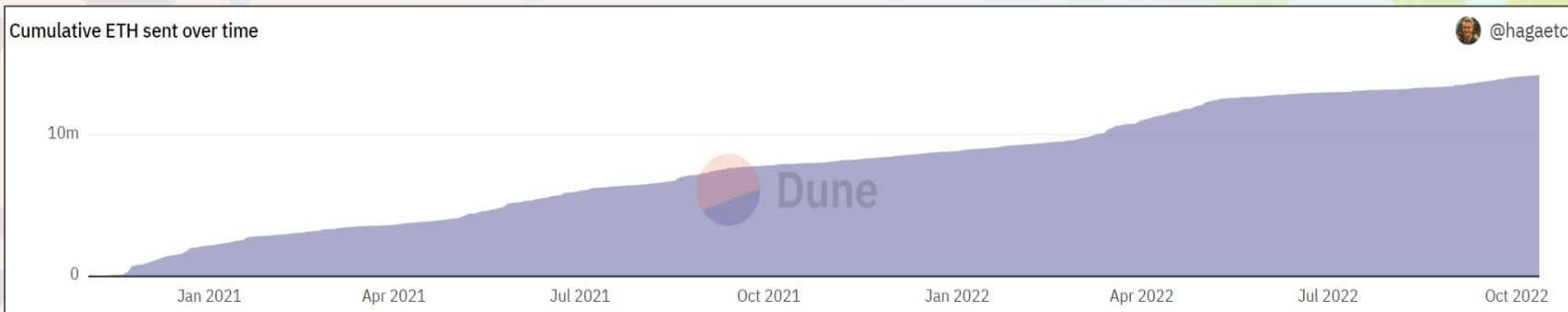
This “slashing” results in a fee that eats into their yield, and potentially even into the principal of their deposit.

Validator Risks: Dilution

As the number of validators increase, blockspace itself remains static, however competition to supply said blockspace increases.

Further, as the validator queue clears, and as time passes, the number of validators has naturally increased.

While one would have expected this increase to tail off, it has led to a 50% dilution of validator yields over this past year, with no plateau in sight.

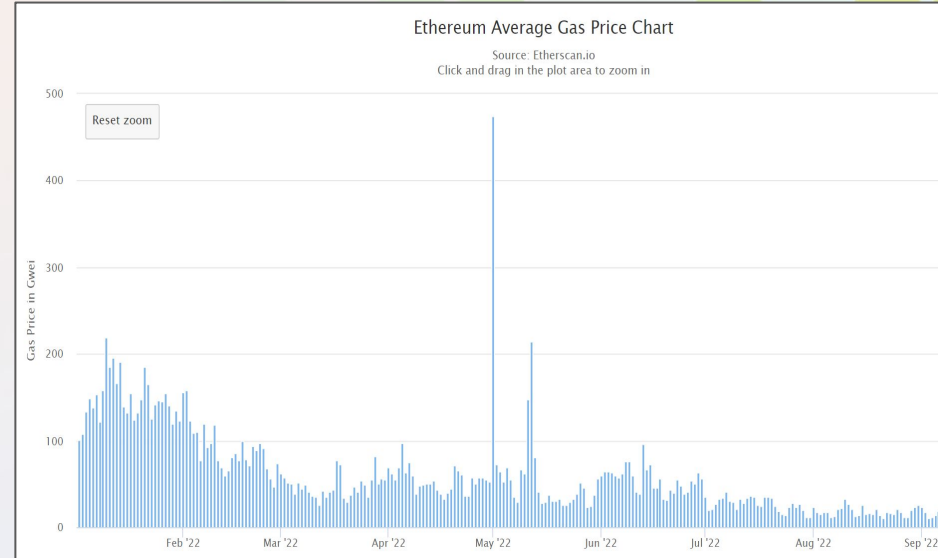


Validator Risks: Tx Demand

Naturally, given validators rely on an increasing amount of fees relative to base rewards, transaction demand itself presents an extremely volatile risk.

This volatility presents issues for validators.

Further, As L2's continue to progress, and EIP-4844 is implemented, there is a reasonable chance that computation demand may continue to compress until more applications are developed.



$$\text{Blockspace Value} = \int_{\text{start}}^{\text{end}-T} (((b(t(T), T) + f(t(T), T) + m(t(T), T)) - s(T)) * d(T)$$

$b = \text{base} \mid f = \text{fees}$

$m = \text{mev/tips} \mid s = \text{slashing}$

$T = \text{time} \mid t = \text{tx demand}$

$r = \text{time remaining}$

$d = \text{validator dilution factor}$

What do blockspace capital markets offer?

Given the difficulty in accurately predicting transaction demand, one might feel pricing blockspace is pointless.

However regardless of these difficulties, the successful modeling of transaction demand enables a number of instruments that enhance the validator experience.

Pricing Blockspace is
HARD...

So why try?



Section 3

Blockspace Capital Markets

Blockspace Capital Markets

Once blockspace has been priced (or at least estimated), users can rationally exchange future blockspace for fixed payments.

This exchange of future yield follows the same concepts of **Yield Tokenization** popularized across protocols like Swivel and others.

Yield Tokens

Yield Tokens represent the yield generated by a deposit



Principal Tokens

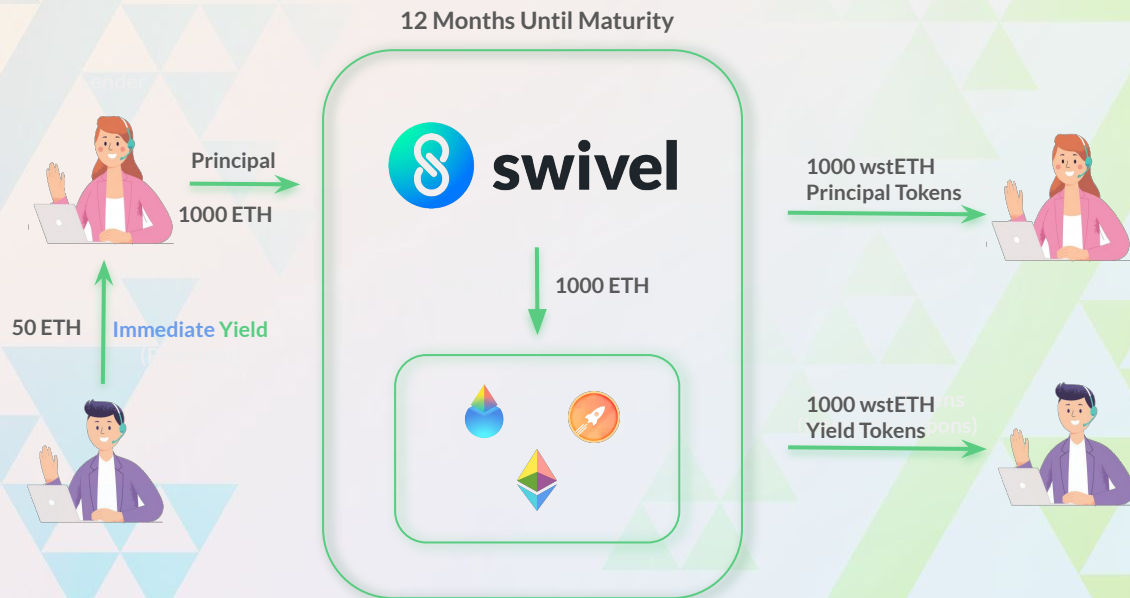
Principal Tokens represent a deposit that can be redeemed at maturity



Staking Without Slashing

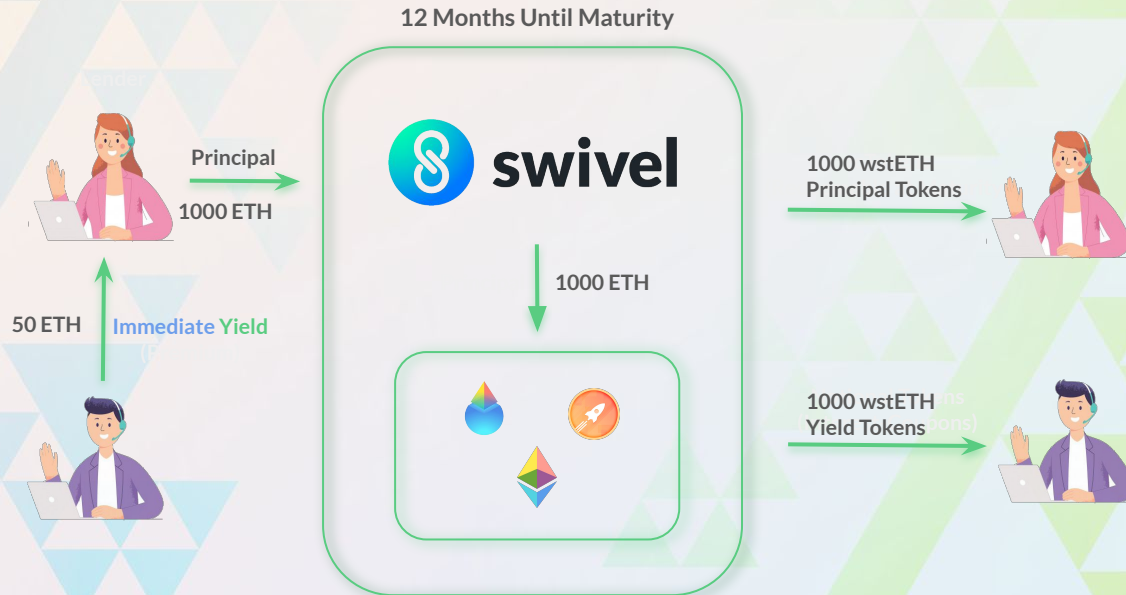
(Or Dilution)

In order to reduce the risks of slashing, dilution, and demand volatility, validators can sell off their blockspace and in the process also sell off the risks involved in validation to another actor.



Hedging Demand & Staking Leverage


As mentioned, through the same process stakers effectively hedge the risks that stem from transaction demand volatility. In doing so, they also enable those purchasing stETH yield tokens to stake with high amounts of leverage, both capturing time-value and speculating on tx demand.





Section 4

Blockspace Market Composability



How can we enable DeFi-native staking integration?

While there may be alternate models surrounding the creation of blockspace capital markets, the question that must be asked is **how we can utilize the advantages of Ethereum to enable further consensus security.**

This starts with the creation of composable markets and ends with further rehypothecation.



Composability is king.

Composable Principal Tokens

With the Swivel stack, it is extremely important to remember that “Yield Tokenization” results in the creation of principal tokens.

Principal tokens are not unique to blockspace markets, and are actually most commonly used for fixed-rate lending/borrowing through Yield and Notional.

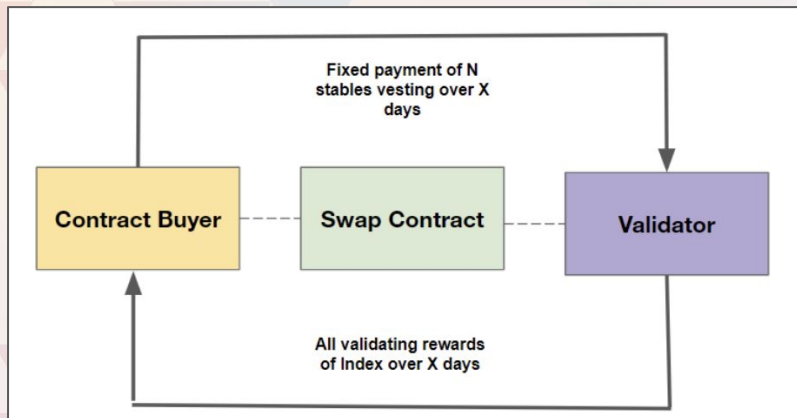
With such composability blockspace markets can be aggregated into a larger stack of aggregated PTs and more interesting decentralized products.



Alkimiya

Alkimiya matches individual validators and buyers of blockspace. Maturities are also non-fungible.

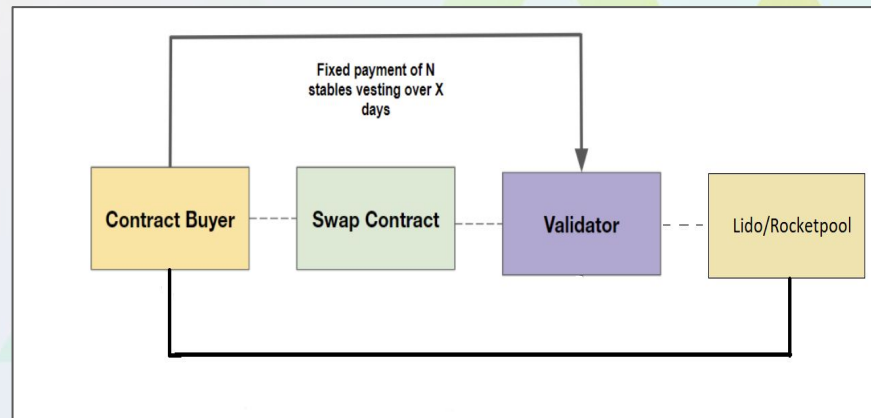
- Covers individual validators
- Non-fungible
- No secondary markets (or difficult construction)



Lido/Rocket Pool + Swivel

Swivel matches pools of validators represented by liquid staking. Maturities are fungible and positions are Principal Tokens.

- Fungible
- Secondary market trading
- Cannot cover individual validators



Leveraged Fixed-Yield Staking

Further, FiatDAO allows validators to borrow at high LTVs on various principal tokens.

With highly efficient lending platforms designed specifically for principal tokens, validators can both hedge and leverage their fixed staking yield.



FIATDAO



Underwriting Options with Principal Tokens

With the composable blockspace capital markets, validators can rehypothecate atomically to underwrite options with principal tokens – a possibility unique to DeFi.

Given principal tokens can be redeemed at a 1:1 ratio upon maturity, options buyers can be confident that capital will be available to be called regardless of the active validation that occurs.



Injecting stETH Into Futures

This atomic rehypothecation can also be utilized to create even more sophisticated instruments.

In the case of **Contango** – Expirable Futures

Further, given a primary use case of expirable futures is the hedging of options positions, this creates a symbiotic trading ecosystem, all routed through ETH's consensus.



contango





Conclusion

Composability Compounds Consensus



With composable blockspace markets validators can confidently increase their participation.

With strong validation, applications can be built that increase the value of blockspace.

And with valuable blockspace, every derivative in DeFi has its liquidity routed through consensus.



Thank you!

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