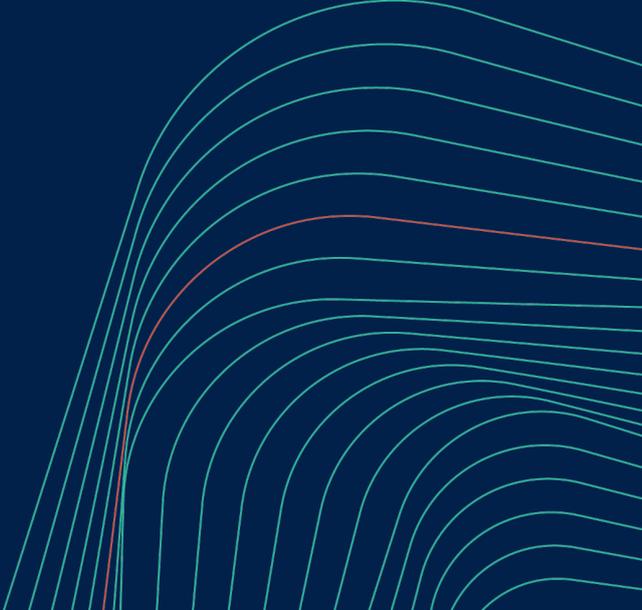


Metamorphosis: Proof of Stake's evolution to a fixed income product

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Turning Proof of Stake yield into fixed-income products

A massive unexplored opportunity

With crypto yields as volatile as the price of their underlying assets, investors seeking fixed-income yield-only financial products are limited to the bond market. But could a fixed-income product be built using proof-of-stake as a source of yield?

Summary

The market for traditional fixed-income securities is one of the largest financial markets in the world, but fixed income products in crypto have taken a back seat to higher demand-driven yield opportunities. This paper asserts that yield from Proof of Stake does not change significantly over time, persists over the long term, and remains high even after significant amounts of capital are deployed into it. It would in theory be possible to create a fixed-income product with proof of stake as its source of yield, which would be completely hedged against the underlying tokens and thus a “yield-only” product with no market risk. If risks are managed correctly, the rate of return of this product would constitute crypto’s “benchmark rate” - much higher than the current risk-free rate of traditional bond markets – and be a prime source of fixed yield for crypto’s future interest rate market.

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1. The nature of blockchain creates yield opportunities

Blockchains work because everyone plays their part, and everyone plays their part because they are incentivized to do so. At any given moment some use blockchain networks, while others enable that use and earn a reward in the process. Let's refer to the reward-earners as "Alice", and the network users as "Bob".

MINING: Historically, the first opportunity for Alice was Bitcoin mining, whereby she would use energy and computation ("Proof of Work") to assert the validity of blockchain transactions. For each block of transactions she verified, she would earn some newly created bitcoin. Today, bitcoin mining is a multi-billion dollar industry: mining generates [tens of millions of dollars](#) of revenue each day and has spawned [several publicly traded companies](#).

STAKING: As explained in a [previous blog post](#), most modern blockchains don't rely on Proof of Work to verify transactions, but rather incentivize Alice to put her assets "at stake" in order to assert the validity of blockchain transactions (this is called "Proof of Stake"). This mechanism removes the need for specialized hardware and high energy consumption required to participate as a miner, and allows investors of any size to earn a yield on their blockchain tokens.

DECENTRALIZED FINANCE YIELDS: In recent years, decentralized finance applications brought new operational requirements and thus created new incentives. For decentralized exchanges (DEXs) to support Bob's buying and selling, for example, Alice lends assets into a pool and earns trading fees in the process. A more straightforward example is lending, where Alice provides lends her assets into a pool and is paid interest when Bob takes out loans from that pool.

Now that we've briefly covered the yield-earning opportunities in crypto, let's consider how our counterparts in traditional finance (TradFi) earn yield on their capital.

2. In traditional finance, yield comes from lending

In TradFi, people who are seeking yield, like Alice, can earn dividends on equity, income from real estate, or yield from bonds. For institutional asset managers purely interested in yield and not looking to speculate in the markets, bonds are where they end up. Bonds are created when a company or government needs to borrow money, and are effectively a tradeable loan. Instead of going to a bank for a loan, the borrower creates and sells a financial instrument called a bond. The bond buyer is guaranteed a series of interest payments until a point in time at which the initial amount is paid back (when the bond is said to have reached "maturity"). The bond buyer doesn't have to hold the bond until maturity, though, as bonds are freely traded in the market.

By holding a bond, you take on the risk that the bond issuer (the borrower) is not able to make the interest payments, effectively defaulting on their debt and rendering the bond worthless. This risk of default determines the price that the bond will trade for in the marketplace – riskier bonds require higher yields to make them worthwhile for investors.

3. In the bond market, fixed income is king

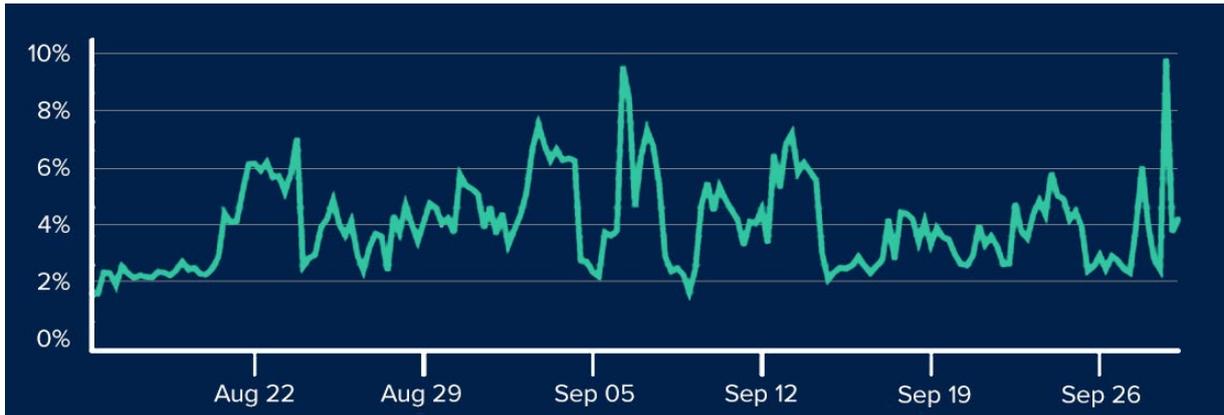
Let's focus on one specific aspect of bond yields: namely that the large majority of bonds are fixed-income bonds, meaning the bond-holder knows ahead of time the schedule and size of the interest payments that will be made to him, in addition to the date of maturity upon which the initial amount will be repaid and payments will stop. (According to Lending Tree, 88% of the outstanding debt in the US corporate debt and mortgage markets in 2018 was in fixed rate terms.)

Fixed-income products are so popular because of the certainty they provide. A bond which will make known payments until a predetermined date of maturity can be priced accordingly. Crucially, this certainty allows bonds to take the place of cash in the financial system and be easily used as collateral to fund other transactions - short-term bonds from high-quality borrowers are even referred to as "cash equivalents".

But what about a bond where the size or schedule of payments is unknown? If the future yield is uncertain, it's much harder to determine how much the bond is currently worth. This is the problem with most of the current yield opportunities in crypto – they fluctuate depending on the demand from the users of blockchain networks and decentralized applications. Thus, Alice can't have any certainty around how much yield she can expect to earn in the coming days, weeks, or months.

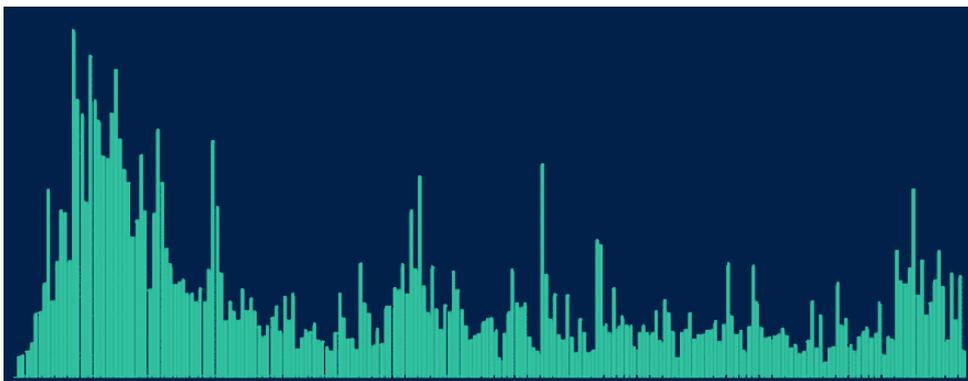
4. Today’s Crypto Yields fluctuate with market demand

While it’s not hard to find yield opportunities with attractive rates in crypto, it’s harder to find rates that don’t undergo large fluctuations. DeFi yields from providing liquidity in [trading](#) and [lending](#) pools depend on demand from traders and borrowers, and fluctuate heavily as a result. Shown in Graph 1 are interest rates for USDC deposits on Aave in August and September of 2021. The interest rate varied dramatically between 2% and 10% APY, creating uncertainty for both borrowers and lenders – a far cry from fixed-rate lending in traditional finance.



Graph 1: Interest rates for USDC deposits at Aave in August and September of 2021. [\(source: Aave\)](#)

These fluctuations contain a degree of randomness in the short term, and seasonality in the longer term. This can especially be seen in graph 2, showing trading fees collected by liquidity providers in the Uniswap ETH-USDC pool, between May and December of 2021. These fees are a percentage of trading volume happening in that liquidity pool.



Graph 2: Fees generated for liquidity providers on Uniswap’s Ethereum-USDC trading pool from May to December 2021, each bar is one day. [\(source: Uniswap\)](#)

The larger seasonality of both interest rates and trading fee yield is determined by the current market regime. In a bullish market, trading volumes are high and so is the demand for loans. When the market turns bearish, trading volume wanes and demand for borrowing dries up.

As shown in graph 3, in the spring of 2021, as bitcoin rose to \$60k, lending yields picked up in parallel. In the spring, as bitcoin fell back to \$30k, interest rates dipped well below 5%. Attractive interest rates can be found in times when the going is good, but in bearish market regimes, good yields are much harder to come by.

Not all lending in crypto happens with variable rates: there are some fixed-rate lending opportunities, but this is still a very young space in crypto. Jack Purdy [explains](#):

“DeFi has done a fantastic job innovating around lending, aggregation, synthetics, and insurance protocols. However, so far there has primarily been only one form of credit in DeFi: over-collateralized crypto-backed loans with variable rates. The playing field is wide open on the fixed-rate lending side and the interest rate derivatives side, with no clear winners having emerged yet.”

Some decentralized fixed-income lending protocols have emerged, but those projects are in the early phases, with low liquidity for a small set of crypto assets. The real bulk of fixed-rate lending happens in centralized finance (CeFi), on the loan books of companies like BlockFi and Celsius.

Of course, once you are locked into a fixed-rate loan, you can earn that yield until the loan expires, but the interest rate quoted for new loans varies as the market changes. In 2021, for example, BlockFi cut their lending rates in [March](#) and again in [June](#), before raising them in [August](#). They explain that their rates *“are primarily driven by demand by institutional investors for borrowing these assets. ... When institutional investors’ demand changes, that affects the rates we can offer clients.”* ([source](#))

Clearly, fixed-rate lending is also demand driven, just like variable-rate lending. Yield-seekers of all kinds are likely to be successful in bull markets but unsuccessful in bear markets.



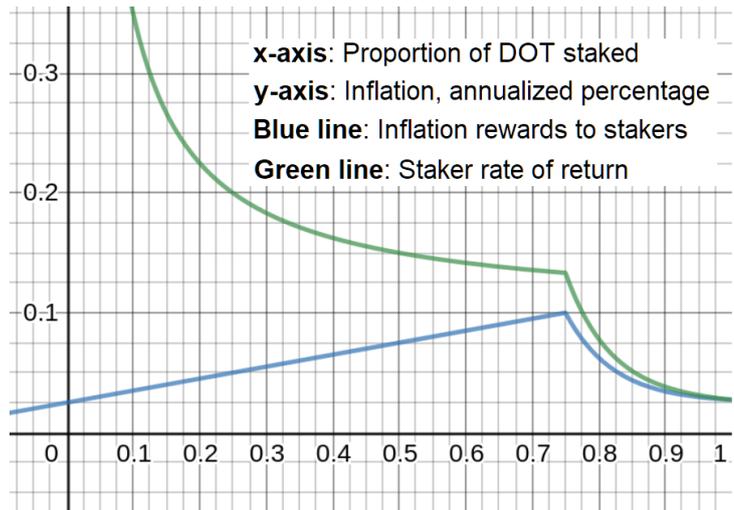
Graph 3: Interest rates on stablecoins (top) are correlated with bitcoin's price (bottom). Shown above are interest rates on Compound (green), dYdX (orange), and Aave (blue). ([source: Loanscan.io](#))

5. Proof of stake has a fixed “worst case” yield

As outlined earlier, there are several opportunities to earn yield in crypto, but it’s hard to find rates that don’t fluctuate heavily with the market. In searching for a steady, multi-year source of yield in crypto, it makes sense that this could be collected in return for performing a service that blockchains will always need: helping to verify transactions. This brings us back to Proof of Work (“mining”) and Proof of Stake (“staking”). Let’s focus on staking, since it doesn’t require high capital expenditure and allows investors of any size to earn a yield on their blockchain tokens.

Staking yield varies from blockchain to blockchain, with stakers currently earning an average real yield of 6.4% ([source](#)). Alice’s staking yield is made up of two parts: transaction fees of the transactions she verifies and newly created tokens. On most blockchains, the large majority of staking yield comes from the new tokens. This new supply of tokens is altered dynamically by the blockchain protocol in order to incentivize or disincentivize token-holders from staking. The blockchain does this because it wants a certain percentage of the total token supply to be staked - too few tokens being staked means the network is less secure, while too many means that people are hoarding the tokens instead of using them to transact and trade.

As described in Polkadot’s [documentation](#), the rate of return to stakers (green line) depends on the proportion of DOT being staked (x-axis). The worst-case rate of return is 2.5%, when 100% of DOT is staked. As shown in Graph 4, the target percentage for Polkadot is 75%, and stakers will earn a 10% yield when this is the case. If less than 75% of the supply is staked, the staking yield increases, and if too many tokens are



Graph 4: Polkadot staker rate of return. ([source: Polkadot](#))

MONTHS FROM LAUNCH	INFLATION TARGET ¹
0-23	12%
24-29	11%
30-35	10%
36-41	9%
42-47	8%
48 onwards	7%

Table 1: MINA’s inflation target reduces over time. ([source: Mina Protocol](#))

staked the yield rate (shown by the green line) decreases. This means that Alice's yield might change, but her worst-case scenario is when 100% of the token supply is being staked, which, in the example of Polkadot, would earn her a yield of 2.5%.

Staking yields can change depending on the percentage of supply being staked. But if that percentage remains on-target, will yield be earned indefinitely? The answer, again, is different for different blockchains. Polkadot as it stands now will inflate its supply indefinitely, until decided otherwise by its governance committee. MINA, by way of comparison, has a pre-defined inflation target shown in Table 1, which drops from 12% to 7% in the 4 years following the launch of its blockchain. (Imagine the entire blue and green curves moving down over time, in graph 4)

Depending on the blockchain, Alice may be able to earn at least a guaranteed "worst-case" yield, that perhaps slowly decreases over time, before eventually landing on a final value. So why hasn't someone turned that yield into a crypto-native fixed-income product? Well, there's even more complexity to handle.

6. Hedging is possible in theory

Although staking generates a regular stream of income with a "worst case" yield rate or higher, a few more problems stand in the way of building a fixed-income product on that yield. First, Alice needs to own the tokens in order to stake them, meaning she's exposed to the price fluctuations of those tokens in the market. A bond-like fixed income product would have to be "yield only" or "market neutral" and thus hedged against the underlying tokens in the derivatives market.

As Alice earns rewards in the form of tokens, she can choose to sell them or compound the reward by staking the new tokens. Because the reward rate is defined as a percentage of staked tokens, and is paid in new tokens, simply hedging the size of the underlying position means that Alice could find that her reward is worth more or worth less, depending on how the market price for the token has changed in the time it's taken to earn the reward. Because of this, she'll have to hedge the upcoming reward as well, in order to "lock in" the dollar-price of that reward. By ensuring that her net exposure is always slightly short, she's translated the reward from a constant percentage of new tokens to a constant percentage of dollars. (see Table 2)

Hedging to achieve stable position size and reward payouts

period	staked tokens	base hedge size (tokens)	t+1 hedge (tokens)	total hedge (tokens)	net exposure (tokens)	price per token (random)	stake size (\$)	stake profit (total, \$)	hedge profit (total, \$)	net profit (total, \$)	net profit (period, \$)	net profit (period, %)
1	1000	-1000	-60	-1060	-60	\$1.00	\$1,000	0	\$0	\$0		-
2	1060	-1060	-64	-1124	-64	\$1.00	\$1,060	\$60	\$0	\$60	\$60	-
3	1124	-1124	-67	-1191	-67	\$1.00	\$1,124	\$124	\$0	\$124	\$64	6%
4	1191	-1191	-71	-1262	-71	\$1.00	\$1,191	\$191	\$0	\$191	\$67	6%
5	1262	-1262	-76	-1338	-76	\$0.96	\$1,212	\$212	\$50	\$262	\$71	6%
6	1338	-1338	-80	-1419	-80	\$0.91	\$1,218	\$218	\$120	\$338	\$76	6%
7	1419	-1419	-85	-1504	-85	\$0.85	\$1,206	\$206	\$213	\$419	\$80	6%
8	1504	-1504	-90	-1594	-90	\$0.82	\$1,233	\$233	\$271	\$504	\$85	6%
9	1594	-1594	-96	-1689	-96	\$0.75	\$1,195	\$195	\$398	\$594	\$90	6%
10	1689	-1689	-101	-1791	-101	\$0.68	\$1,149	\$149	\$541	\$689	\$96	6%
11	1791	-1791	-107	-1898	-107	\$0.62	\$1,110	\$110	\$681	\$791	\$101	6%
12	1898	-1898	-114	-2012	-114	\$0.63	\$1,196	\$196	\$702	\$898	\$107	6%
13	2012	-2012	-121	-2133	-121	\$0.69	\$1,388	\$388	\$624	\$1,012	\$114	6%
14	2133	-2133	-128	-2261	-128	\$0.74	\$1,578	\$578	\$555	\$1,133	\$121	6%
15	2261	-2261	-136	-2397	-136	\$0.83	\$1,877	\$877	\$384	\$1,261	\$128	6%
16	2397	-2397	-144	-2540	-144	\$0.94	\$2,253	\$1,253	\$144	\$1,397	\$136	6%
17	2540	-2540	-152	-2693	-152	\$1.01	\$2,566	\$1,566	-\$25	\$1,540	\$144	6%
18	2693	-2693	-162	-2854	-162	\$1.06	\$2,854	\$1,854	-\$162	\$1,693	\$152	6%
19	2854	-2854	-171	-3026	-171	\$1.10	\$3,140	\$2,140	-\$285	\$1,854	\$162	6%
20	3026	-3026	-182	-3207	-182	\$1.10	\$3,328	\$2,328	-\$303	\$2,026	\$171	6%

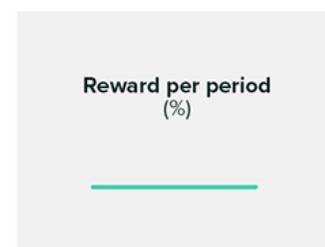
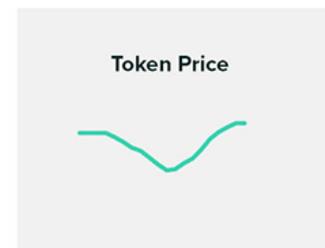


Table 2: This table shows how staking rewards would be hedged, given a reward rate of 6% per period and a randomly fluctuating token price. By hedging all of the staked tokens, the dollar-value of the underlying position is protected from changes in the token price. By additionally hedging the upcoming reward, the reward is also protected from changes in the token price. The result is that the hedged staker is always slightly short, but is guaranteed a reward that is a constant percentage of the position in dollars.

7. Hedging difficulty #1: using staked tokens as Margin

In theory, Alice can hedge a staking yield such that she could guarantee a fixed yield denominated in fiat currency. Now the practical hurdles start.

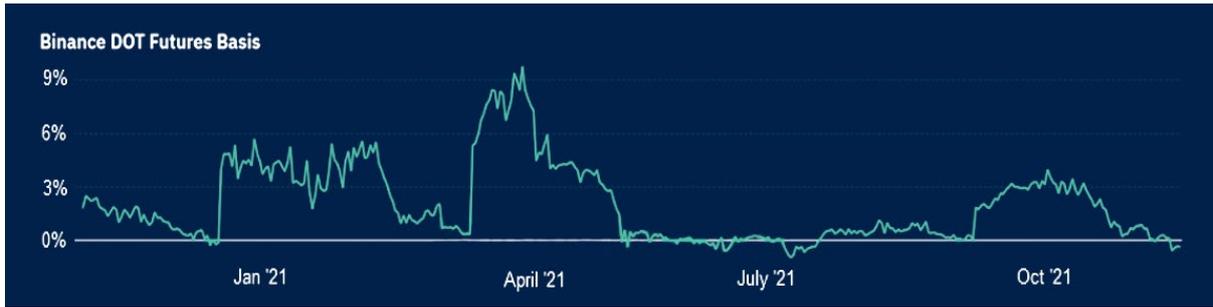
The first hurdle: it's unlikely that Alice could use her staked tokens as collateral for her derivatives positions. Since staked tokens are "locked up" and illiquid, today's crypto derivatives exchanges won't accept them as collateral. She'd have to put up a separate amount of margin collateral, reducing the capital efficiency of this exercise. However, institutional crypto derivatives exchanges like CME function differently than crypto-native derivatives exchanges like FTX. On crypto-native exchanges, margin is held on the exchange and the exchange is responsible for automatically liquidating bankrupt margin traders. At CME, it's the brokers that settle trades on the exchange, and those brokers are responsible for managing their clients' margin and contract deliveries. It could therefore be possible for Alice to form a tri-lateral agreement with her broker and her custodian, whereby the broker accepts as collateral the illiquid tokens being staked from within the custodian.

8. Hedging difficulty #2: Continuously hedging at low cost

The second hurdle: there are a limited number of exchanges where one can trade derivatives on staking tokens. Major firms like [CME](#) and Goldman Sachs only offer derivatives on [Bitcoin](#) and [Ethereum](#) and there are limited derivatives and liquidity for staking coins on crypto-native exchanges. If liquidity is very thin for contracts further than three or six months out, the price-insensitive nature of the required hedging might force the hedger to pay for slippage.

Additionally, hedging over months and years could net an extra profit or have a cost, but this would depend on the derivatives markets and would not be known ahead of time. If using quarterly futures, contracts would have to be rolled forward every quarter. This would provide extra yield if the [futures curve](#) is in contango, (likely in a bull market) as the hedger would effectively be doing the cash and carry trade. If the futures curve were to slip into backwardation, however, (not unlikely in a bear market) the hedger would be paying a premium, which would eat into the minimum yield guaranteed as part of the fixed income product.

As shown in Graph 5, over the course of 2021, futures for coins like Polkadot have indeed traded at a premium, only briefly trading at a discount during bearish periods in the broader crypto market as bitcoin's price fell below \$30k. Hedging for the entire year of 2021 would have earned an extra yield, but a bear market it's likely that a negative basis would result in a hedge that is not cost-free.



Graph 5: DOT's December-expiring futures contract on Binance.(Shown is the annualized basis) (Source: Coinglass)

The alternative is to hedge with a perpetual swap, in which case the cost of the hedge depends on the funding rate – determined by the deviation of that product's price from the price of the underlying in the spot market. Since the hedge on the Proof of Stake tokens would always be short, it would earn a profit given a positive funding rate, where the perpetual is trading at a premium, and it would pay costs given a negative funding rate, when the perpetual is trading at a discount to spot.

As shown in Graph 6, in the second half of 2021, hedging DOT would have earned an extra yield from the funding rate or the basis trade, but this may not always be the case, and especially in a bear market these dynamics could reverse. However, comparing the DOT funding rate with the Futures Basis from the previous chart, however, it does seem like it would have been preferable to use the perpetual to hedge during the bearish period in June and July, as the perpetual spent less time in negative funding territory than the basis did in negative basis. This indicates that a flexible, opportunistic hedging strategy may save some costs during such periods.



Graph 6: The 8-hour funding rate on the DOT perpetual on Binance in Q3 and Q4 of 2021. (Source: Coinglass)

Unfortunately, this uncertainty surrounding the cost of the hedge hinders the fixed-income product's ability to guarantee a specific yield to investors no matter the circumstances in the markets. Even though the Proof of Stake yield beyond the "worst case" is likely to cover any hedging costs, removing this uncertainty or hedging away the basis risk itself would be necessary to build a true fixed-income product.

9. What would this fixed-income product look like?

In summary, if one wanted build an institutional-grade fixed-income product on top of yield from Proof of Stake, capital would have to be taken into a fund, used to purchase staking tokens in the crypto market, and those tokens would be put into a qualified custodian and staked with an institutional-grade validator. Then, the token exposure would have to be continuously hedged out in the derivatives market, with the size of the hedge expanding as staking rewards are earned, or shrinking if investors pull out capital.

As displayed in Table 3, the exercise of attaining staking yield and hedging actually creates several sources of yield. The “worst case” staking yield from supply creation would be fixed, as discussed, but there is likely to be a significant amount of yield above that at almost every point in the product’s life, since it’s unlikely that 100% of the token supply becomes staked. There is also some small additional yield from transaction fees. As shown previously, it’s also possible that the product earns additional yield from a positive futures basis or a positive perpetual funding rate.

The fixed, “worst case” yield from the supply creation could be sold as a fixed-income product, with the variable yield above it used to cover any potential costs of hedging. If there is yield left over, that could be sold in a different product as variable yield.

These fixed-income products could be given maturity dates and sold in the form of classic fixed-income bonds, as perpetuials with no maturity date, or even as zero coupon bonds with a maturity date but no interim payments until that maturity.

If the underlying blockchain protocol defines a point in time at which supply inflation slows and rewards decrease (as per the MINA example previously) it would be necessary to have the product reach maturity at that point, with new products offering the lower rates for the period after the change.

Yield components for hedged staking

YIELD TYPE	YIELD SOURCE	YIELD RATE	TOTAL
Cash and carry yield	From futures short, if in contango	+ 2% (approx.) Variable	12%
Staking yield	Transaction fees	+ 1% (approx.) Variable	10%
Staking yield Above “worst case”	Block reward	+ 5% (approx.) Variable	9%
Staking yield “worst case”	Block reward	+ 4% (approx.) Fixed	4%
			0%

Table 3: The total yield from a hedged staking product is made up of several components. All numbers shown are for example.

10. Is staking yield the lowest risk “benchmark rate” of crypto?

There is no such thing as a truly risk-free investment, but the traditional finance world accepts the risk of default of the United States to be the lowest risk of any investment. This causes the yield on US government bonds to be referred to as the “risk-free rate”, or the “benchmark rate.” The benchmark rate contextualizes the return that an investor is entitled to expect for taking on risk, as additional risk should earn returns greater than the benchmark rate.

In crypto, [as discussed earlier](#), the yield with the most stability and lowest risk is the staking yield. The risk of loss does not depend on market dynamics but rather on the likelihood of a “slashing” penalty, which would be carried out if staking infrastructure is run poorly or if attempts are made to insert malicious transactions into the blockchain.

Finoa’s partner validator [Figment](#), for example, uses Hardware Security Modules (HSM) to secure private keys and prevent double signing faults, and has multi on-premise and off-premise secure server backup and redundancy. Another partner, Chorus One, not only secures their own infrastructure, but also works with protocol teams to ensure that there are no vulnerabilities in the underlying protocols themselves – for example by offering a [\\$2m bug bounty](#) for Lido on Solana. Finoa’s third partner, [Blockdaemon](#), uses protocol-specific failover strategies to eliminate risk of double-signing and is confident enough to insure any losses due to slashing, further removing risk for the customer.

As long as the validator keeps their staking infrastructure online and running correctly, there is no risk of loss from staking activities. In fact, as shown in Table 4, some blockchain protocols do not punish delegators at all, removing risk at the protocol level.

Slashing penalties vary by blockchain

Blockchain network	Downtime Slashing	Penalty	Double sign slashing	Penalty	Punishes Delegators
Terra	Yes	0,01%	Yes	5%	Yes
Harmony	Yes, after ~12h	0,01%	Yes	>2%	Yes
Celo	Yes	100 CELO	Yes	9000 CELO	No
Icon	Yes, if >15%	6%	No	0	Yes
Ethereum	Yes	-	Yes	>3.13%	No
Polkadot	Yes, if >10%	7%	Yes	1-100%	Yes
Cosmos	Yes, after ~16h	0,01%	Yes	5%	Yes
Tezos	No	512 XTZ	Yes	8,000 XTZ	No

Table 4: Penalties for slashing and downtime vary by protocol, and some protocols do not punish delegators. (Source: [Novum Insights](#))

The remaining risk of a staking yield product would be related to the counterparty risk taken on by the various moving parts – the custodian, the spot and derivatives exchange, and the operations of the fund manager. Once these processes are properly audited and the risk is accurately understood, insurance providers could cover any remaining uncertainty or risk of loss and turn the fixed income product into a true “benchmark” yield product.

If appropriately managed and insured, the yield from a fixed-income yield-only staking product would constitute crypto’s version of a benchmark rate. This rate would only change as blockchain protocols go through scheduled slow-downs in their rate of supply inflation. This benchmark rate in crypto would contextualize what investors can expect to earn for taking on additional risk in the crypto market, altering the dynamics in the lending and DeFi markets, and eventually the fixed-income markets of traditional finance.

11. Theory versus practice – comments from industry experts

The author of this paper reached out to several industry experts for comment on this idea of fixed-income staking, assessing both interest in and difficulty of realizing this financial product.

Sentiment was good from ETP providers, who expressed interest on the income generation aspect of staking, but cited audit-like transparency as a key requirement, which should be possible given that custody and staking activities happen on public blockchains. It was also stated that in general, operational risks would have to be reduced as much as possible, for example by the use of multiple custodians to achieve custody diversification. Another key concern was whether the locked liquidity of staked tokens would affect the fund's ability to service redemptions, with one suggested solution being to stake only a fraction of the tokens in the fund. This also makes blockchains with fast unstaking times more favorable than those with longer times to unstake, something that wasn't touched on in this piece. Another topic that would need more research and clarification is the frequency of reward pay-outs, and whether those payments would be distributed to investors or auto-compounded.

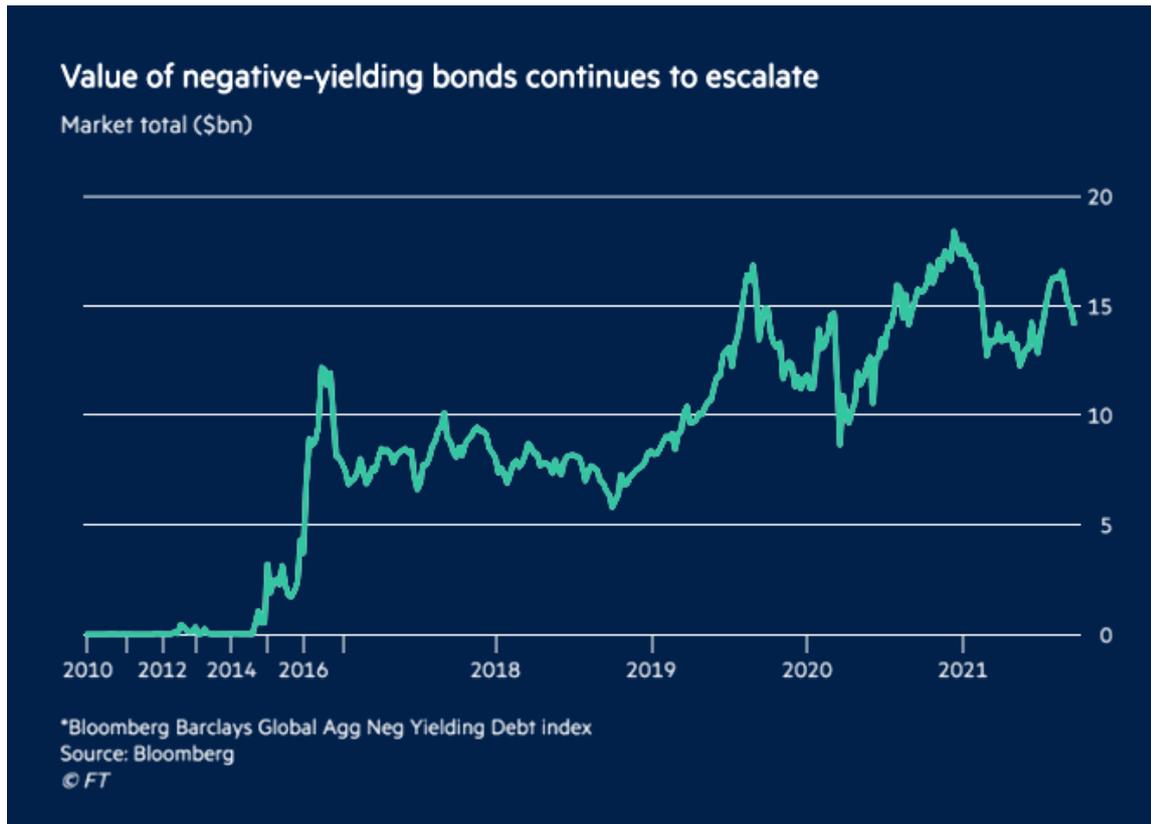
Critically, something that many ETP providers have spoken to is the refusal of traditional stock exchanges to list ETPs containing tokens from outside the top-15 by market cap, which limits the selection of Proof of Stake coins available to be put into an exchange-traded product. Another key learning was that, depending on the jurisdiction, the crypto custodian might need an asset management license, or would need to partner with a licensed asset manager, in order to conduct the staking activities in the context of an exchange traded product.

Feedback from crypto derivatives experts was mixed – some stated that it would be a complex regulatory exercise to build this product, while others pointed out that it would not require changes to any existing business structure, and would hinge on an agreement with the brokers to accept staked tokens as collateral. Sentiment was also mixed on the ability to find liquidity for the long-term hedges.

Staking-as-a-service providers agreed that the opportunity for staking rewards is good over the next few years, but pointed out that these may decrease in the coming years, as many protocols create their supply quickly in their initial years before slowing or even halting rewards by 2027 or 2028.

12. Crypto’s benchmark rate is much higher than bonds

Staking yields in crypto are far above current bond yields, but a lack of yield-only fixed-income financial products has prevented the entrance of fixed-income investors to the crypto space. Eventually, someone will build a fixed-income product on staking as yield as described in this piece. Such a product will be properly regulated in a fund structure and become available to institutional capital. It will likely take years, but eventually, even investors with limited knowledge of staking will come to accept it as a safe source of yield. In the meantime, insurers can fill the gap between perceived and actual risk.



Graph 7: \$13 trillion of capital sits in negative-yielding bonds. (source: FT)

In TradFi, central banks have used their bond-buying programs to push fixed-income yields on government bonds to near-zero levels, and \$13 trillion of capital sits in negative-yielding bonds as of the end of 2021, according to the [Financial Times](#). (Shown in Graph 7) Once crypto-native yield products are liquid and widely traded, a parallel fixed-income market will have been established, and a wave of interest rate arbitrage will reshape the relationship between crypto and traditional markets and what is regarded as the risk-free rate.

However, we are still far away from this reality. Currently, those seeking yield in crypto are pushed toward high but volatile rates, or fixed-rate lending opportunities. Earning Proof of Stake yield has remained an auxiliary activity for buy and hold investors of Proof of Stake tokens, allowing them to support the token’s blockchain network and earn extra yield in the process. Eventually this underrated source of yield will be discovered by the crypto and traditional worlds alike, and turned

in financial products. In parallel, or even before this point, the crypto world will have to create an interest rate market and come to an understanding of what the yield curve in crypto looks like.

13. Crypto's interest rate market has yet to bloom

In traditional finance, not only is there a market for fixed-income products, but there is also a market for hedging or speculating on interest rates directly. This can be done through the purchase of fixed-income products, or directly through products like interest rate swaps. According to the [Bank for International Settlements](#), the notional amount outstanding in over-the-counter interest rate swaps was more than \$341 trillion in 2019. But why is there such a big market for interest rate swaps? Although they may seem niche or unnecessary at first glance, they are actually incredibly useful tools for businesses and financial institutions.

Interest rate swaps can be used to hedge against interest rate fluctuations, or conversely, to speculate on the direction of interest rates. The most common interest rate swap is a fixed for floating swap, whereby one party makes payments to the other based on an agreed fixed rate of interest, and receives back payments based on a floating interest rate. Each of these series of payments is called a "leg", so a typical interest rate swap is said to have a "fixed leg" and a "floating leg".

For example, someone earning a high but variable yield might prefer to earn a lower, fixed yield. They would find someone willing to trade the variable yield for a fixed yield, who perhaps might want to place a bet on the variable yield increasing beyond its current level.

Let's explore what a crypto-native example might look like. Let's say a small crypto business has \$1m of stablecoins in their treasury, and is looking to hire another employee whose salary expectation is \$50k per year. Ideally, the business would be able to earn a yield on their treasury and pay the new employee's salary directly from that yield. The company does not want to enter into a fixed-term, fixed-rate lending contract, because that would require them to lend out their assets, which is not an option for the working capital of their treasury.

The company could deposit their stablecoins onto Compound, for example, and retain the ability to withdraw them at any time, but not have any certainty around the yield they will earn going forward. Perhaps they see that the past six months has seen yields between 2-8% on Compound, which would correspond to between \$20k-\$80k per year on the company's \$1m treasury. However, in order to guarantee the \$50k salary, they need to be able to guarantee a 5% yield or better on their treasury, and they don't want to have their ability to pay the employee's salary depend on the changing interest rate. So, they would look for someone willing to swap the variable 2-8% yield for a fixed 5% yield. This might be a speculator who believes that on average the Compound yield will be higher than 5%, or it may be a different business with different opportunities and needs.

As described by Rahul Rai in his hugely valuable piece for [Messari](#),

“Given the prevalence of variable-rate yields in the DeFi ecosystem, there is a huge opportunity for interest rate swap (IRS) protocols to step in and allow lenders and LPs to swap out their floating yields and lock-in fixed yields.”

What does this have to do with the Proof of Stake fixed income product described earlier in this paper? Well, that fixed-rate product would be an ideal source of fixed yield for interest rate swaps, and as the benchmark rate would play a pivotal role in shaping the yield curve and interest rate markets in the crypto ecosystem.

As Rahul Rai puts it,

“The ability to trade future yield as an asset/ token is a very powerful idea. It increases the amount of credit and leverage in the ecosystem, improves price-discovery, increases market efficiency, and allows market participants to speculate on and hedge against interest rate exposure.”

When market participants are finally able to “trade” interest rates as easily as the assets themselves, all of the yield opportunities in the crypto space will become interconnected, as traders make use of arbitrage opportunities and accurately price yields according to their risks. An entirely new dynamic will emerge, reshaping crypto’s DeFi and lending markets and bringing crypto into its next stage of maturity.



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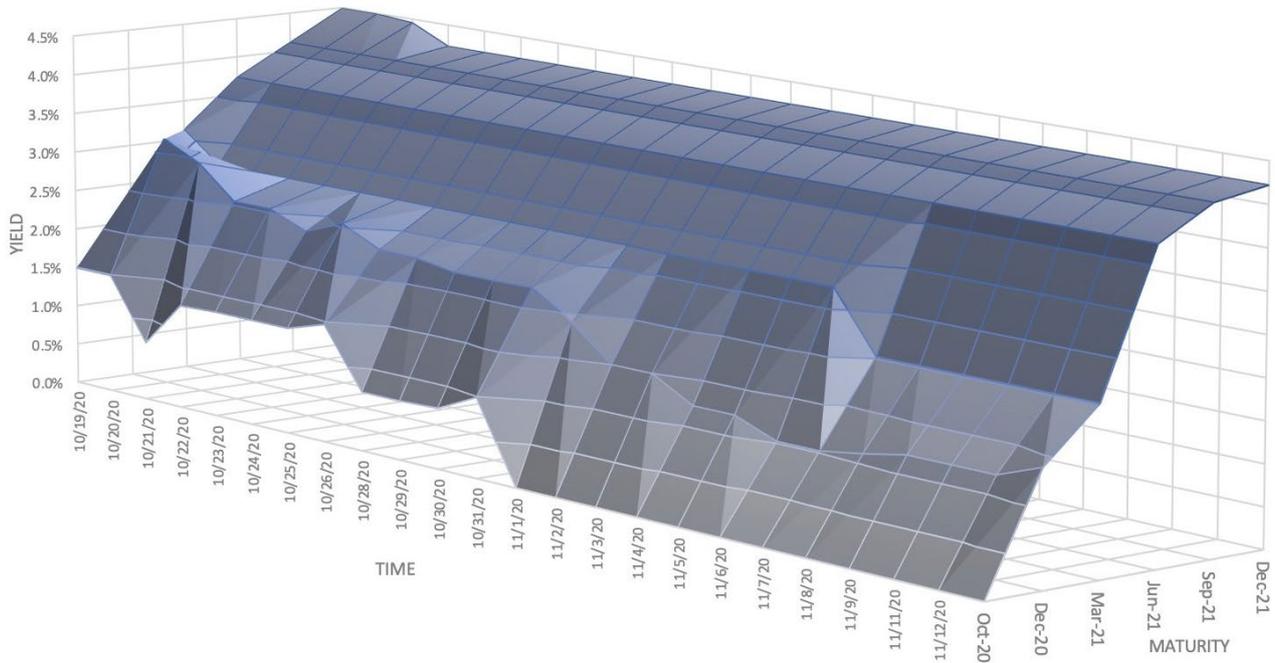
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On-chain interest rate swaps (IRS) are going to be awesome. The ability to swap floating rates into fixed income streams is especially important given how high + volatile floating yields with token underlyings. Vanilla example:

1:29 PM · Nov 19, 2020 · Twitter Web App

[source: Twitter](#)

It's hard to find any data at all on crypto's current "yield curve" as of the end of 2021, with the only [rendering](#) available shown below from the protocol named "Yield Protocol". How will the yield curve change with the emergence of new fixed-income products, and with the interconnectivity provided by a market for interest rate swaps?



A rendering of a yield curve on Yield Protocol from Oct and Nov 2020. ([source: Twitter](#)) This reflects data from the lending markets of a single protocol, for 6 months duration, over one month of activity.

It's clear that fixed-rate products would not only change the dynamics of the interest rate markets, but also unlock a new wave of innovate DeFi products, [as explained](#) by Jack Purdy for Messari (in the context of fixed-rate lending),

"We're only just beginning to touch the surface of what's possible with these new fixed-rate primitives. ... What the first iteration of floating-rate lending did to enable interest-bearing accounts, leveraged trading, and a number of other key products we see today, fixed-rate lending will do for all sorts of financial instruments we're accustomed to in traditional markets as well as altogether new ones enabled by this uniquely composable world of DeFi."

14. We stand on the shoulders of giants

Crypto is emerging as an industry that is not only innovative and disruptive but also regulated and competent. New products and services build on existing ones, and innovation happens at an extreme pace. Finoa is one of these core building blocks, offering institutional-grade custody and staking to investors in emerging blockchain protocols, creating a bridge for institutional capital to flow into the crypto world. We look forward to enabling the newest wave of crypto innovators and service providers, as they leverage infrastructure like ours to build financial products like the one described in this piece, tearing down the remaining separation between traditional finance and crypto in the process.

If you have any questions or comments on this piece, please don't hesitate to get in touch with [Max Sherwood](#) or [Marius Smith](#).

15. Further reading

Fixed income protocols, the next wave of defi innovation

Messari – Rahul Rai – Jan 25th, 2021

<https://messari.io/article/fixed-income-protocols-the-next-wave-of-defi-innovation>

The Yield Curve Cometh: Why Fixed-Rate Loans in Crypto Matter

Messari – Jack Purdy – October 28th, 2020

<https://messari.io/article/the-yield-curve-cometh-why-fixed-rate-loans-in-crypto-matter>

Exploring the Opportunity for DeFi Interest Rate Markets

Multicoin Capital – Tushar Jain – October 6th, 2021

<https://medium.com/notional-finance/why-fixed-rates-matter-1b03991275d6>

Why Fixed Rates Matter

Notional Finance – Teddy Woodward – Nov 12, 2020

<https://medium.com/notional-finance/why-fixed-rates-matter-1b03991275d6>

Here's Why Interest Rates on Cryptocurrencies Could Be a Game-Changer

Coindesk - Christine Kim - Feb 22, 2020

<https://www.coindesk.com/business/2020/02/22/heres-why-interest-rates-on-cryptocurrencies-could-be-a-game-changer/>

Notional Finance: Borrowing and Lending at Fixed Rates... in Crypto?!

Messari – Matt Lewis – Dec 1st, 2021

https://messari.io/article/notional-finance-borrowing-and-lending-at-fixed-rates-in-crypto?utm_source=newsletter_middle&utm_medium=organic_email&utm_campaign=notional_finance_fixedrate_lending

The Yield Protocol: On-Chain Lending With Interest Rate Discovery

Whitepaper - Dan Robinson & Allan Niemerg – April 2020

<https://research.paradigm.xyz/Yield.pdf>

Borrowing and Lending the “Yield Dollar” on UMA

Uma - Clayton Roche

<https://medium.com/uma-project/the-yield-dollar-on-uma-3a492e79069f>

From Zero to Hero on DeFi Rate Swap

Defiprime - Andrey Belyakov – April 13th, 2020

<https://defiprime.com/defi-interest-rate-swaps>

Introducing CIRI: Crypto Interest Rate Index – Messari – May 6th, 2019

Messari – May 6th, 2019

<https://messari.io/article/introducing-ciri-crypto-interest-rate-index>

A CIRIous look at the market

Messari – June 13th, 2019

<https://messari.io/article/messari-research-a-cirious-look-at-the-markets>

Trading Future Yield, Now.

Messari – Rasheed Saleuddin - Aug 23, 2021

<https://messari.io/article/trading-future-yield-now>

Seeking Yield in the Crypto Market

Coinmonks - Christian Hsieh – Feb 18th, 2021

<https://medium.com/coinmonks/seeking-yield-in-the-crypto-market-858ec3455d11>

How Fund Managers View Lending and Staking

Coindesk – Galen Moore – January 31st, 2020

<https://www.coindesk.com/markets/2020/01/31/how-fund-managers-view-lending-and-staking-3-takeaways-from-a-coindesk-research-webinar/>

Parsing 3 Types of Risk in Digital Assets

Coindesk – Jeff Dorman – July 29th, 2021

<https://www.coindesk.com/markets/2021/07/29/parsing-3-types-of-risk-in-digital-assets/>

What are Staking Rewards?

Staking Rewards – August 12th, 2021

<https://www.bitcoinsuisse.com/fundamentals/what-are-staking-rewards>

Beware staking yields: The finances of proof of stake

Messari – Ryan Watkins – Feb 13th, 2020

<https://messari.io/article/beware-staking-yields-the-finances-of-proof-of-stake>

Does the percentage of total tokens staked have an impact on price?

Messari - Wilson Withiam – April 1st, 2020

<https://messari.io/article/does-the-percentage-of-total-tokens-staked-have-an-impact-on-price>

Staking is the Quiet Giant of Crypto Yield

Nasdaq – Guest Contributors - June 23rd, 2021

<https://www.nasdaq.com/articles/staking-is-the-quiet-giant-of-crypto-yield-2021-06-23>