CRYPTO
PRAGMATIST
PRO

An Important Note
Euler traded up +15% on the day this report came out. Not only did that throw off some of our valuations/estimates, it ate into some of the short-term upside we were projecting. Take this into consideration when reading the report.

Name	Euler Finance
Market Cap	$220 million
Fully Diluted Market Cap	$220 million
Executive Summary	Euler finance is an innovative permissionless lending protocol on Ethereum. One of the main focal points of the project is to protect against the risks associated with creating markets for both **illiquid and highly volatile assets,** also known as *long-tail* assets**.** In practice, this means that **any** asset with a $WETH trading pair on Uniswap can have its own market on Euler.
Problem Solved	Euler addresses a whole slew of issues with innovative solutions, but the most critical is isolated asset tiers. Described below, different assets pose a different risk to lenders and/or borrowers. Liquidity issues can lead to higher volatility, making lending markets unsafe for a given asset. This is why it has been so difficult for money markets to be created for the long tail crypto assets, like $DOGE. By sorting the asset into different tiers, users can take on isolated risk if they desire. In addition to the asset grouping, there are also **flexible interest rates**, MEV liquidation protection and **extremely low liquidation penalties**,
Tokens	**$EUL:** The main token of the protocol is used for governance. There are a lot of factors considered by $EUL holders, some of the most important are: ● Collateral and borrow factors ● Tier of assets ● Price oracle parameters

	dTokens: Representative of the borrower's debt position within a single pool. **eTokens:** Representative of the depositors (lenders) claim to a specific asset pool. eTokens are interest-bearing and allow the user to withdraw more over time as interest accumulates.
Terminology	Euler breaks down the assets into different tiers to be able to categorize the risk of each token: **Isolation-Tier:** The most restricted asset type on Euler finance means that a user can *only* borrow this asset for a given pool of collateral. Posting $USDC as collateral means I can only withdraw $APE against that $USDC. If I wanted to withdraw $DOGE, I would have to use a separate “sub-account”. **Cross-Tier:** To continue with the above example, cross tier allows me to withdraw the $DOGE against the same $USDC pool that I previously deposited. **Collateral-Tier:** As implied by the name, these assets are able to be used as cross tier assets and supplied as collateral for other loans. $EUL holders are able to vote on how a given token is treated, increasing or decreasing the tier rating as necessary. **Sub-Account:** For positions that have different asset tiers, users will have to utilize a different account to access Euler’s features. Sub-accounts are all within the **same wallet**, which means that tokens only require one approval per wallet and can be transferred easily between accounts.
Founders	Michael Bentley, Seraphim
Risks	As with all lending markets, one of the biggest vulnerabilities is smart contract risk. With all of the hacks that we have seen as of late (Rari, bridges, and others), a new protocol could be seen as having heightened susceptibility to exploits compared to older projects, especially one serving the long tail of assets. The team has been thoroughly audited and reviewed by *6 different* security firms, which does provide a diverse and tested assumption of safety.

	Another risk is that the $EUL token strictly stays a governance token. While this is valuable and has proven to already improve the protocol, we anticipate that at some point revenues will be directed towards token holders. Of course, there is no way to tell *when* that might happen, but it would obviously be a positive catalyst for token price.
Competitors	Looking at the two legacy lending markets in DeFi, Aave and Compound, it is no doubt that Euler has its work cut out to break into the market share of the two blue-chip protocols. The products and innovations offered by Euler are clearly several steps ahead of the blue-chip protocols, but with it comes new risk and potential unsustainability. Silo Finance and Fraxlend are two other markets that plan on utilizing the isolated asset pools. However, one of the big differentiators that we appreciate is Euler utilizes a moving TWAP from Uniswap v3 to determine asset prices on the platform. While this method comes with its own tradeoffs, which we will dive into below, we find Euler to be in a compelling position to win out and be a leader in permissionless lending markets due to some of the marginal improvements it has made over competitors.
Documentation	Docs.euler.finance
Code Repository	Github
Site	https://www.euler.finance/
Social Media	Twitter Medium Discord

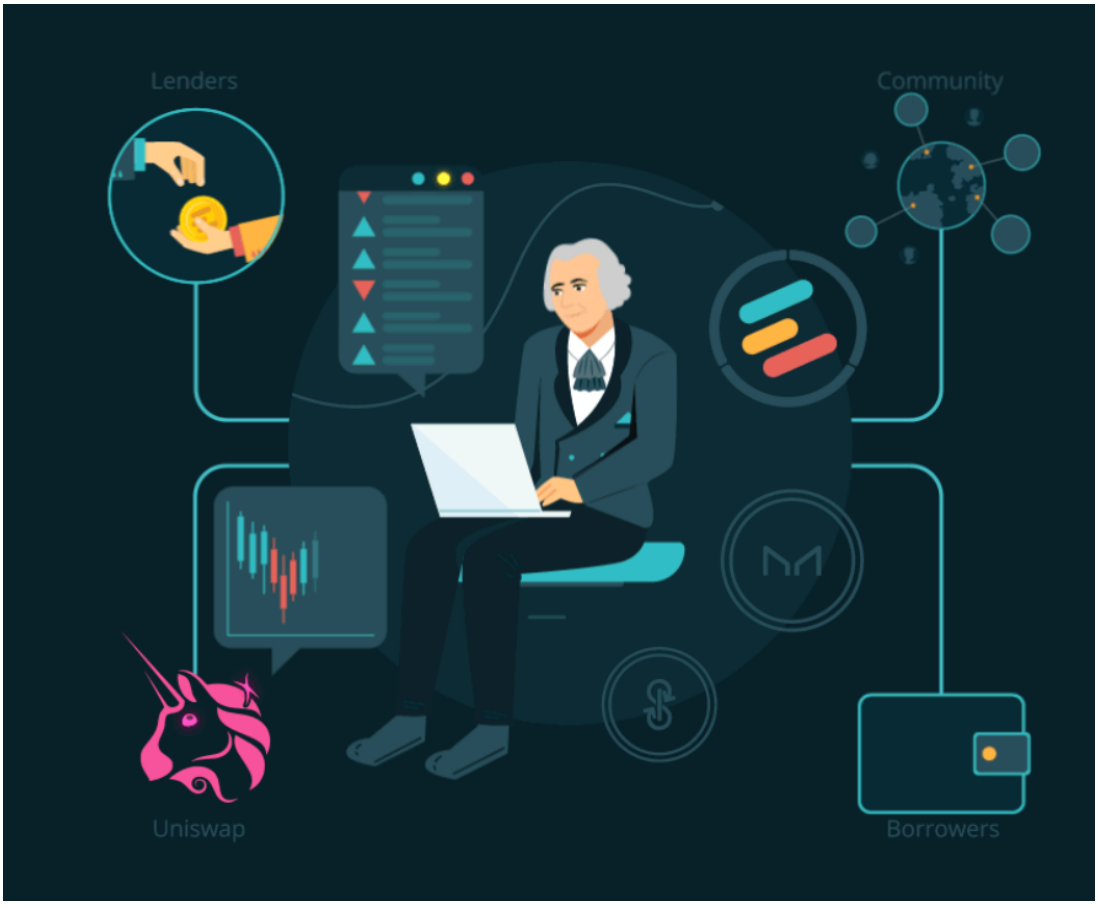
Intro

Rarely do we see a new protocol that attempts to become truly innovative in crypto. More often than not, ideas are recycled into forked codebases with new flashy names, or the same rendition of a protocol just on a different EVM chain.

In bull markets, these lead to successful trades. But as history repeats itself, 95% of the altcoins and protocols will be rendered obsolete: only the best of the best will prevail. Liquidity tends to consolidate.

Among these winners are the innovators; Convex, Curve, GMX Protocols that bring a new and **useful** idea to fruition.

While a comparison to the above list would be *more* than premature, Euler Finance just might be able to make it up there with the big boys.



Euler Finance

The Thesis

It should be worth noting that while we believe Euler to be absolutely innovative and unique to the development of DeFi lending markets, the token does not carry the same wow factor around tokenomics and revenues as opposed to some other much-talked-about projects. Protocol

growth should go hand in hand with $EUL demand (discussed below), but in terms of the “real yield” that Crypto Twitter has been foaming at the mouth over recently, $EUL does not fit the bill.

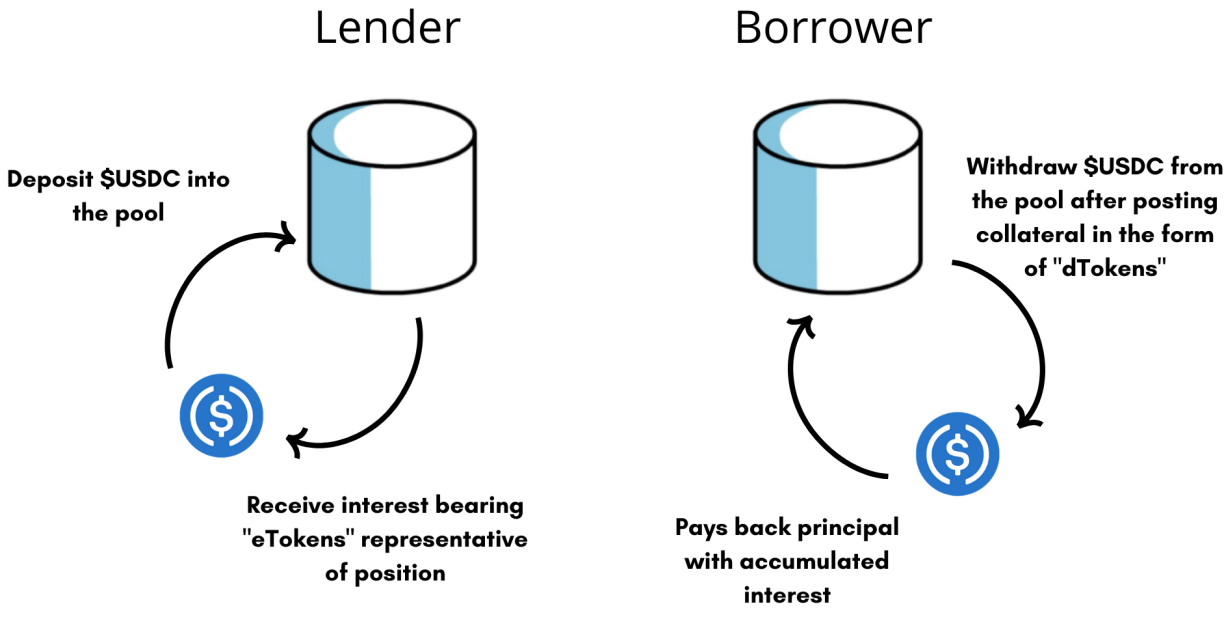
Of course, we wouldn’t be discussing this protocol if there weren’t ways to make money. By introducing unique asset lending markets that cannot be accessed elsewhere, users are able to create new delta neutral strategies, short assets on-chain that were previously unavailable, and benefit from being an early contributor to asset pools.

And, $EUL governance is going to be highly democratized through their distribution schedule, meaning that $EUL holders could easily vote in the future to kick back protocol revenues to tokenholders.

The Protocol

Borrowing and Lending Markets
The markets on Euler follow a similar structure as Aave and Compound, with interest bearing tokens representing a deposit amount for a lender. The borrower receives dTokens that represent their debt position. This is useful because the tokens can be used to create derivative products as representing the **position**, not the underlying asset itself.

Here is the flow, visualized:



Canva

The amount that you can borrow is dependent on the collateral you have posted and the value of the asset you are borrowing:

Max Borrow Amount = Borrow Factor x Collateral Factor x Collateral Deposit Value

To keep track of your collateral and interest, Euler mints an eToken for the value of assets that you deposit. The eTokens represent principal deposited and interest earned..

The **borrow factor** is in place to protect against upside risk in the borrowed assets. Let's say that ETH has a borrow factor of .5 and I have used $1,000 USDC posted with a collateral ratio of .9 (I can borrow 90 cents for every dollar of collateral).

This makes my maximum borrow amount $450 (.5 * .9 * 1,000). Now, if $ETH increases in price, my borrowed **dollar amount** will be greater than $450, which flags my account for liquidation.

Protected Collateral
Aave and Compound's collateral pools are always able to be borrowed against. If I deposit $1,000 USDC into Aave, anyone can borrow that against their own deposit amount. As such, there is a risk that I would not be able to withdraw my $USDC if all available $USDC is being utilized.

*Total Colateral - [Pool Utilization * Total Collateral] < My Deposit*

Let's say that I deposited 100k into the $USDC pool to bring the total amount to 1M. If there was a 95% utilization, I would only be able to withdraw a maximum of 50k of my original deposit:

*1M - (95% * 1M) = 50k $USDC < My 100k Deposit*

Euler protects against this by allowing users to deposit collateral *only to be used as collateral for their borrow positions*. Essentially, you are creating your own pool of $USDC that cannot be touched by anyone else. Obviously the tradeoff here is that you would not be able to earn interest on the deposit, but the capital is always able to be withdrawn as long as you repay the debt tokens.

Euler's Take on Flash Loans
The protocol refers to the operation of flash loans as "deferred liquidity checks." In this case, liquidity is referring to the collateral levels, and determining whether a transaction is eligible or should be reverted.

The liquidity checks can be done at the very end of a list of operations. In this sense, a user could create their own "flash loan" by borrowing and repaying back the loan in the same transaction batch. At the liquidity check, the borrowed assets would be paid back, so the transaction would be eligible to go through.

The fees for this are **zero**. Euler charges interest based on the time value of money, and in the case of a flash loan, everything is done at the *same point in time.* In the whitepaper, the protocol states they believe that money markets are in a race to the bottom, and that the effect of offering users feeless flash loans will create more value in the long run than charging flash loan fees.

The above image is an oversimplification of how these flash loans can be utilized, but there really is endless application.

Price Feeds

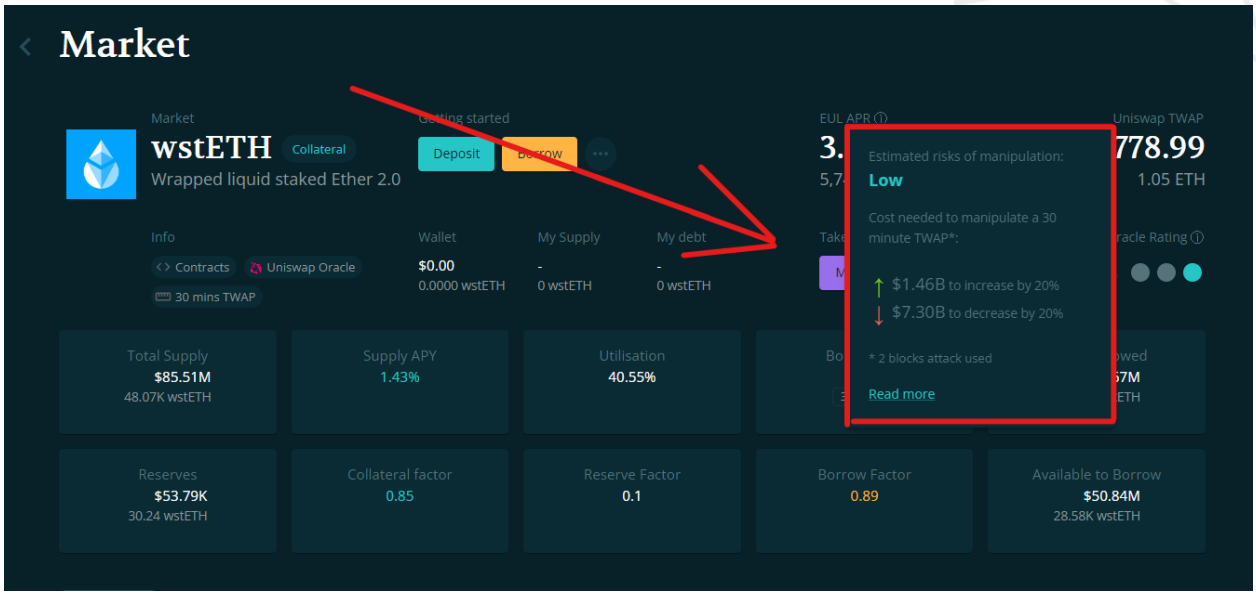
A critical component of money markets is the price feed implemented into the protocol. Aave, Compound, and Maker all have some level of reliance on off chain price oracles such as Chainlink. While this method is battle-tested, there is some level of centralization to create a reliable price feed.

Because Euler allows for *any* asset to have its own money market, it utilizes a time-weighted average price (TWAP) from Uniswap. This has a couple of benefits:

1) Can greatly increase the cost of price manipulation, which could force an otherwise healthy position to be liquidated
2) TWAP is a continuous price not subject to large movements, which allows for the liquidation process to implement Dutch auctions

Different parameters need to be considered for the TWAP implementation in Euler, such as the time interval implemented for the price average, which is subject to $EUL governance.

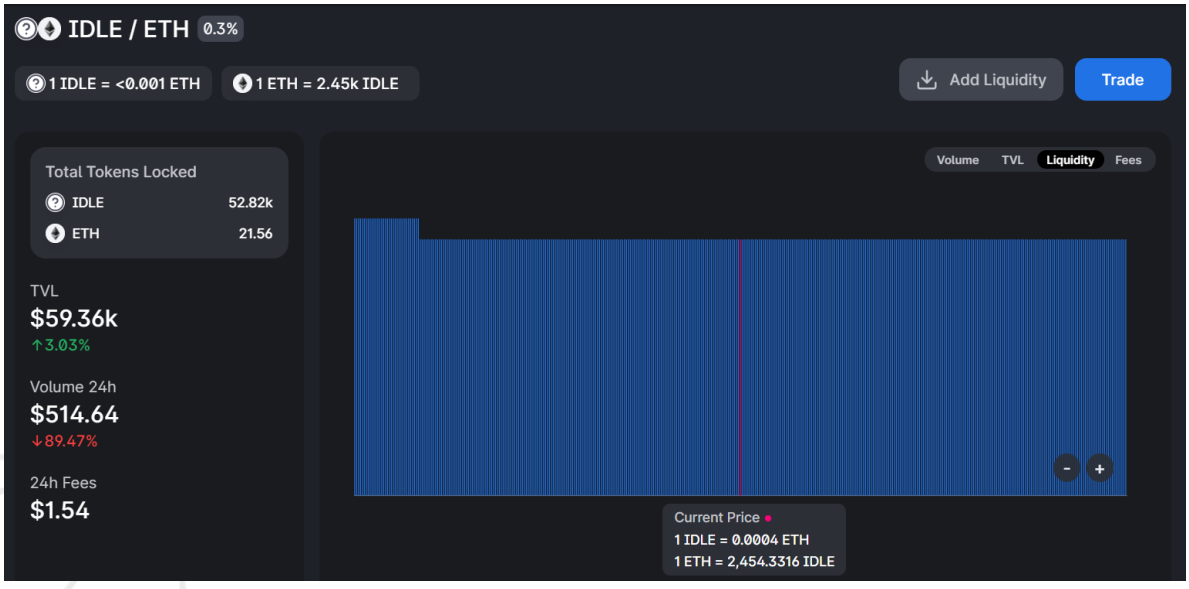
Because this price feed is unique to Euler, they implement an easy to read UI for newcomers to understand how the price feed works for a given asset pool. Denoted in the graphic is manipulation risk and cost needed to manipulate. These fast price swings can create a risk to lenders, which is an existential threat to the protocol



Euler Finance

Our qualms with the oracle ratings lie in the difficulty to improve them. For a token that is less liquid and thus naturally has a lower cost of rating, the solution would be to provide **full-range liquidity** in the Uni-LPs. What this means is that rather than providing within given bands–which is what the large majority of Uni-LP arbitragers do–there would need to be liquidity provided at the lowest point to highest point.

As denoted in the docs, the $IDLE/$WETH pool has a $52k market cap, but a minimum manipulation cost of $115 **million**.



Euler Docs

As we know, LPs are picky when it comes to the range they want to provide liquidity, and a large part of the Uniswap liquidity provision is focused on *concentrated liquidity provision* in UNI pools. UNI V3 pools make the TWAP oracles even harder to manipulate, although it's still possible.

To combat this issue, Euler recently passed a governance vote that allowed for Chainlink pricing support when a Uniswap pool was either highly illiquid or tightly concentrated. This is a massive benefit for the protocol and erodes one of the big risks in the trustless oracle they have utilized.

Liquidations
There is almost too much to talk about with liquidation improvements, so we'll keep it short. Euler absolutely anhilliates the fees charged to would-be liquidated positions. Current money markets give a fee to liquidators, making sure underwater positions are liquidated that way.

By using a **dutch-auction**, there is not a flood of MEVers having a gas bidding war to win the liquidation contract, but instead a slow movement into profitability. Users/bots can bid on a liquidation when it is profitable for them to do so, and it becomes somewhat of a game of profit-chicken: who is willing to take the smallest profit % just to secure the transaction?

Soft liquidations are in place to benefit borrowers from getting screwed over for being mildly below the required collateral amount. In this case, the liquidator repays the loan up to the amount needed to bring the borrower out of the violation level.

For comparison, Aave and Compound have a fixed amount of debt that can be paid off as .5, meaning half of your loan can be liquidated just by being barely undercollateralized. This benefit will **clearly** be more welcoming for people who are eager to borrow a large amount.

Reserves
To protect a bank run, Euler borrow pools continuously accrue a reserve. Of the interest paid from borrowers, a portion will go to the reserves based on a factor set by $EUL governance. This will fluctuate and be somewhere between too low, which renders the pool risky and eligible for a bank run, and too high, which would disincentivize lenders as their earned yield will not be sufficient–you can't earn yield on assets you're not lending out.

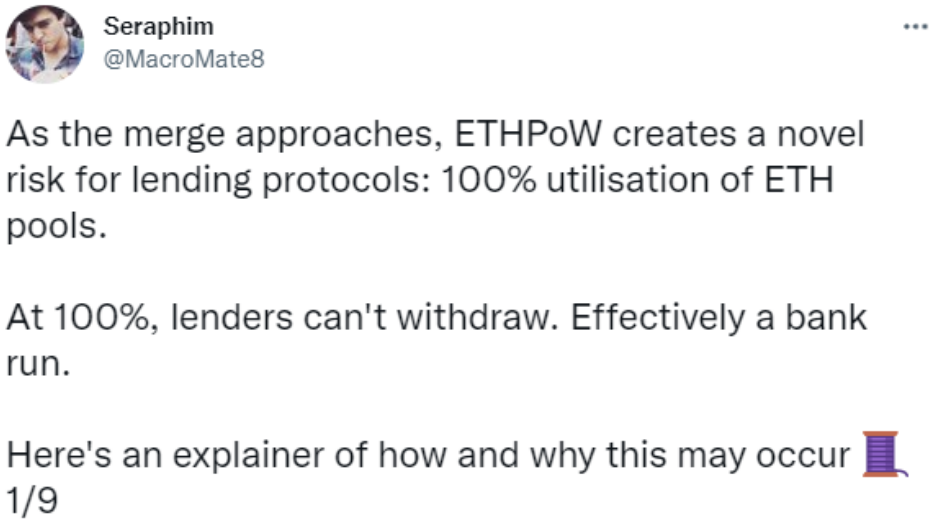
Liquidators are also required to pay a small fee on top, which accumulates in the reserve. This also protects against "self-liquidators" to ensure that it is always unprofitable.

On a podcast, founder Michael Bentley discussed the main point of reserves is to provide a backstop for "bad-debt". He says they are seeking to **load up the reserves as early as possible**, which will then allow incoming depositors to be more comfortable supplying a large amount of assets. Currently, it is 25% of interest paid that goes to reserves, which he said will be brought down in the future.

Interest Costs
A simple–yet necessary–adjustment that Euler made compared to traditional crypto lending markets is dynamic interest rates.

Rather than a static rate of, say 10% for $ETH borrowing, the interest rate will increase in times of high utilization of available assets, and decrease when the asset pool is below its optimal utilization.

Here's a thread outlining this in practice and why this is so beneficial at a protocol level to implement fluid interest rates determined by pool utilizations:



Twitter

We won't get in too deep here, but the thread is a great explainer.

Finally, let's look at a comparison at the cost of borrowing majors on Aave and Compound, then we will dive into the good stuff:

Token	Aave	Compound	Euler
BTC	1.05%	3.41%	0.43%
ETH	2.74%	2.80%	-0.50%
DAI	2.29%	2.20%	-0.45%
USDC	1.39%	2.14%	0.11%
USDT	2.39%	2.96%	-0.32%

Excel

I mean, you get **paid** in half of the borrowable assets on Euler. No, the markets are not as deep as they are on Aave or Compound, but they are by no means exclusively for small wallets–$ETH and $DAI have over $50M available for borrowing as of writing.

And yes, the $EUL distribution *is* subsidizing these rates (more below). But take that out of the equation and the rates are still on par with the two **blue-chip DeFi** lending projects valued at $1.4B and $350M, despite much lower liquidity.

The Token
Euler only utilizes one token for its protocol: the vanilla $EUL which is used for various governance matters. The most important aspects mentioned in the intro graphic pertain to the fundamental uses of the protocol and parameters around borrowing/lending, price feeds, and asset tiers.

Liquidity
We'll consider two versions of liquidity in this section: $EUL token and assets available on the platform.

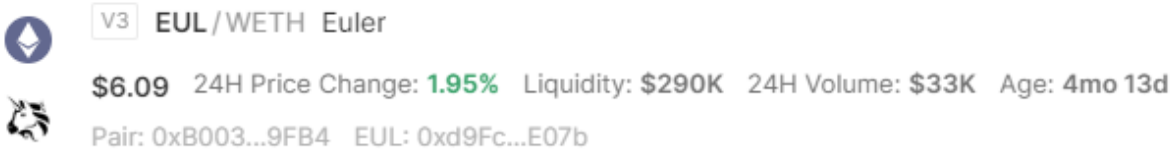
For the assets available on the platform, it comes as no surprise that the deepest liquidity comes with mega blue-chip tokens:

Market	Oracle Rating	Uniswap Price	Uniswap TWAP	Supply APY	Borrow APY	Total Supply	Total Borrows	Available
WETH Collateral WETH	●●●	$1,625.87	$1,625.87	0.64%	2.04% 2.38 %	$87.30M 53.70K WETH	$35.91M 22.09K WETH	$51.39M 31.61K WETH
USDC Collateral USD Coin	●●●	$1.00	$1.00	1.11%	2.69% 2.31 %	$86.72M 87.03M USDC	$46.88M 47.04M USDC	$39.84M 39.98M USDC
WSTETH Collateral Wrapped stETH	●●●	$1,715.21	$1,715.05	1.42%	3.96% 2.70 %	$81.39M 47.46K WSTETH	$32.86M 19.16K WSTETH	$48.53M 28.30K WSTETH
DAI Collateral Dai	●●●	$1.00	$1.00	0.60%	1.97% 2.59 %	$55.41M 55.60M DAI	$22.00M 22.08M DAI	$33.40M 33.52M DAI
USDT Cross Tether	●●●	$1.00	$1.00	2.99%	9.79% 8.47 %	$17.31M 17.38M USDT	$7.09M 7.12M USDT	$10.22M 10.26M USDT
WBTC Collateral Wrapped Bitc...	●●●	$21,311.26	$21,310.76	0.01%	0.40%	$17.22M 808.22 WBTC	$718.99K 33.74 WBTC	$16.50M 774.48 WBTC

Euler

For whales, the respectively low liquidity could be an issue when attempting to kickstart platform growth. However, we think the unique benefits introduced by Euler present a compelling case for OG's to make the transition to the platform.

Trading liquidity, however, is a bit uglier. The deepest liquidity is on Uniswap v3 and carries a meager ~$300k in the pool:



DexScreener

Without any liquidity mining incentives, is that surprising at all? Not really, and as $EUL is distributed/unlocked over time, we can assume that with protocol growth that people will be looking to capitalize on some LP yields available.

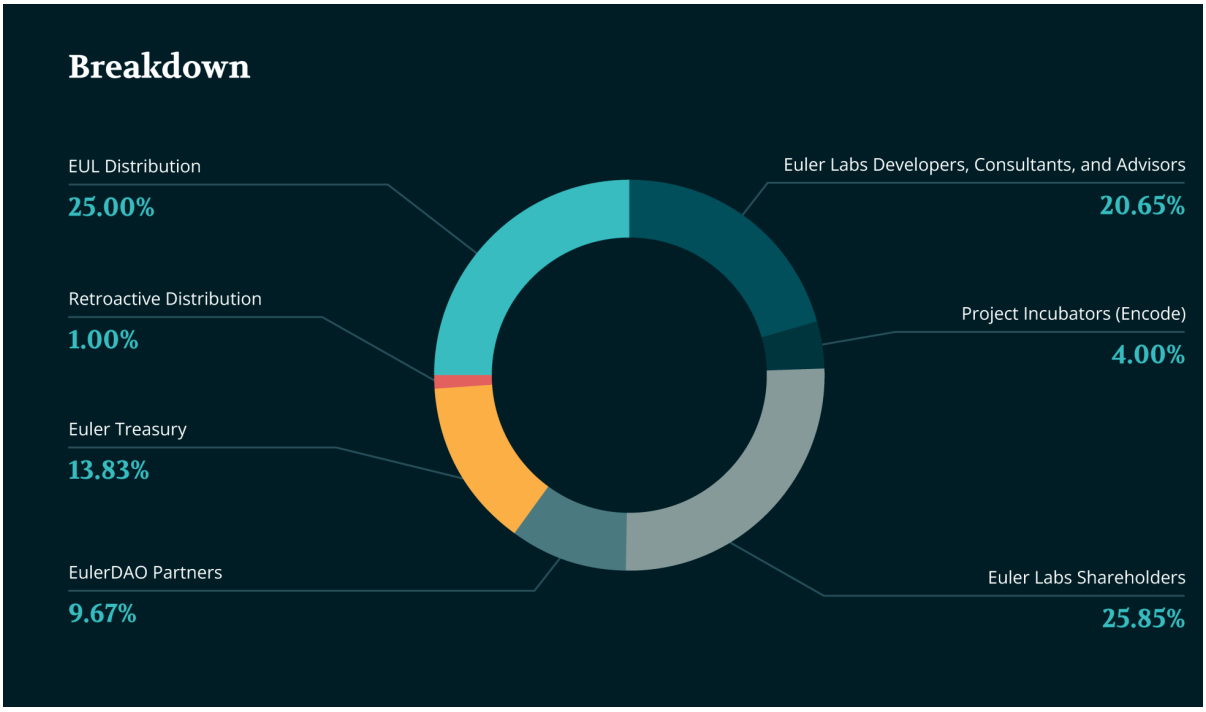
The best liquidity comes from Huobi, where both the $EUL/$USDT and $EUL/$USDC pairs are running ~500k in daily volume. Spreads are still pretty poor, with

Token and Market Cap

$EUL launched just 2 months ago, hitting markets at ~$6.47–where it sits today–before ranging between $3 and $4 for the next month and a half. After listing on Gemini, $EUL shot above $6, where it has been sitting for the better part of August:

Tokenomic Deep Dive

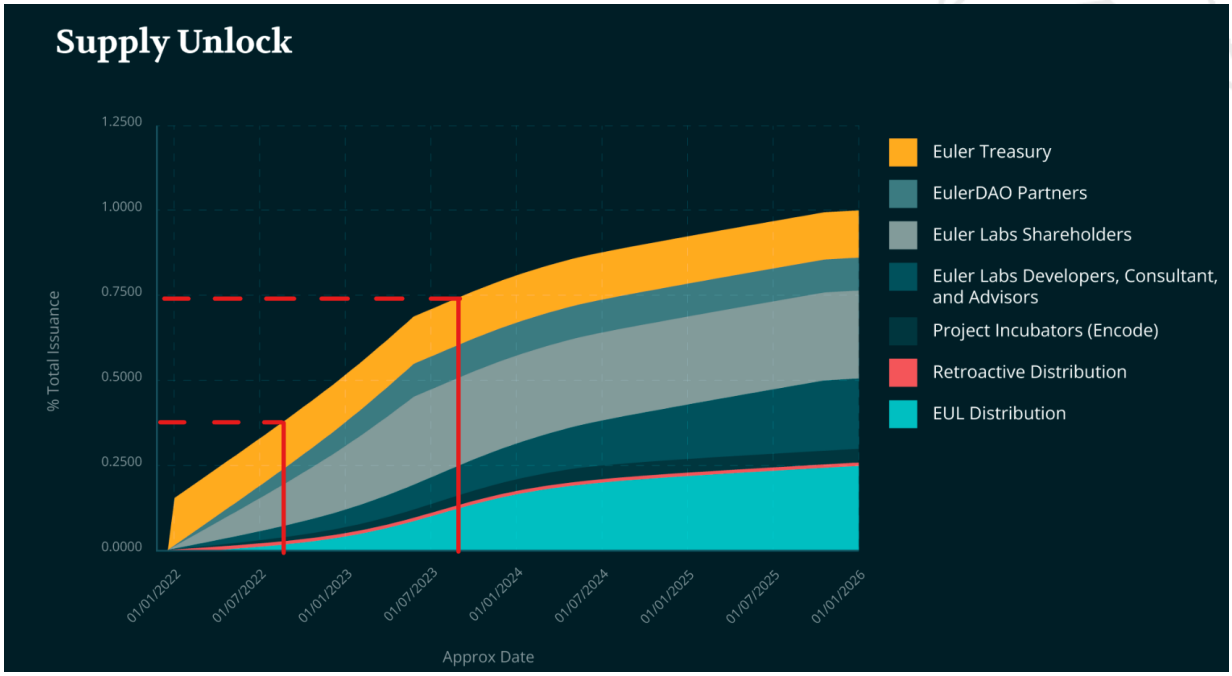
$EUL tokenomics are fascinating and should lead to an equitable distribution to protocol users over time. Something worth noting before diving in, however, is the dilution of unlocks over the next 12 months. Details of this issue will be discussed further below:



Euler Docs

Right off the bat we can notice a high allocation to not necessarily *team members*, but early project contributors and those involved before retail (us). The distribution amongst early stakeholders is fair, but the **sum** is what we are not fond of.

Regardless, the unlock schedules can be seen in detail here, and in the following picture:



The first red line shows where we are at today: roughly 37.5% total $EUL unlocked, and the second shows 1 year from now (roughly 2x that). Doubling the token supply in a **single year** will likely not be good for the price. This should be taken into strong consideration when understanding the future potential price action.

Equitable Distribution

With that blip out of the way, we can move to how Euler plans to achieve decentralization among its token holders. As we know, borrowers are incentivized to use Euler for a number of reasons (capital efficiency, unique assets, low liquidation fees, etc.), but a bonus included is the distribution of $EUL.

It may sound like another simple farming incentive, but this is aimed to not be front-run, and actually delays the peak distribution over time to when the founders believe the project will dig its roots in and start to grow.

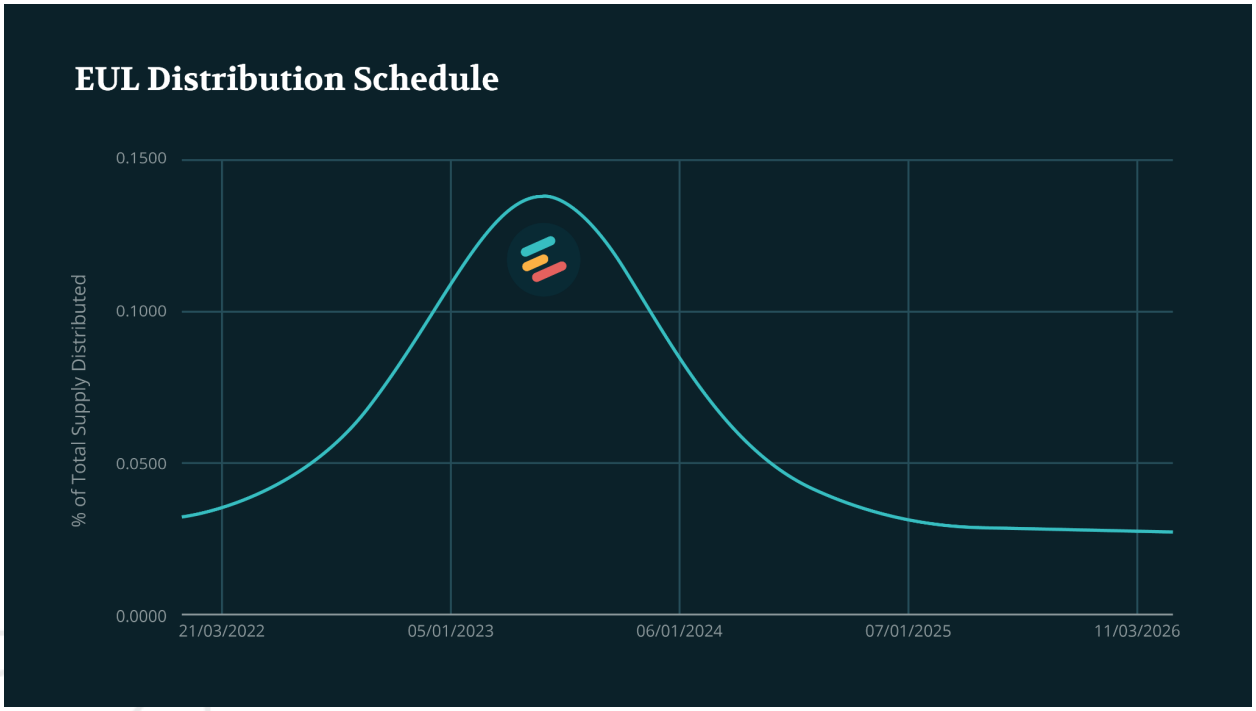
$EUL distribution follows a gauge voting system like we've seen in Curve Finance, where $EUL holders can vote for the markets which they want to see the most $EUL distributed.

The current APRs are nothing to sneeze at for more risk on assets such as $VEGA and $STG, but come down as expected with the tried and true assets:

Market	Epoch 10 Rank	Epoch 10 EUL	Epoch 10 APR	Voting Rank	Proj. Distribution	Votes
USDC USD Coin	1	7,009.01 EUL 14.43%	2.34%	1 10.65%	7,181.41 EUL 14.15%	89,741.27 EUL 15.75%
WSTETH Wrapped stETH	2	5,744.81 EUL 11.83%	2.83%	3 9.15%	6,176.52 EUL 12.17%	66,336.40 EUL 11.64%
WETH WETH	3	5,540.42 EUL 11.41%	2.32%	2 9.86%	6,648.51 EUL 13.10%	76,974.70 EUL 13.51%
VEGA Vega Protocol	4	5,329.21 EUL 10.97%	119.31%	4 7.92%	5,349.26 EUL 10.54%	49,735.00 EUL 8.73%
SDL Saddle Finance	5	5,316.27 EUL 10.95%	121.46%	7 6.11%	4,126.14 EUL 8.13%	30,634.86 EUL 5.37%
EUL Euler	6	4,487.44 EUL 9.24%	38.69%	9 5.99%	4,039.86 EUL 7.96%	32,209.91 EUL 5.65%
STG Stargate Finance	7	4,069.76 EUL 8.38%	43.55%	10 5.90%	3,978.96 EUL 7.84%	27,870.20 EUL 4.89%

Keep in mind, as always, that this is simply the $EUL being paid out, and the earnings are entirely dependent on the $EUL price.

Here is the bell-curve distribution of the token that delays the largest distribution until the protocol has some product market fit established: not until well into 2023.



Strategies on Euler
Besides flat out better UX for both borrowers and lenders, there are some unique strategies available to a protocol this early in its youth. The $EUL distribution discussed above offers borrowers an opportunity to significantly cut down their borrowing costs, even if you consider a decline in $EUL price.

$wstETH Looping
We are bullish on $ETH in the long term, and while the rally has cooled off recently, there is still one of the biggest events in crypto history less than a month away. Whether this is bullish or bearish for the short term price action of $ETH is a different conversation, but we can utilize the most popular liquid staking derivative service in combination with Euler to unlock some solid leverage and stack $ETH.

Note: The following strategy takes on smart contract/depeg risk in Lido

$wstETH is a collateral tier asset on Euler, meaning we can borrow against our interest bearing token. Here is a summation of the APRs:

	Lend APY	Borrow APY	Euler Dist.	Net Borrow
WETH	0.72%	2.17%	2.34%	-0.17%
WSTETH	1.43%	3.97%	2.86%	1.11%

Net Euler Apy (Lend - Borrow)	1.60%
WSTETH Staking Rewards	3.90%
Total APY	**5.50%**

Current Max Borrow Ratio	0.7565

Given that $WETH and $wstETH are going to track one another *almost* 1:1, there is a mitigated risk of liquidation–if one goes down, the value of the other does as well. This means that, *if you are bullish on the merge and Lido's products*, doubling down on Euler is one of the most fruitful protocols to do so. You are essentially getting **paid** to borrow $WETH against your $wstETH, and can loop this many times.

Obviously, not financial advice, but a good way to capitalize on some free capital efficiency.

Borrow $ETH Ahead of Merge

The PoW $ETH discussion has been alive and well the past few weeks. Hasu discusses potential merge and PoW implications in this tread. Like above, the discussion is outside the scope of this report.

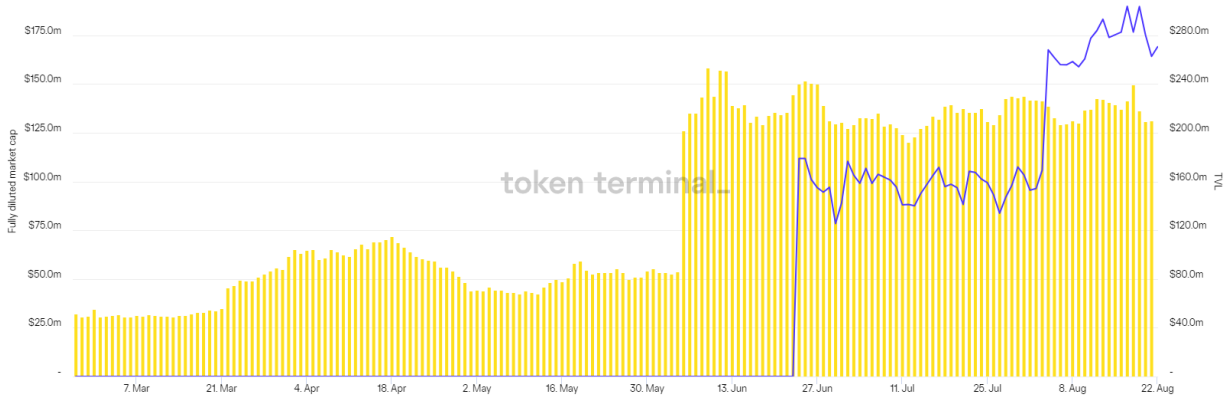
What this strategy is betting on is that PoW $ETH will retain *some* level of value. The trade is quite simple:

1) Borrow $ETH ahead of the merge against $USDC
2) If PoW $ETH has value, keep $USDC on the PoS chain and repay the loan
3) Keep PoW $ETH and abandon worthless PoW USDC
4) Repay loan, now you have both PoW ETH and PoS ETH

$EUL distribution would negate $ETH borrow costs for this trade. The risk is, of course, that borrowing volatility will be increasing massively when the merge occurs, so could $ETH price action. To mitigate this, keep a close eye to avoid liquidation.

Financials and Projections
Despite being a very new protocol (launched beginning 2022), Euler has amassed a significant and growing $214.93m TVL. Still, compared with Aave and Compound, $6.5b and $2.8b respectively, there is a lot of room to grow and a **lot** of market share needed to capture.

Euler TVL with Market Cap (Blue):



Growth has been strong and consistent, and there seems to be no reason for it not to continue given the benefits we've discussed.

Using rough numbers, Euler has been stronger than Aave when looking at revenue extracted **per dollar of TVL**. This is an extremely strong tailwind for Euler showing that they are more efficient earning on the money that users are depositing within the protocol:

	Rev/Day Since May	TVL	Rev Extracted from TVL
Euler	$ 20,000	$ 212,000,000	**0.0094%**
Aave	$ 350,000	$ 4,700,000,000	0.0074%

Excel, Data from Token Terminal

Even more promising is Euler's distribution of revenue between supply side and protocols.

- Supply side revenue goes to depositors and is earned interest on their assets
- Protocol revenue is anything that is kept to token holders (none in the case of Euler)

Currently, the "protocol" revenue goes to the treasure, which we discussed, is too high at the moment. But if Euler passed a governance vote to send protocol revenues to token holders, this would be mega-bullish for the $EUL price.

The distribution of Total revenues, since May, is as follows:

- **Aave: ~**13%
- **Euler:** ~23%

Future Valuation
Given the limited price data as $EUL has been trading on markets only since June 24th, there is no historical data to compare today's FDV of $174 million. We can still look at the comparison of Aave and Compound to understand how much demand is out there for lending and borrowing markets.

Aave TVL has found a local bottom in this bear of $5.1B, about 25x the current TVL on Euler. Compound has established a steady ~$3b TVL, 14x Euler

Given Euler generates more protocol revenue per dollar of TVL than Aave (even more so for Compound) any growth in TVL directly correlates to more value earned for the protocol.

Conclusion
Euler is a truly unique and innovative protocol. Expanding on the traditional idea of borrowing and lending markets, Euler solved **a bunch of problems** in one go.

Given the strengths of the protocol that we have outlined in this report, we believe it is only a matter of time before Euler starts to gain popularity among the crypto community. It has been on a tear of growth since inception.

Competition is strong in lending markets, and with new protocols attempting to solve the same exact issues, it may never end up being a winner-takes-all market. Aave and Compound are established and tested protocols, and eating into the market share could be a tall challenge.

Additionally, there has been a high number of support tickets opened in the discord. While the team is prompt to communicate and reach a solution, customer support and slow response times can definitely be a pain point for new protocols. Nonetheless, it is at least expected that there should be a fair amount of improvements to be made as use kicks up. Note that these are all front end interactions, nothing with smart contracts.

Overall, we are excited about the possibilities with Euler. Our biggest thing we would like to see would be a governance vote for *some* level of protocol revenue to be distributed to $EUL holders. This will generate massive demand and give the token some more of the “real yield” everyone is looking for these days.