What Happens When Anyone Can Be Your Representative? Studying the Use of Liquid Democracy for High-Stakes Decisions in Online Platforms*

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Abstract

Since the 19th century, political reformers have proposed broadening civic and corporate governance by allowing voters to delegate to any other voter—sometimes known as liquid democracy. Today, systems like liquid democracy have become an important part of ongoing efforts to create democratic online platforms governed by users rather than elites. We provide a first empirical political science study of liquid democracy in a high-stakes, real-world setting, analyzing data from over 250,000 voters and 1,700 proposals across 18 crypto projects ("DAOs") built on the Ethereum blockchain. We find that, on average, 17% of voting tokens are delegated, with substantial clumping on the most-popular delegates. Delegation is primarily bottom-up, with smaller token-holders more likely to delegate. More active voters receive more delegations, suggesting somewhat informed decision-making. Using a difference-in-differences design, we estimate that creating online hubs to coordinate delegation significantly increases delegation and overall voting rates. In sum, liquid democracy can foster bottom-up participation, particularly when paired with tools for coordination. On the other hand, real-world participation remains relatively low among both voters and delegates, posing an important challenge to liquid democracy not yet contemplated in existing theoretical literature.

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1 Introduction

Representative democracy, in which voters elect people to make decisions on their behalf, dates back to antiquity, but academics and reformers have long been interested in studying ways to improve on it for both corporate and civic governance. One popular proposal—often called liquid democracy, today, and which dates back at least to Carroll (1884), Tullock (1967), and Miller (1969)—allows voters to delegate (or proxy) their votes to any other voter they wish on a continual basis, changing whom they award their votes to whenever they please.[1] Such a system could let voters who know less about an issue give their vote to someone who shares their values and who is more expert on the policies being considered, facilitating informed collective decision-making with better and more open representation, according to proponents.

In this paper, we offer the first political science analysis of how liquid democracy works in the wild in a high-stakes, real-world setting. To do so, we introduce and use a natural laboratory for the study of new voting technologies, with the broader goal of further expanding the study of democracy in the online world within political science. We add to a thriving literature in political science and the natural sciences that examines the use of democratic procedures like crowdsourcing and online juries to moderate content online (Pennycook and Rand 2019; Roitero, Soprano, Fan, Spina, Mizzaro, and Demartini 2020; Roitero, Soprano, Portelli, Spina, Mea, Serra, Mizzaro, and Demartini 2020; Allen et al. 2021; Saeed et al. 2022; Arechar et al. 2023; Cirone and Zhao 2024), investigating how we can use voting in online settings to make collective decisions on a much wider range of topics.

Today, thanks to the rise of computers and the internet, online democracy is becoming an increasingly important part of how we govern human communities. While this movement has roots in the 1990s and even earlier, it has gathered momentum over the past decade with social media platforms including Facebook and X using groups of users to evaluate the reliability of information.[2] It is now expanding to encompass a much broader range of decisions beyond simple content moderation. AI companies including Anthropic, Meta, and OpenAI rely on citizens' assemblies to

[1]For political theory work considering liquid democracy, see Blum and Zuber (2016), Valsangiacomo (2021), and Valsangiacomo (2022).

[2]Meta: `https://www.facebook.com/business/help/373506759931554?id=1769156093197771` and `https://www.facebook.com/formedia/mjp/programs/third-party-fact-checking`. X: `https://help.x.com/en/using-x/community-notes`.

help set guardrails around what their AI chatbots and agents will and won't say and do.[3] Meanwhile, the three largest investment institutions, Blackrock, State Street, and Vanguard have all announced programs that provide shareholders with a menu of options for how to delegate their votes for shareholder votes that cover a wide range of corporate governance decisions (Montagnes, Peskowitz, and Sridharan 2024).[4] Over the same time period, political parties and tech companies have gone further, experimenting with the direct use of liquid democracy to make internal decisions.[5]

As the use of online democracy and liquid democracy continues to expand, there are basic questions about how voting and delegation work in the online context. Would voters avail themselves of the opportunity to delegate their votes, and if so, which kinds of voters are more likely to? How do they choose whom to delegate to? While a thriving theoretical literature studies some of the core properties of liquid democracy in computer science and political economy (Miller 1969; Alger 2006; Christoff and Grossi 2017; Kahng, Mackenzie, and Procaccia 2018; Caragiannis and Micha 2019; Bloembergen, Grossi, and Lackner 2019; Halpern et al. 2023; Butterworth and Booth 2023; Dhillon et al. 2023), and while there is a small but valuable literature studying liquid democracy in a laboratory setting (Mooers et al. 2024; Berinsky et al. 2024), there is limited existing empirical research studying how voters behave in a real-world, high-stakes setting where liquid democracy is used and especially investigating the causal effects of different design decisions (though see Jensen, von Wachter, and Ross (2021); Fritsch, Müller, and Wattenhofer (2022); Barbereau et al. (2023); Feichtinger et al. (2023); Liu (2024); Messias et al. (2024) for descriptive patterns on voting and delegation in a small number of blockchain-based settings).[6]

To fill this important gap, we collect new data on patterns of participation and delegation within communities built on top of the Ethereum blockchain, a setting we will explain below. Querying

[3] Anthropic: https://www.anthropic.com/news/collective-constitutional-ai-aligning-a-language-model-with-public-input. Meta: https://about.fb.com/news/2024/04/leading-the-way-in-governance-innovation-with-community-forums-on-ai/. OpenAI: https://openai.com/index/democratic-inputs-to-ai/

[4] Blackrock: https://www.blackrock.com/corporate/about-us/investment-stewardship/blackrock-voting-choice. State Street: https://www.ssga.com/us/en/about-us/what-we-do/asset-stewardship/proxy-voting-choice. Vanguard: https://corporate.vanguard.com/content/corporatesite/us/en/corp/articles/expanding-proxy-voting-choice.html

[5] Google Votes: https://www.youtube.com/watch?v=F4lkCECSBFw and https://www.tdcommons.org/cgi/viewcontent.cgi?article=1092&context=dpubs_series. German Pirate Party: https://liquidfeedback.com/en/history.html

[6] That being said, Kling et al. (2015) studies the use of a liquid democracy platform called LiquidFeedback for the internal deliberations of a German political party, suggesting the presence of some "supervoters" who amass outsize voting power through delegations.

data from the blockchain, we obtain individual voter- and vote-level data for more than 250,000 users spanning more than 1,700 proposals in "Decentralized Autonomous Organizations," or DAOs as they are called. These organizations exist online, include participants from all across the world, sometimes command large amounts of money, and use voting and other democratic tools to make binding, irreversible collective decisions regarding their enterprises. This dataset of DAO voting allows us to track patterns of vote delegation and to relate it to underlying factors such as voters' stake, their probability of pivotality, and their propensity to participate.

Using this data, we first establish basic patterns in delegation behavior. Consistent with the well-known challenges to encouraging participation in online governance (Fritsch, Müller, and Wattenhofer 2022; Barbereau et al. 2023; Feichtinger et al. 2023; Li, Xu, and Duan 2023; Hall and Oak 2023; Liu 2024), roughly 17% of tokens (where one token equals one vote, and a voter may possess more than one token) are delegated to others for voting. This is substantially lower than the overall U.S. corporate shareholder voting rate which is around 70%, on average, and is similar though still lower than estimated rates for retail shareholder, which are approximately 30% (Zachariadis, Cvijanovic, and Groen-Xu 2020; Brav, Cain, and Zytnick 2022). However, since DAO votes occur much more frequently than shareholder votes, this comparison may not be entirely fair to DAOs.

This delegation is somewhat lumpy, leading some delegates to amass considerable voting power, consistent with theoretical concerns about over-delegation (Kling et al. 2015; Fritsch, Müller, and Wattenhofer 2022; Barbereau et al. 2023; Feichtinger et al. 2023; Messias et al. 2024; Liu 2024; Mooers et al. 2024). Voters with small to moderate numbers of tokens are more likely to delegate than large token-holders, suggesting that most delegation is "bottoms up" rather than "top down." Delegates with track-records of participating in votes more often obtain more delegated tokens, on average, indicating that delegation decisions are at least somewhat informed. However, overall participation rates among delegates are surprisingly low, in contradiction to most theoretical models.

Does building some structure around the delegation process increase voters' propensity to delegate? By making it easier to delegate, do such systems also increase overall participation in voting? To answer these questions, we leverage a set of natural experiments in which some DAOs implemented what we call delegation programs. These programs consist of (a) making delegation less costly for voters by building out simple and convenient online user interfaces, and (b) offering online hubs that provide information on delegates' positions and track records. Using a difference-in-differences design, we find that the rolling out of these delegate programs appears to cause a substantial increase in rates of delegation and, consequently, in rates of voting on proposals.

Taken together, the results suggest that liquid democracy works quite differently in the wild than might be predicted theoretically. While clumping on a small number of super-delegates may be a concern, currently the biggest obstacle is encouraging voters to delegate or vote at all. Responding to this challenge, easier user interfaces and collated information about delegates appear to increase delegation substantially, but there is still considerable slack in participation—among both voters and delegates. As more online platforms consider building governance systems based on liquid democracy, they may want to build in UIs and white-listing from the start, and also consider further token-based incentives for voters to participate more often (Hall and Oak 2023).

Beyond the specifics of delegation and liquid democracy, our paper also aims to introduce political scientists to the use of blockchain data to study core questions in the design of voting systems and online governance. The paper provides background on blockchain and DAOs, explains why patterns studied in this unusual context should be generalizable, and offers information on how we collected this new data. When we publish this paper, we will also release a guide to the collection of blockchain data for political scientists, as well as a set of public online dashboards that will allow applied researchers to download voting data from the blockchain without requiring familiarity with blockchain code or software. While our paper focuses on the specific question of liquid democracy, there is substantial variation in many other features of voting and governance across the blockchain ecosystem, and our data should prove useful for studying those topics in the future.

The remainder of the paper is organized as follows. In the next section, we describe the setting of our empirical study and describe our data collection efforts. Next, we present basic descriptive facts regarding voter behavior and delegation within the Ethereum ecosystem. Then, we offer background on the delegate programs built by different DAOs and present the estimates from our difference-in-differences design. Finally, we conclude by discussing what our study implies for the future of online voting systems and voter delegation more generally.

2 Background and Importance of Studying Online Voting

In this section, we explain the voting context that allows us to study patterns of delegation and voting in online platforms, and we explain why studying online voting is a relevant and important context for political scientists.

2.1 Context on Online Voting and Blockchain

Online platforms are both an increasingly important domain in which democratic tools are being deployed, and a laboratory in which we can study the use of new systems of voting that would be difficult or risky to deploy in the physical world. While complicated forms of delegation have not typically been used in the real world, a variety of digital systems are actively experimenting with them. In this paper, we focus on the largest ever use of liquid democracy to make real, high-stakes decisions online, which occurs within blockchain-based platforms commonly known as "DAOs."

2.1.1 Blockchain and DAOs

Blockchain is a technology that seeks to allow people to keep track of information without relying on a central authority. It's akin to a shared digital ledger that many computers maintain together, or a "computer in the sky" that "in effect, has no owner or operator" (Roughgarden 2024). Groups of developers, hobbyists, business people, artists, and others have built software applications and online communities using the infrastructure of the blockchain. For the purposes of this paper, it is not essential to understand the technical workings of blockchain; it is only necessary to understand that software projects in a wide variety of domains, from financial applications to art, coordinate their shared efforts in these online communities, and in some cases do so with millions or even billions of dollars at stake.

These communities are known as Decentralized Autonomous Organizations, or DAOs (Arruñada and Garicano 2018; Chod, Trichakis, and Yang 2021; Jensen, von Wachter, and Ross 2021; Wang et al. 2023; Appel and Grennan 2023*a*,*b*; Cong et al. 2023; Bena and Zhang 2023; Sockin and Xiong 2023; Tan et al. 2023; Benhaim, Falk, and Tsoukalas 2024). A stated ethos behind these communities is that no single person should be in charge of the community. This is the articulated reason for why the community's software resides on the blockchain, and is also the reason why,

Table 1 – Overview of DAOs: Founding Date, TVL, Treasury, and Mission.

	Founded	TVL	Treasury	Mission
aave	2017	$6.6B	$156.7M	Decentralized lending and borrowing.
arbitrum	2018	$12.1M	$5.3B	Ethereum Layer 2 scaling.
builder	2022	–	$475K*	Developing DAO infrastructure.
compound	2017	$2.3B	$123.7M	Decentralized money market and lending.
cryptex	2021	$2.4M	$9.6M	DeFi protocol.
cult	2022	$3M*	$350K*	Funds decentralized initiatives.
dydx	2017	$347.6M	$0	Decentralized trading and lending.
ens	2017	$1.37M	$712M	Naming system on Ethereum.
gitcoin	2017	$408.4K	$68.6M	Funds open-source development.
idle	2019	$34.0M	$1.2M	Optimizes DeFi yields.
lil_nouns	2022	–	$1M*	Sub-DAO of Nouns for NFTs.
nouns	2021	–	$12.2M	Auctions unique NFTs.
optimism	2019	$5.8M	$3.2B	Ethereum Layer 2 scaling.
pooltogether	2019	$8.1M	$3.3M	No-loss prize savings game.
purple	2022	–	$100K*	Tool for creating social apps.
reserve	2019	$28.4M	$0	Stable, decentralized currency.
uniswap	2018	$3.7B	$3.0B	Decentralized token exchange.
yamfinance	2020	$264.9K	$2.8M	Elastic supply protocol.

Note: TVL and Treasury values are as of December 31, 2023, except for values marked with an asterisk (*), which are as of September 24, 2024. Cells with dashes (–) indicate unavailable data. Source: DeFiLlama, Messari, Coingecko, CoinMarketCap, Etherscan, and Uniswap.

in theory at least, anyone in the world can join any DAO, anonymously, and become part of the decision-making process.

To give a clearer sense of what these DAOs are, Table 1 summarizes the main DAOs we will study below. The table lists the name of each DAO, the year they were founded, and two measures of their economic size: the total value of digital assets locked in smart contracts in their system ("TVL"), and the amount of money each DAO holds in its treasury. The final column gives a brief summary of the general business purpose of the DAO.

As the table shows, DAOs vary in their purpose and in their size, with some growing extremely large in economic value. At the high end of the scale, Aave, Arbitrum, and Uniswap all hold more than 1 billion dollars worth of assets in their treasuries, and those three plus Optimism have more than 1 billion dollars of digital assets locked into their systems.

2.1.2 What Do DAOs Vote On?

Given the overarching goal of remaining "decentralized," it is not surprising that DAOs often use voting to make decisions. Members might vote on how to spend the group's money, what new features to add to their software, or other important choices. They vote using digital tokens specific to each DAO. Early in the DAO's formation, tokens are distributed in a variety of ways to community members. Additionally, tokens trade on the open market, allowing anyone who wants to to become a voter by buying tokens, or to cease being a voter by selling tokens.

It is helpful to consider a few quick examples of specific DAOs to understand what kinds of collective decisions they make. Uniswap operates a decentralized cryptocurrency exchange where users trade billions of dollars worth of digital assets monthly. Its token holders vote on crucial matters like fee structures and which blockchain networks Uniswap should expand to. Aave, a decentralized lending protocol, allows its token holders to vote on risk parameters for loans and which new assets to support. In a different vein, NounsDAO is a collective art project where members vote daily on how to spend the group's funds, often supporting public goods or creative endeavors. These votes can involve substantial sums—sometimes millions of dollars—highlighting the real-world impact of DAO governance decisions. In Appendix E, we offer screenshots of specific DAO proposals drawn from a variety of topics and DAOs.

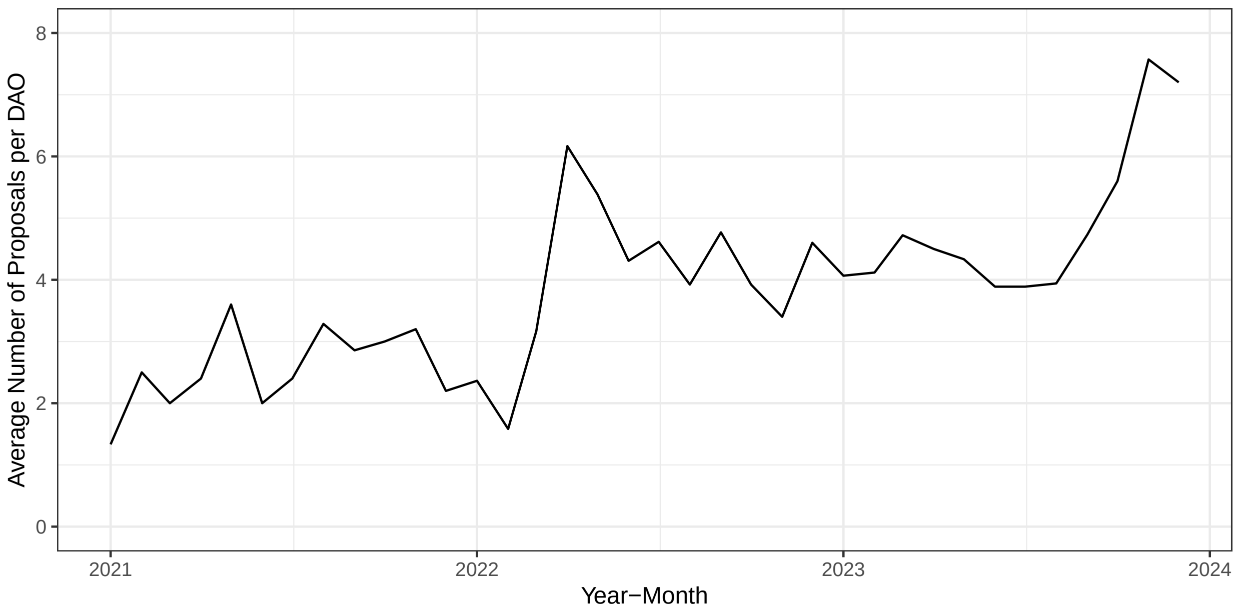
2.1.3 DAO Voting Procedure and Context

The bulk of DAOs we analyze in this paper all use an identical, or very similar, voting system called GovernorBravo. In this subsection, we briefly describe the key elements of this voting procedure.

First, there is an open proposal system: anyone can come and submit a proposal for a vote. Technically, a proposal is a submission in the form of written computer code; in practice, it is nearly always accompanied by a set of social practices including making a forum post discussing the proposal, taking feedback, talking one on one with important voters, and revising the submission.

In the GovernorBravo system, DAOs set a parameter that determines the amount of tokens needed for a proposal to gain consideration in the voting system. Some DAOs choose to set this parameter to zero, meaning that any proposal can get a vote; others set it higher, with the idea being to reserve attention to only viable proposals in which a meaningful number of tokens have

Figure 1 – Number of Proposals Overtime.



already been pledged. In Appendix B, we present a table that shows the value of this parameter for the DAOs in our sample. In addition to the proposal threshold, DAOs also set parameter values relating to the quorum requirement (the amount of tokens required to be voted before a vote can be considered valid), and to the number of days between when a proposal is listed and when it goes live for voting (proposal delay), the length of the voting period, and the length of the "timelock" period between when the vote ends and the result of the vote executes. Appendix B shows how these values are set for the DAOs in our sample, too.

Figure 1 shows the average number of proposals voted on in the DAOs in our sample by month. DAOs vote on about 5 proposals per month, on average, with an upward trend over time. Appendix C breaks this down by DAO, showing that there is conisderable variation, with some DAOs voting on more than 10 proposals per month while others vote on less than 1 per month.

In sum, DAOs have an open proposal system and place some structure around how viable a proposal must be before receiving a vote and what quorum is necessary to pass a proposal. DAOs vote much more frequently than shareholders in publicly traded companies or voters in civic elections, typically voting a bit more than once per week.

2.1.4 Analyzing DAO Voting Data

Researchers study this voting by looking at digital wallets, which are like online accounts where people keep their tokens. We look at wallets instead of individual people because it's hard to know who owns which wallet, and because the number of tokens in a wallet determines how much voting power it has.

2.2 Generalizabilty of the Blockchain Voting Setting

The blockchain setting may not be immediately familiar to most political scientists but it offers a useful context in which to study voting systems more broadly. In contrast to laboratory settings, voting on the blockchain is used to make binding decisions with meaningful real-world consequences. Engaged blockchain users are highly strategic and adversarial, similar to real-world elections or shareholder votes in many ways.

At the same time, there are peculiarities to the blockchain setting that are important to flag. First, as already discussed, voting power is allocated based on tokens, not people, so it is not a one-person one-vote system, and is therefore more akin to corporate shareholder voting in some ways. Related to this point, voting power can be very unevenly distributed and votes can often be lopsided, with many proposals passing by wide margins—similar again to corporate shareholder voting. These features are clearly not a problem if one is interested in studying shareholder voting systems, and moreover, they do not change the basic facts that voting in these systems is high stakes, and we can learn how liquid democracy might work in practice therefore from how it is used in these contexts.

2.3 Data Collection

We now turn to describing the details of how we collected DAO voting data from the blockchain. Readers primarily interested in our analyses may wish to skip this subsection.

To collect voting data from DAOs, we use a blockchain data platform called Dune, which allows for the querying of decoded blockchain data. Our analysis focuses on the Ethereum blockchain, which is the blockchain on which the vast majority of active DAOs are currently built. We focus on three primary data types: token balances, delegation activities, and vote casts. We only study the irreversible, self-executing votes that DAOs use to make decisions, which are called "on-chain" votes since they occur on the blockchain itself. We do not study a wide array of advisory votes that DAOs take, which do not occur on-chain and are not self-executing, though such votes could be interesting to study for other purposes.

The fundamental unit of analysis is the "wallet," uniquely identified by its 42-character hexadecimal address, with voting power determined by the quantity of specific governance tokens held or delegated within each wallet. Most of the DAOs we examined use governance tokens with ERC-20 technical standards, which are fungible. However, four DAOs—Nouns, Lil Nouns, Builder, and Purple—use non-fungible ERC-721 tokens, commonly recognized as NFTs. Both token types are governed by smart contracts, each associated with a unique address. Notably, some DAOs may use multiple address identifiers, particularly when they update their governance or token systems through new smart contracts.

Our study includes a total of 18 DAOs that operate under a governance system branched from Compound's "GovernorBravo[7]" or similar smart contract structures. While many smaller DAOs also use GovernorBravo, they often remain inactive. Out of the 115 DAOs we initially reviewed, only 27 had more than ten voting proposals. To ensure relevance, we conducted a thorough review of each DAO's website and discussion forums to verify the use of on-chain voting for governance activities. In some cases, on-chain voting is reserved for the final execution process following off-chain consensus, a practice common among DAOs with fewer token holders, and we excluded these DAOs from our analysis. Additionally, we included two large Layer-2 DAOs, Arbitrum and Optimism, whose governance systems closely resemble GovernorBravo.

When analyzing token circulation, it is crucial to differentiate between tokens in circulation and those locked in DAO-owned wallets that cannot be used for voting. We excluded locked tokens from the total supply to more accurately calculate circulating tokens and delegated voting power. For each DAO, we identified and excluded specific wallet addresses, such as mint/burn addresses, foundation funds, and other addresses designated by the DAO.[8] These exclusions were cross-referenced with data from Etherscan, Coingecko, and Governance Docs of each DAOs for verification.

[7] https://docs.compound.finance/v2/governance/

[8] For example, https://docs.arbitrum.foundation/dao-faqs#what-does-it-mean-for-an-arb-voter-to-exclude-their-votes-why-is-this-functionality-beneficial--.

The token balance data we use originates from records of token transfer events, which are logged whenever a wallet commits a token transaction on-chain. For ERC-20 tokens, these transaction events capture both wallet and contract address information, while for ERC-721 tokens, the data tracks each individual NFT within the contract address. As this data is event-based, we converted it into daily time-series datasets, reflecting the end-of-day token balance for each wallet and smart contract. To manage the extensive data, particularly the numerous small wallets, we filtered out those holding less than one-millionth of the tokens in circulation.

Delegation data is also event-based, capturing two types of delegation activities: changing votes and changing delegates. The former records changes in votes received by delegates, while the latter tracks the delegation activities of token owners. We use both events to construct daily time-series data on delegation, distinguishing between self-delegation and delegation to others. In cases where voting power and proposable power are separated, our analysis focused exclusively on the delegation of voting power.

For voting records, the vote cast data documents every instance where a voting power owner casts a vote on a proposal. This data was compiled at both the wallet and proposal levels to provide a comprehensive overview of voting behavior. Also, we excluded the proposals that are cancelled to ensure not to include the proposals that are not votable and executed.

Finally, we constructed a panel dataset that combines token balance, delegation, and voting data at the wallet level for each DAO and proposal using the data events between January 1st, 2021 to December 31st, 2023. The resulting dataset includes more than 250,000 unique wallets and over 1,700 proposals. This allows us to calculate various metrics for each DAO, such as the turnout rate, delegation rate, and the distribution of voting power. Because the number of proposals varies significantly across DAOs, we converted the panel data into DAO-month level.

3 Patterns of Online Delegation and Voting Behavior

The ability to delegate your vote to any other voter massively expands the options available to each voter. Moreover, the ability to delegate your vote at any time masively expands the opportunities to vote. On the other hand, liquid democracy potentially imposes a higher cognitive burden on voters; instead of a simple choice between a small number of parties, voters are asked to consider

Figure 2 – Rates of Delegation and Voting Over Time in DAOs

a multitude of possible delegates. Given these considerations, it is worth beginning our analysis by chronicling basic facts about the rate at which voters avail themselves of the delegation system at all.

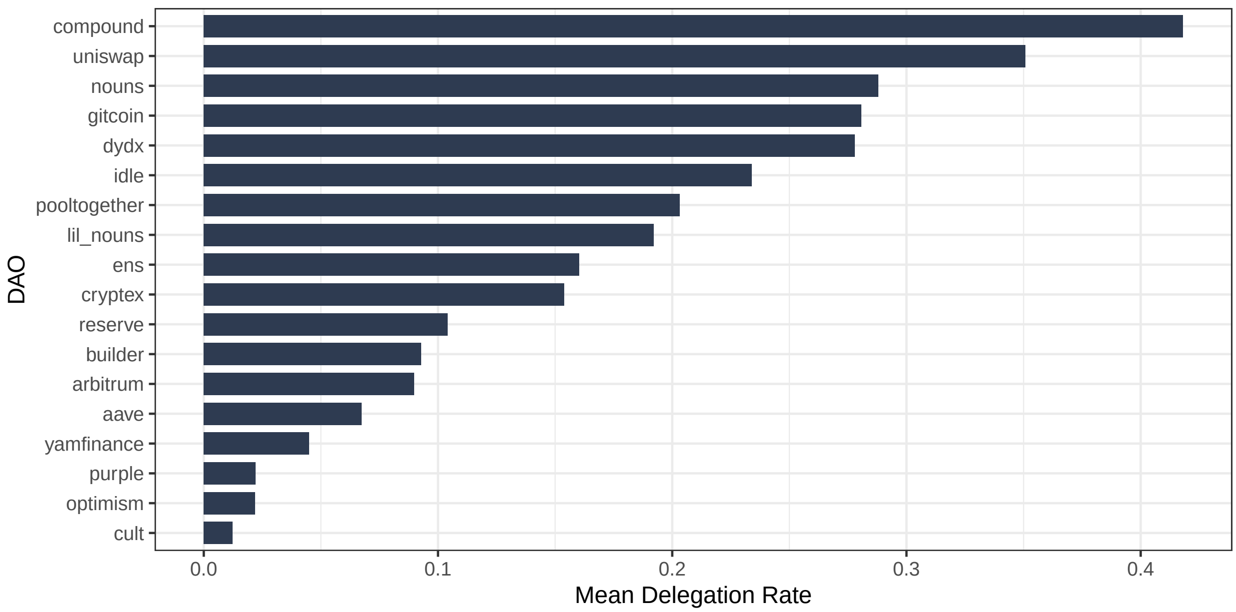
3.1 Rates of Delegation and Voting

Figure 2 plots the average rates of delegation and voting over time, across all 18 DAOs in our sample.

Two basic facts emerge from this plot. First, rates of particpation are relatively low: roughly 17% of all tokens in circulation are delegated to a delegate, and roughly 12% of all tokens in circulation are used to vote on proposals. These rates of participation are somewhat lower than what we observe in retail shareholder voting, and are significantly lower than what we observe for institutional shareholders or for typical civic elections in democracies. On the other hand, as we've flagged, DAOs vote much more often than shareholders or citizens typically do, so this is not an apples-to-apples comparison. What is more, a 17% voting rate is actually on par with many local US elections when they are held off cycle.[9]

[9]See `https://effectivegov.uchicago.edu/primers/the-timing-of-local-elections`.

Figure 3 – Average Rate of Delegation by DAO.



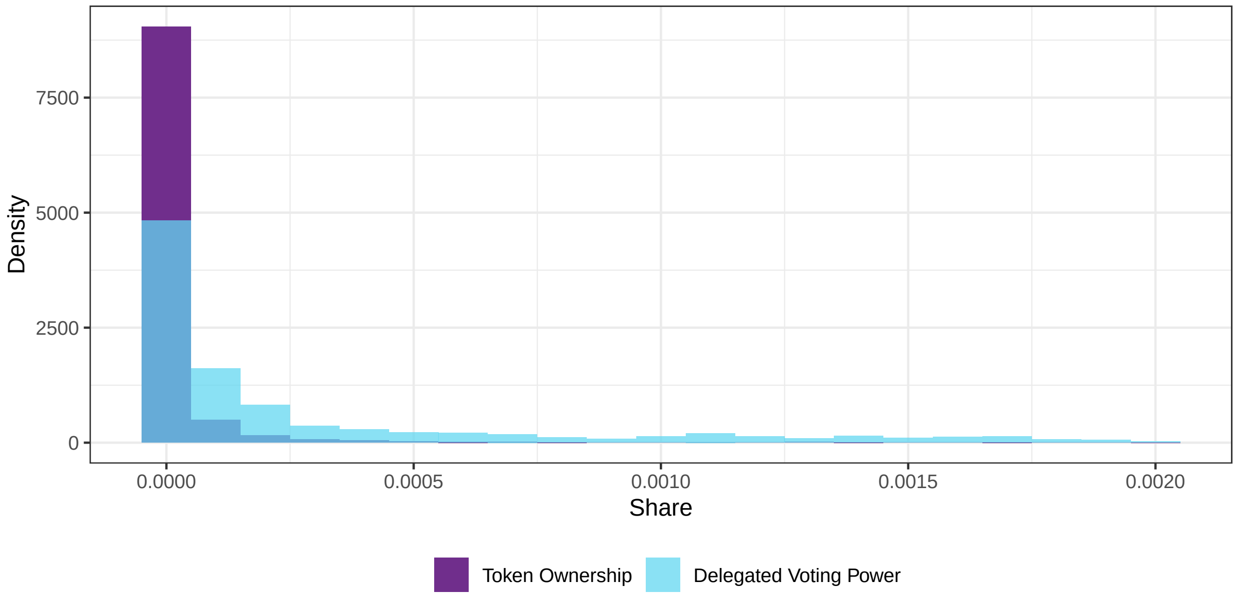
Second, delegates themselves participate in voting at a surprisingly low rate. Because models of delegation typically focus on the informational challenges from the perspective of delegators, they typically do not consider the possibility that delegates themselves may choose to abstain or shirk their duties. Yet, as we see in the figure, the average rate of delegation is substantially higher than the rate of turnout, implying that a meaningful number of delegates are receiving tokens and not voting based on them. Indeed, the overall participation rate in voting for delegates is approximately 33%.

Figure 3 breaks down the average rate of delegation by DAO. There is a large amount of variation in the rate at which tokenholders avail themselves of the opportunity to delegate. While more than 40% of tokens are delegated in Compound, less than 5% are delegated in several other DAOs (Cult, Optimism, Purple).

3.2 Concentration of Voting Power Among Delegates

A major theoretical and empirical question about liquid democracy concerns overdelegation: the risk that a small number of delegates obtains a large share of voting power through the delegation process. This clumping of voting power could be fine in many circumstances, but it carries at least two potential costs. First, by reducing the number of independent signals being aggregated through

Figure 4 – Distribution of Token Percentage Held by Delegates.



voting, it could harm information aggregation. And second, it could give undue power to a small number of people if many delegators are not closely monitoring their delegates.

Figure 4 shows the distribution of underlying token ownership compared to the distribution of tokens post-delegation. Looking at the underlying distribution of token ownership (the dark shaded distribution), we can see that there are many token-holders with very small holdings, and a very long tail of large token-holders. The post-delegation distribution (lighter shaded and overlaid) is significantly shifted to the right, indicating the aggregation of voting power via delegation. While this shifted distribution has more density in the tail, most of it still reflects a small fraction of overall tokens.

The histogram cannot show us the really long tail, which is what we care about most for understanding the risk of overdelegation and highly concentrated voting power. Table 2 investigates the most powerful delegates in each DAO. The first column shows the percent of circulating tokens held by the single largest delegate in each DAO. In some cases, the largest delegate has a meaningful fraction of all tokens—as high as 8% in pooltogether. In most DAOs, though, including most of the very active DAOs, the percentage is smaller. The second column broadens out to investigate the percentage of circulating tokens held by the five largest delegates.

Table 2 – Concentration of Power Among Largest Delegates Across DAOs.

	% of Tokens in Circulation		% of Tokens Voted	
	Largest	Top 5	Largest	Top 5
aave	5.25	11.62	28.05	54.59
arbitrum	0.25	1.02	12.29	41.62
builder	4.01	7.22	15.19	20.10
compound	5.27	13.80	35.70	59.51
cryptex	1.64	1.64	11.24	11.24
cult	0.48	1.14	23.58	30.49
dydx	6.64	13.16	29.18	41.12
ens	1.11	4.47	12.44	48.37
gitcoin	2.95	11.52	33.04	90.98
idle	5.85	11.13	37.22	52.42
lil_nouns	3.78	6.47	23.86	34.68
nouns	6.81	15.70	17.74	37.02
optimism	0.15	0.52	13.91	45.61
pooltogether	8.02	11.06	35.98	59.24
purple	1.10	1.55	6.78	9.00
reserve	0.06	0.06	0.24	0.24
uniswap	1.86	6.40	15.03	46.24
yamfinance	1.41	2.03	19.16	22.48

In the final two columns of the table, we look at a measure of the "effective" concentration by focusing on large delegates' fraction of votes. That is, instead of looking at delegates' voting power relative to all tokens in circulated, we ask the question: what percent of observed voting shares come from the top delegates? Because overall rates of participation are low, large delegates' share of voted tokens is often quite high. Across DAOs, the single largest delegate almost always casts more than 10% of the votes, on average, and goes as high as 35% to 37% in the most extreme cases. The top five delegates are above 50% of votes in a number of DAOs, and even exceed 90% in one case.

The differences between the first two columns and the second two columns emphasizes the role that low participation rates play in giving delegates outsize power. In principle, the rates of delegation we observe do not look like they ought to lead to concerns of overdelegation, but in practice, because few other people vote, the clumping gives the largest delegates significant potential power. Whether and how they could abuse this power is not clear, however—everything we observe here is what occurs in equilibrium, and if the largest delegates colluded to propose or push a malicious proposal, it is possible that many other token-holders who normally do not participate would participate, which would reduce the delegates' power. Nonetheless, the concentration we observe in delegates' votes when compared to overall voting rates is consistent with other research that worries about over-delegation in liquid democracy.

3.3 Bottoms-Up vs. Top-Down Delegation

Different types of voters may vary in their propensity to avail themselves of the opportunity to delegate. On the one hand, the most informed voters or those that have more at stake may prefer to vote on their own behalf; on the other, they may be more attentive voters and therefore more likely to be aware of the option to delegate and have the knowledge necessary to choose a delegate. Additionally, in systems where voting power is skewed towards a small number of large voters—as is the case in a number of DAOs—large token holders may wish to delegate in an effort to avoid being accused of holding undue power over the system.

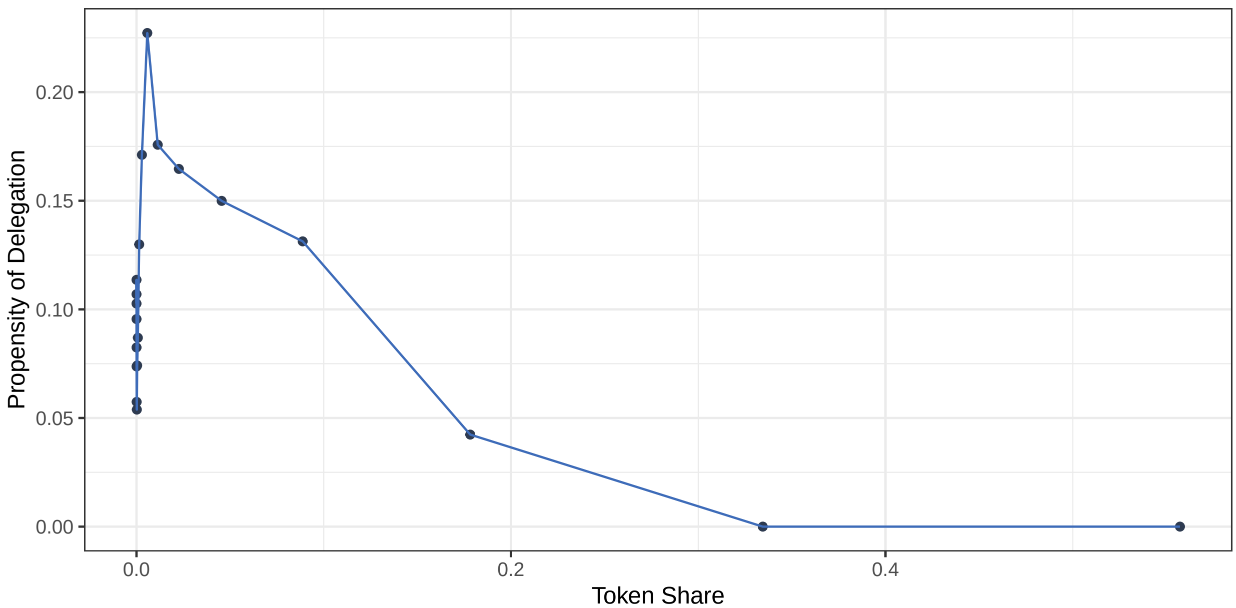
To examine how these forces play out in practice, Figure 5 plots the rate at which wallets delegate as a function of the size of their wallets, as measured using the share of all tokens in circulation that they hold. Each point in the plot represents a binned average computed from many underlying points. As the plot shows, the very smallest token holders delegate at a low rate—slightly greater than 5%. As wallets share of tokens increases, they delegate at steeply higher rates; however, as we look to the right in the plot towards the much larger token holders, we see much lower rates of delegation.

This inverted-U shape suggests some amount of 'bottoms-up" delegation—instead of the very largest and most attentive token-holders being most likely to delegate, it is the medium-small token-holders who delegate the most. These may be the users who are attentive enough to be interested in participating, but not so informed or well-resourced that they want to continue voting for themselves.

3.4 Propensity of Voting and Delegation

A related question is whether voters who tended to vote often themselves prior to having the option to delegate are also more likely to delegate, or not. If the ability to delegate encourages voter participation by giving voters a cognitive short-cut, then we might expect voters who participate

Figure 5 – Delegation Rate By Size of Token Holdings.

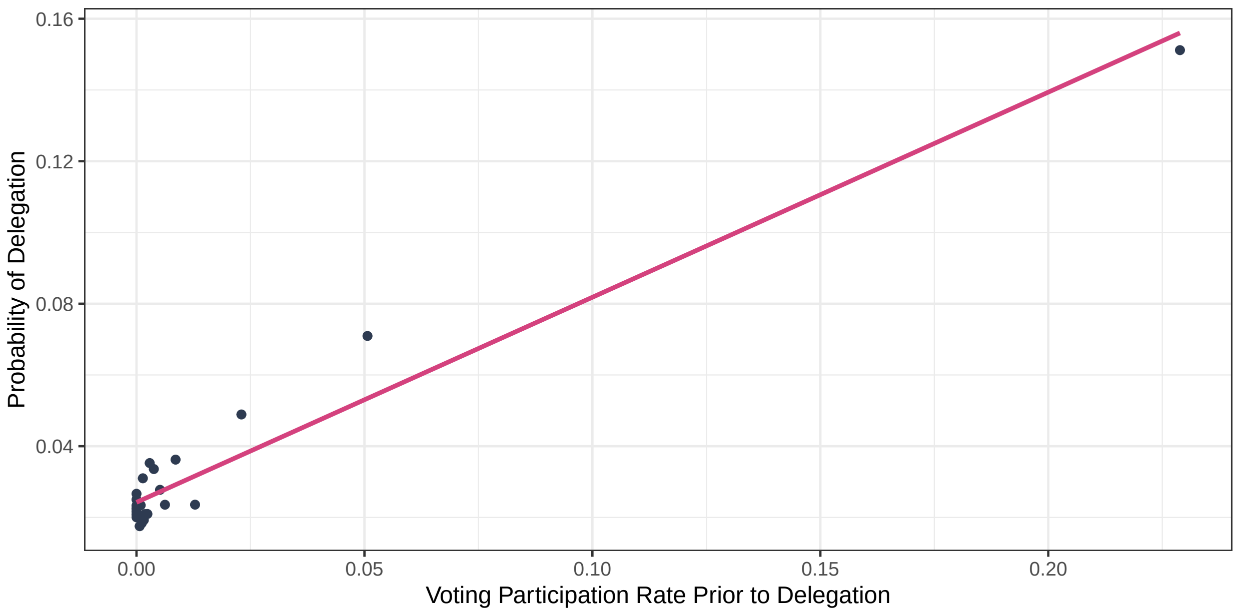


less frequently to prefer to delegate. On the other hand, if delegation itself requires being attentive, it may be that only active participants choose to do it, in which case voting and delegation could be positively correlated.

Figure 6 compares overall rates of voting for addresses to their rates of delegation. To make this comparison, we compute the rate at which addresses voted on proposals prior to any delegation they made to another address. For addresses that never delegate, this will cover their entire voting history. For addresses that do delegate, it will capture the rate at which they voted themselves prior to their decision to delegate. We therefore omit addresses who have delegated to others from the moment they acquired a non-zero token balance. To make the plot legible, we also omit addresses whose wallets held token balances constituting less than 0.01% of the tokens in circulation, because these wallets do not hold meaningful amounts of tokens and almost never participate or delegate.

As the figure shows, we find a strongly positive relationship: addresses that have a history of participating more often in votes are more likely, rather than less likely to delegate. This points to a central challenge to liquid democracy in real-world systems: although delegation should in principle make the voter's problem easier, since they only have to make occasional delegation decisions instead of voting on every underlying proposal themselves, it still requires effort. Voters who prefer not to pay the cost of participating may simply choose neither to vote, nor to delegate.

Figure 6 – More-Active Voters Are More Likely to Delegate

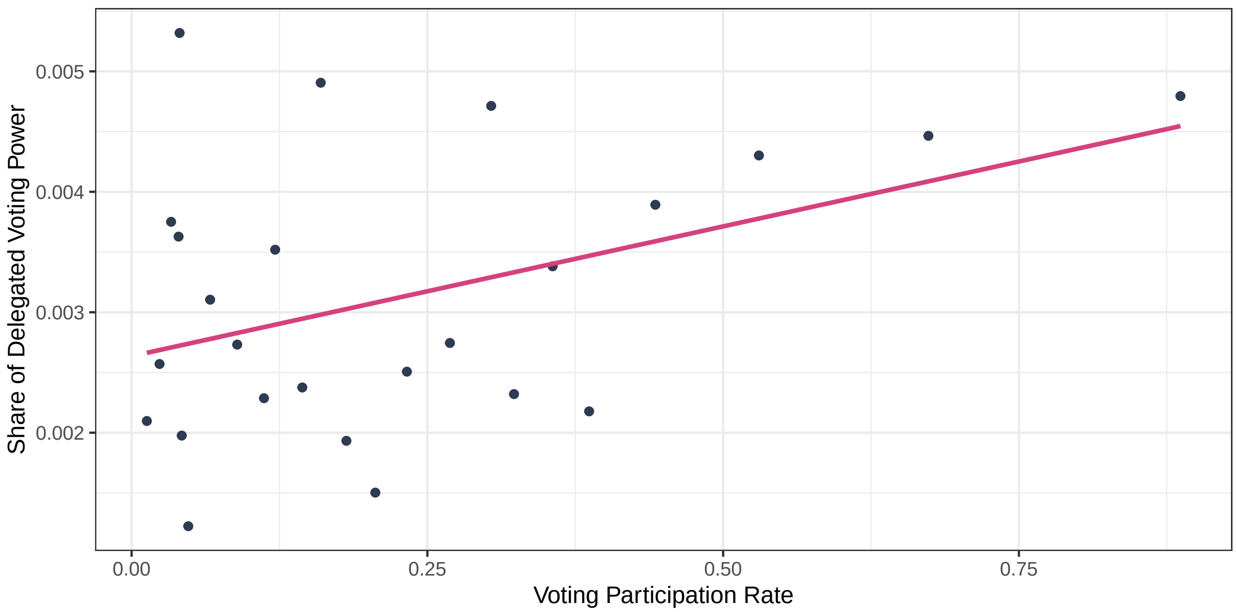


3.5 Delegate Effort and Voter Delegation

A final question is whether voters are able to make informed decisions about whom to delegate to, or whether they delegate randomly. There is not a lot we can say about this question, because we don't have any obvious way to evaluate which delegate a voter "ought" to delegate to. However, we can do one simple test, which is to examine whether voters are more likely to delegate to delegates who have a track-record of voting more often. Given that voting rates are low, in general, and that delegate voting rates are well below 100%, there is a lot of slack in the system.

Figure 7 evalues the overall correlation between a delegate's participation rate and the share of tokens delegated to them. Each point in the plot is a binned average representing many underlying points. As the figure shows, we find a strong positive association; the delegates who participate more often in voting tend to get larger amounts of tokens delegated to them. This suggests that some amount of information is available to voters within the system. We now turn to a more detailed study of how voters might be getting this information.

Figure 7 – Delegates' Voting Rates and Their Share of Delegated Tokens.



4 The Effects of Delegation Programs on Voter Behavior

For tractability and focus, theoretical treatments of liquid democracy tend to assume some sort of pre-existing structure that allows voters to find people to delegate their votes to. But in reality, simply creating the functionality allowing any voter to delegate their vote to any other voter is insufficient to create a meaningful system of delegation. While particularly invested users may find and use the feature on their own, or might find out about it through discussion with others, scaling delegation requires building some kind of clearing house to coordinate voters to delegates.

Efforts to encourage delegation for the clients of ETFs at the three largest asset managers (BlackRock, State Street, and Vanguard) reflect this reality. To implement their Voting Choice programs, which allow clients to delegate their votes in all the underlying companies held by their index funds, each has built a website that shows clients their delegation options, along with information about how each option will vote on matters as they arise. For reasons related to legal compliance and simplicity, these Voting Choice programs only give clients a choice of seven delegates to choose from, and these delegates are not individual people who take votes on clients' behalf, but rather are algorithms that define how votes will be taken across many issues, based on the recommendations of different interest groups and experts. The seven main choices are: ISS

Benchmark Policy; Sustainability Policy; Socially Responsible Investment (SRI) Policy; Catholic Faith-Based Policy; Public Pension Fund Policy; Taft-Hartley Policy; Global Board-Aligned Policy. For further discussion of these programs and their implications for governance, see Montagnes, Peskowitz, and Sridharan (2024).

This same reality—that voters must be given structure to help them coordinate their delegations—has been observed in DAO governance. While delegation has been a built-in function to the GovernorBravo smart contract since its inception (and even pre-dates GovernorBravo, as DAOs have matured, to encourage higher rates of delegation, many have chosen to build what we call delegate programs. These programs typically include a website where users can learn about delegates and point-and-click to delegate their votes to them. They sometimes also include a "whitelisting" program in which delegates are formally vetted, and in some cases even involve awarding large salaries to delegates as a function of how many tokens they are able to attract from delegators. In the Appendix E, we share screenshots of what some of the main examples of these online hubs look like to the user.

4.1 Effects on Delegation

We begin by estimating the effect of the delegate programs on rates of delegation. Specifically, we estimate equations of the form

$$Delegation\ Rate_{it} = \beta Delegate\ Program_{it} + \gamma_i + \delta_t + \epsilon_{it}, \tag{1}$$

where $Delegation\ Rate_{it}$ measures the share of tokens in circulation that are delegated to other voters in DAO i during month t. The variable $Delegate\ Program_{it}$ is a binary variable that takes the value 1 when DAO i has an active delegate program in month t, and 0 otherwise. Finally, γ_i and δ_t stand in for DAO and year-month fixed effects, and ϵ_{it} is the error term. In all regressions, we cluster standard errors by DAO. Given the small number of DAOs, these standard errors should be regarded with skepticism; however, there is no obvious better approach given the constraints we face.

Table 3 presents the results. The first column shows our vanilla specification, where we estimate that the launch of the delegate program leads to a 9.2 percentage-point increase in the rate of

Table 3 – The Effect of Delegation Program on Delegation Rate.

	Delegation Rate		
	(1)	(2)	(3)
Delegate Program Launched	0.092	0.044	0.063
	(0.051)	(0.018)	(0.033)
Delegate Program Launched, $t-2$			-0.0001
			(0.009)
Delegate Program Launched, $t-3$			0.055
			(0.051)
Observations	342	342	288
DAO FEs	Yes	Yes	Yes
Month FEs	Yes	Yes	Yes
DAO Linear Trends	No	Yes	No

Note: Robust standard errors clustered by DAO in parentheses.

delegation. In column 2, we relax the parallel trends assumption by including DAO linear time trends, which reduces the estimated effect to a still-large 4.4 percentage points. In the final column, we further probe the parallel trends assumption by adding two leads of the treatment, leading to an estimate of 6.3 percentage points. While there is therefore some instability in the estimate—not surprising, given the small number of clusters we are working with—there is a consistently large and positive effect. Given that the overall delegation rate in our sample is about 17%, an estimated effect of 4.4 percentage points (the most precise of our estimates, from column 2) represents slightly more than a 25% increase over this mean.

With the staggered nature of the treatment, it is worth considering alternative methods for estimating this effect that explicitly avoid using earlier treated units to construct counterfactual trends for other, later treated units. In the Appendix A, we perform an analysis in this fashion, continuing to find a clear, large increase in delegations after treatment.

4.2 Effects on Voting

The rolling out of delegate programs causes large increases in the rate at which voters delegate—but does that translate into more tokens being voted, on net? Theoretical expectations for this are surprisingly nuanced. If delegation programs attract voters to delegate who would not otherwise have paid attention and voted, then we should expect them to increase overall rates of turnout,

Table 4 – The Effect of Delegation Program on Turnout Rate.

	Turnout Rate		
	(1)	(2)	(3)
Delegate Program Launched	0.036	0.028	0.037
	(0.013)	(0.015)	(0.011)
Delegate Program Launched, $t-2$			-0.006
			(0.009)
Delegate Program Launched, $t-3$			0.016
			(0.020)
Observations	342	342	288
DAO FEs	Yes	Yes	Yes
Month FEs	Yes	Yes	Yes
DAO Linear Trends	No	Yes	No

Note: Robust standard errors clustered by DAO in parentheses.

assuming delegates vote at a positive rate. On the other hand, if delegate programs mainly attract delegations from voter who were already high-propensity voters, then they could have no effect on turnout, or even reduce turnout if the voters who delegate would otherwise participate at higher rates than their delegates do.

Table 4 presents the results, using the same specifications from the previous analysis. As the estimates show, we again find a large and positive effect. In this case, moreover, the estimates are more stable across specifications (though the estimate in column 2 is somewhat noisy). The results therefore suggest that the delegate programs attract users who were not already voting their tokens themselves—for whom delegating would cause no net increase in turnout—but rather is attracting users who wouldn't vote for themselves but are willing to take the time to choose a delegate to vote for them.

4.3 Investigating Additional Effects of Delegate Programs

Finally, we look for evidence that delegate programs reduce or increase inequalities or concentration in governance participation. First, in columns 1 and 2 of Table 5, we look for differences in the effects of the delegate programs on the delegation rates of small token-holders (column 1) vs. large token-holders (column 2). Although the point estimate is larger for large token-holders, the difference between them is small, both are positive, and we cannot reject the null hypothesis that the effects

Table 5 – The Effects of Delegation Program.

	Small Tokenholder Delegation Rate	Large Tokenholder Delegation Rate	Largest Delegate Share of Tokens	Top 5 Delegates Share of Tokens	Delegate Participation Rate
	(1)	(2)	(3)	(4)	(5)
Delegate Program Launched	0.037	0.055	0.010	0.039	0.027
	(0.026)	(0.039)	(0.010)	(0.022)	(0.071)
Observations	342	342	342	342	342
DAO FEs	Yes	Yes	Yes	Yes	Yes
Month FEs	Yes	Yes	Yes	Yes	Yes

Note: Robust standard errors clustered by DAO in parentheses.
Large tokenholders are defined as wallets holding more than 1% of tokens in circulation, while those holding less are classified as small tokenholders.

are equal. In sum, there is not strong evidence here that the delegate program encouraged either larger or smaller token-holders to participate more.

In columns 3 and 4, we look for evidence that the delegate programs might increase concentration by encouraging token-holders to herd on a few top delegates. This could happen naturally, and could potentially be exacerbated when the delegate webpages sort potential delegates by the number of tokens already delegated to them, as several of the leading DAOs websites do today. However, we do not find very much evidence for this concentration. In column 3, we estimate that the delegate programs cause a 1 percentage-point increase in the share of tokens controlled by the single largest delegate. In column 4, we estimate that the delegate programs cause a 3.9 percentage-point increase in the share of tokens held by the 5 largest delegates, but this estimate is imprecise and we cannot reject the null hypothesis of no effect. While the direction of the estimates does suggest the possibility of some concentration induced by the delegate programs, therefore, the effect does not seem extremely large, and evidence for it is relatively weak.

Finally, we investigate whether the delegate programs, by increasing attention on delegation and serving more information to token-holders about delegates, causes delegates themselves to participate in votes more often. To do so, column 5 estimates the effect of delegate programs on a variable that measures the average percent of proposals that delegates in each DAO voted on (defining a delegate as any address that has received delegated tokens from at least two other addresses). While we do estimate a 2.7 percentage-point increase in the participation rate, this estimate is extremely noisy, and we draw no strong conclusions from it.

5 Conclusion

As online platforms and technology continue to become more important in our economic, political, social, and economic lives, interest in developing tools for governing our online lives democratically is increasing. Using democratic tools like voting online is an interesting applied problem for political scientists, both because the online world presents new challenges to democracy, and also because technology allows for us to experiment with alternative voting systems not easy to implement in normal elections, but that might prove useful in the real world in the future.

In this paper, we have begun this research agenda by focusing on one of the oldest, most discussed proposals for modernizing voting: allowing any voter to delegate their vote to anyone else, sometimes called liquid democracy. While many people have explored this idea, and while academics have developed a strong theoretical foundation for understanding some of its basic properties, we have lacked opportunities to explore how liquid democracy works in real, high-stakes settings. This paper presents the first evidence on how voters use delegation when it's made available to them in a real-world setting in blockchain, where voting is used to make important decisions often with significant economic resources at stake.

Exploring patterns of delegation, we have found some evidence consistent with theoretical concerns about overdelegation: while even the most powerful delegates do not typically hold a particularly large share of overal voting power, in the midst of low participation rates in voting, their effective share of the tokens actually voted for proposals can be quite high. In some instances this may be fine, but it can raise concerns that, if token holders are not monitoring their delegates, these powerful delegates could nefariously influence outcomes, could become vectors for pressure by outside interests, or might lower the amount of information aggregation by over-weighting a small number of delegate signals and ignoring the private signals of the underlying token holders who delegated their votes to these "super-delegates." For all these reasons, it is worth continuing to study how liquid democracy systems can encourage a broader distribution of delegation without creating incentives for voters to delegate votes to unqualified delegates.

We have also found a more fundamental limitation not explored in most theoretical work: the tendency for both voters and delegates to fail to participate in the process at all, by not delegating or voting, in the case of token-holders, and by not voting, in the case of delegates. While there may be many causes behind these low rates of participation, one obvious potential explanation is that voters find it cognitively costly to monitor the day-to-day goings on of these DAOs, and also find it costly to figure out which delegate to delegate to and how to do it.

With this issue in mind, we investigated a main intervention DAOs have developed to try to spur more participation by building online platforms that encourage "matching" between token-holders and delegates—a key practical consideration missing from theoretical work on liquid democracy that is essential to making it work in the real world. We find that the creation of these delegate programs causes substantial increases in delegation, and in turn increases overall rates of participation—even though delegate participation rates themselves remain relatively modest, on average.

These findings raise an important question not considered in existing theoretical work: what is the best way to present this information to voters? When there are many delegate options, how should this information be ranked and packaged for voters? Future empirical work could examine differences in the way different DAOs have organized their online clearing houses, while future theoretical work could consider the role that these clearing houses play in realistic versions of liquid democracy.

These findings also offer important lessons for financial institutions that are building systems of delegated voting. Today, the voting choice programs being built by BlackRock, State Street, and Vanguard all rely on offering voters a fixed set of delegate options. These options are limited, and there is evidence that voters would prefer delegates with positions different from any offered in the fixed set of options (Montagnes, Peskowitz, and Sridharan 2024). In the future, these institutions may wish to build a more open system of delegation, in which case they can learn from the experiments with delegation programs that DAOs are engaging in right now.

More generally, our hope is that this paper—and the data, dashboards, and instructions we are making public along with it—will encourage more political scientists to study the workings of democratic systems in the online world. Political scientists have a tremendous wealth of knowledge relevant to the design of these systems, yet today are barely involved in studying them. There is a tremendous opportunity to push forward more research on the design of governance systems for large institutional investor platforms like BlackRock, for social media and AI platforms, as well as the blockchain platforms studied in this paper. Historically, political science abdicated its role in the study of many important governance systems in the real world—such as shareholder voting and internal corporate politics and decision-making. There is no reason we should make the same mistake again as technology platforms become an increasingly important part of our world.

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A Staggered Diff-in-Diff

Figure SI.1 – Staggered Diff-in-Diff on Delegation Rate

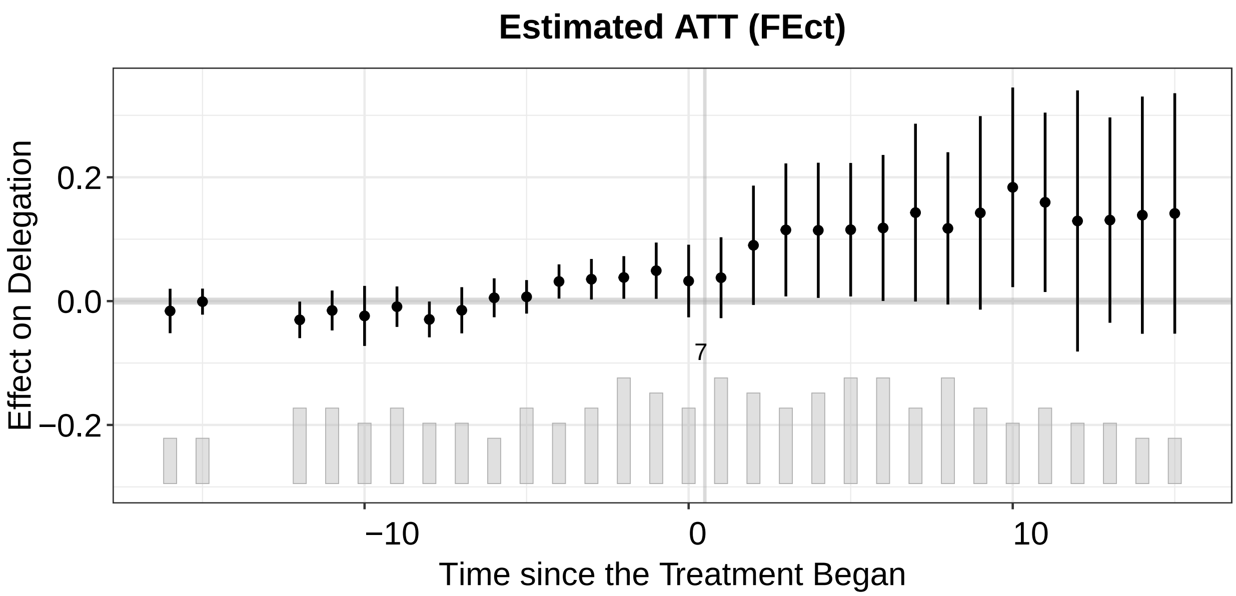
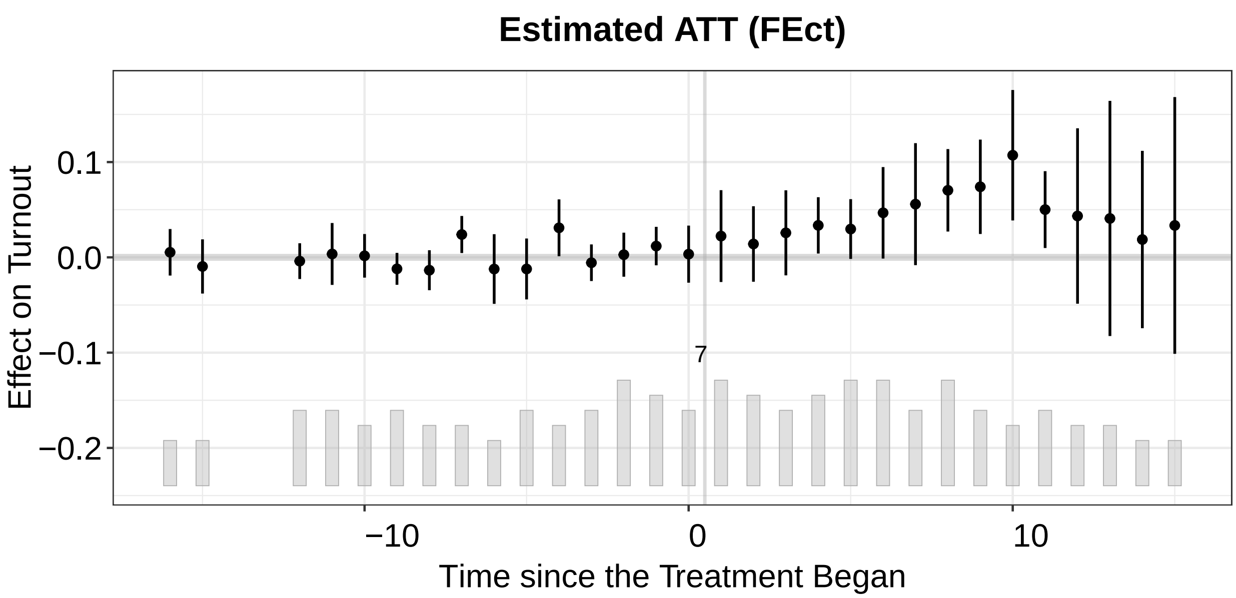


Figure SI.2 – Staggered Diff-in-Diff on Turnout



B Governance Smart Contract Parameters

	Proposal Creation	Vote to Pass		Voting Timeline		
	(1) Minimum Threshold	(2) Quorum	(3) Differential	(4) Proposal Delay	(5) Voting Period	(6) Timelock
aave[(a)]	0.5% / 1.25%	2% / 6.5%	0.5% / 6.5%	1 day / 7 days	3 days / 10 days	5 days
arbitrium	0.01%	5% / 3%	—	3 days	14 - 16 days[(b)]	3 days
builder	0.50%	10%	—	3 days	4 days	2 days
compound	0.25%	4%	—	2 days	3 days	2 days
cryptex	1%	4%	—	2 days	3 days	2 days
cult	Top 50 Holders	—	—	7 days	5 days	—
dydx[(a)]	0.5% / 2%	2% / 10%	0.5% / 10%	1 day	4 days / 10 days	2 days / 7 days
ens	0.10%	1%	—	a few seconds	7 days	2 days
gitcoin	1%	2.50%	—	2 days	6 days	2 days
idle	1%	4%	—	2 days	3 days	2 days
lil_nouns	1%	10%	—	2 days	3 days	2 days
nouns	2 Nouns (≈0.2%)	10-20%[(c)]	—	5 days	5 days	2 days
purple	0.25%	10%	—	a few seconds	4 days	2 days
optimism	0%	30%	—	a few seconds	5 - 14 days[(d)]	—
pooltogether	0.10%	1%	—	a few seconds	5 days	2 days
reserve	0.00%	10%	—	2 days	3 days	3 days
uniswap	0.10%	4%	—	2 days	7 days	2 days
yamfinance	1%	4%	—	a few seconds	2 days	12 hours

Parameters:
(1) The minimum amount of votes (in % of total voting power) required for an account to create a proposal.
(2) The required minimum amount of votes (in % of total voting power) in support of a proposal for it to succeed.
(3) The difference between for-votes and against-votes (in % of total voting power) needs to exceed.
(4) The number of Ethereum blocks (i.e., time) to wait before voting on a proposal may begin.
(5) The duration of voting on a proposal.
(6) The minimum waiting time for successful proposals to be queued before execution, and sometimes called grace period.
Note:
(a) Aave and dYdX have two types of voting executors (long and short), depending on the type of proposal.
(b) A Governance proposal's voting period can be extended by up to two days if quorum is reached late, ensuring at least two days of voting after quorum. This extension means the voting period lasts between 14 and 16 days.
(c) Dynamic quorum adjusts a proposal's quorum based on its level of contentiousness: more "against" votes lead to a higher quorum. The coefficient is 1: every against vote increases quorum votes by one.
(d) Optimism updated its voting period eight times in 2023.

Table SI.1 – Governance Smart Contract Parameters.

C Basic Statistics of Voting for each DAOs

		Proposal		% of Tokens in Circulation	
	Treatment	Total	per Month	Turnout	Delegation
aave	✓	391	10.9	4.71	6.74
arbitrum	✓	16	1.6	2.95	8.97
builder		73	5.6	29.05	9.29
compound		156	4.3	13.06	41.81
cryptex		13	0.5	14.85	15.38
cult		144	8.0	0.83	1.22
dydx	✓	16	0.6	10.92	27.79
ens	✓	20	0.9	8.49	16.03
gitcoin	✓	83	2.9	8.21	28.08
idle	✓	37	1.2	12.26	23.40
lil_nouns	✓	144	7.2	16.78	19.20
nouns	✓	395	13.6	31.40	28.79
optimism	✓	34	3.4	1.39	2.19
pooltogether	✓	78	2.6	4.40	20.31
purple		46	3.3	17.77	2.20
reserve		24	2.2	11.04	10.41
uniswap	✓	32	1.2	10.44	35.09
yamfinance		37	1.1	3.14	4.50

Table SI.2 – Basic Statistics of Voting for each DAOs.

D Further Information About Delegation Programs

	Delegation Program			Compensation for Delegate	
	Treatment	Whitelist	Platform	Status	Format
aave	✓	✓	Discussion Forum	✓	Gas Fee Rebate
arbitrum	✓		Karma	✓	Delegate Incentive System (Started 2024)
builder					
compound					
cryptex					
cult					
dydx	✓	✓	Discussion Forum		
ens	✓		Discussion Forum		
gitcoin	✓	✓	Karma	✓	Stipend for Steward Councils (200 - 750 USD/month)
idle	✓	✓	Discussion Forum		
lil_nouns	✓		Agora		
nouns	✓		Agora		
optimism	✓	✓	Agora	✓	Retroactive Delegate Rewards
pooltogether	✓		Discussion Forum		
purple					
reserve					
uniswap	✓		Agora	✓	Delegate Reward (Up to 6000 USD/month; Started 2024)
yamfinance					

Table SI.3 – Delegation Program Information.

E Screenshots of Delegate Platforms

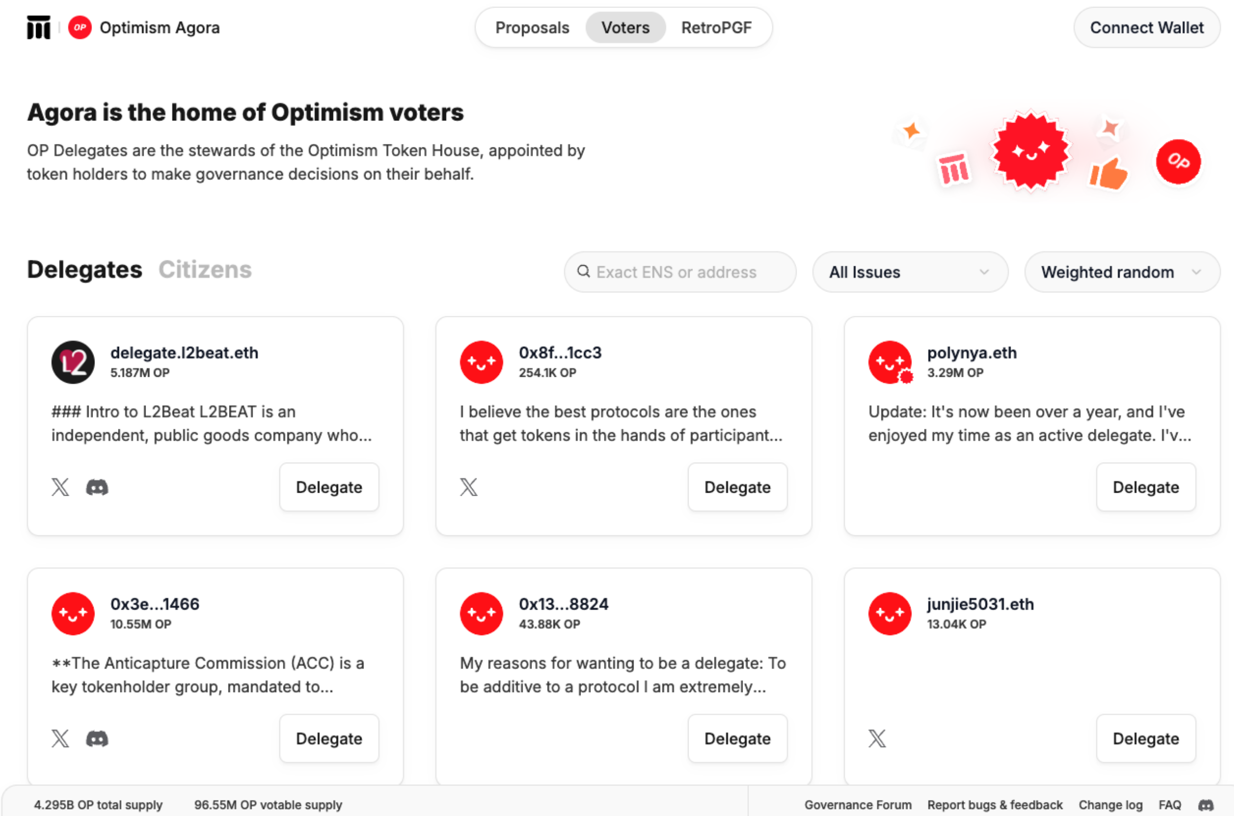


Figure SI.3 – Agora (Optimism).

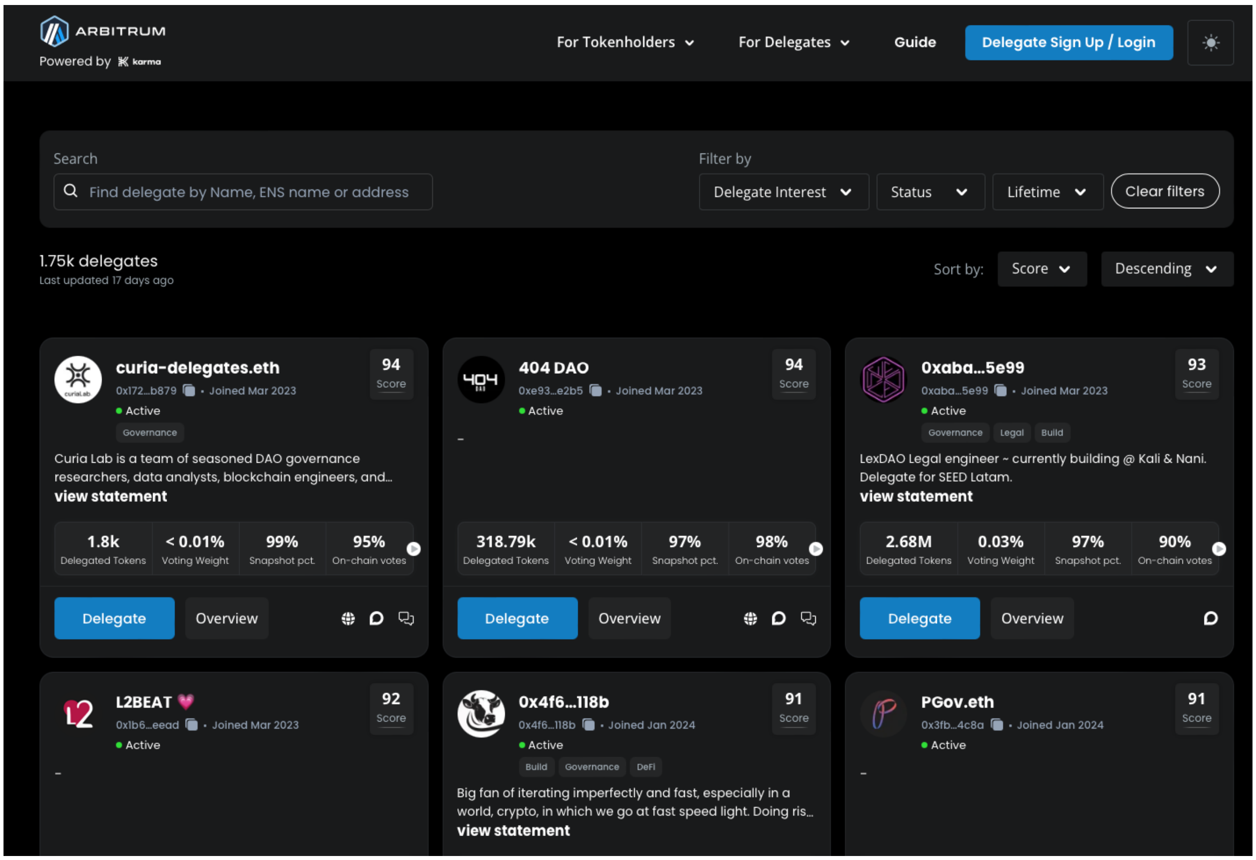
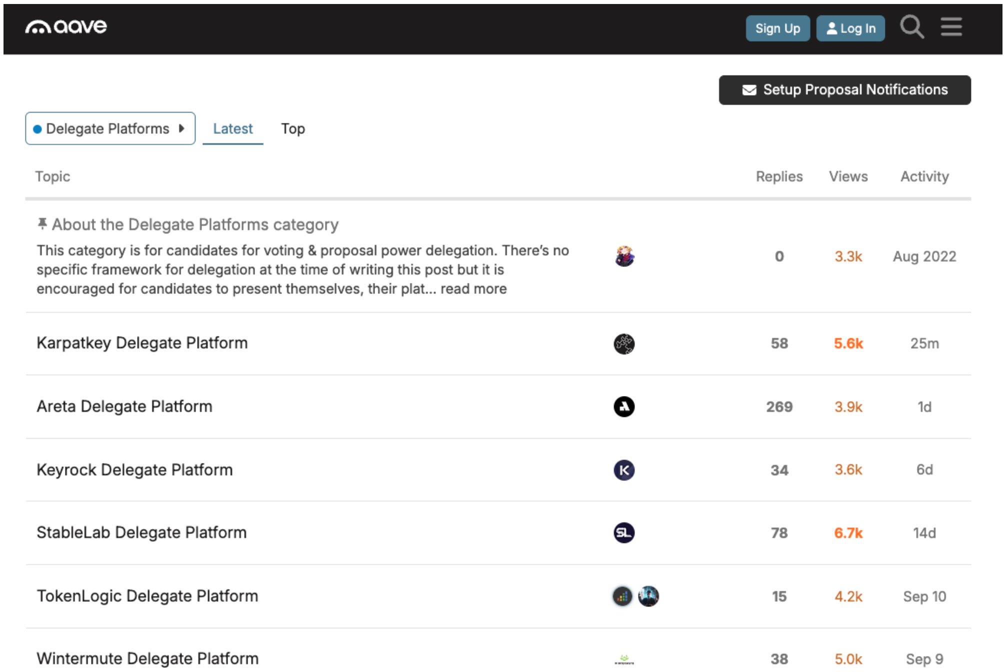


Figure SI.4 – Karma (Arbitrum).

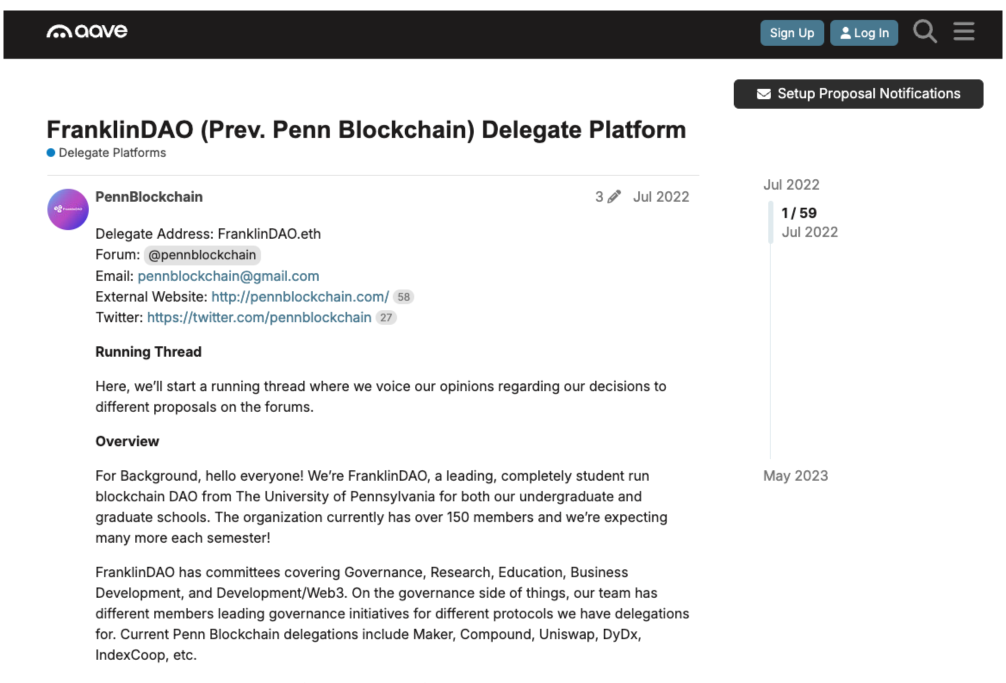

aave — Sign Up | Log In

Setup Proposal Notifications

Delegate Platforms | Latest | Top

Topic		Replies	Views	Activity
About the Delegate Platforms category This category is for candidates for voting & proposal power delegation. There's no specific framework for delegation at the time of writing this post but it is encouraged for candidates to present themselves, their plat... read more		0	3.3k	Aug 2022
Karpatkey Delegate Platform		58	5.6k	25m
Areta Delegate Platform		269	3.9k	1d
Keyrock Delegate Platform		34	3.6k	6d
StableLab Delegate Platform		78	6.7k	14d
TokenLogic Delegate Platform		15	4.2k	Sep 10
Wintermute Delegate Platform		38	5.0k	Sep 9

(a) Delegate Platform in Discussion Forum


aave — Sign Up | Log In

Setup Proposal Notifications

FranklinDAO (Prev. Penn Blockchain) Delegate Platform

Delegate Platforms

PennBlockchain — 3 — Jul 2022

Delegate Address: FranklinDAO.eth
Forum: @pennblockchain
Email: pennblockchain@gmail.com
External Website: http://pennblockchain.com/ 58
Twitter: https://twitter.com/pennblockchain 27

Running Thread

Here, we'll start a running thread where we voice our opinions regarding our decisions to different proposals on the forums.

Overview

For Background, hello everyone! We're FranklinDAO, a leading, completely student run blockchain DAO from The University of Pennsylvania for both our undergraduate and graduate schools. The organization currently has over 150 members and we're expecting many more each semester!

FranklinDAO has committees covering Governance, Research, Education, Business Development, and Development/Web3. On the governance side of things, our team has different members leading governance initiatives for different protocols we have delegations for. Current Penn Blockchain delegations include Maker, Compound, Uniswap, DyDx, IndexCoop, etc.

Each week, governance leads will share updates with the club about new proposals and we

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(b) Example of Delegate's Page

Figure SI.5 – Discussion Forum (Aave).

F Proposals

F.1 Governance-related Proposals

F.1.1 Aave

Proposal overview

Aave Governance V3 Activation Short

Executed | Executed on Dec 25, 2023 | Raw-Ipfs | Share on twitter | Share on Lens

Simple Summary

This is the short executor part of the proposal for the migration of the Aave Governance v2.5 to v3, transferring all permissions from the v2 system to v3, executing all required smart contracts upgrades and different miscellaneous preparations.
Additionally, Aave Robot systems is activated, being requirement for the optimal functioning of Governance v3.
This Proposal is a resubmission of 415 with initial voting / proposition configurations consistent with current Aave GovernanceV2.

Motivation

v3 is the next iteration for the Aave governance smart contracts systems, controlling in a fully decentralized manner the whole Aave ecosystem.
Being a replacement on the currently running v2.5, a set of two proposals on v2.5 need to be passed to migrate one system to another: once both are passed and executed on the current governance smart contracts, these will stop working, and the new v3 ones will start operating.

Specification

A full specification can be found HERE, but as summary:

- 2 governance proposals need to be created: one running on the Level 1 Executor (Short Executor) and another on the Level 2 Executor (Long Executor).
- As both proposals need to be atomically executed, a `Mediator` contract will temporarily receive certain permissions, in order to sync both Level 1 and Level 2.
- High-level, the proposals do the following:
  - Migrate the ownership of the v2 Executors to the v3 Executors, in order to avoid any possible permissions lock.
  - Upgrade the implementations of the Governance v3 voting assets (AAVE, stkAAVE and aAAVE), to make them compatible with the new system.
  - Fund Aave Robot.
  - Transfer permissions for ARC and for swap adapters on Base.
- Implementation: V2Ethereum, V3Ethereum, V3EthereumLong, Avalanche, Polygon, Base
- Tests: Ethereum, EthereumLong, Avalanche, Polygon, Base
- Pre-approval Snapshot
- Governance forum Discussion
- Aave Governance V3 smart contracts
- Aave Governance V3 interface
- Aave Robot v3
- AAVE token v3
- aAAVE governance v3 compatible
- stkAAVE governance v3 compatible

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F.1.2 Arbitrum

AIP-7: Arbitrum One Governance Parameter Fixes

Non-Constitutional

Abstract

Three independent issues have been identified in the Arbitrum One Governance system and the current proposal aims to address them. Given this is maintenance of the system, after the forum discussion period it will skip the Snapshot temperature check and go directly for an on-chain vote.

Specifications

1. Updating the airdrop distributor fee sweep address to the DAO Treasury's address

The Arbitrum DAO airdrop was distributed to users via the TokenDistributor contract. The recipients are able to claim their tokens until the Ethereum block #18208000 (estimated to be created on the 24th September 2023).

After the claim period is over, unclaimed leftover tokens may be swept over to the specified sweepReceiver address, which is currently set to the L2 treasury timelock. Per the Governance Architecture documentation, this should be set to the DAO Treasury's address.

Fix: Call the the 'setSweepReciever()' function on the TokenDistributor contract, and include the DAO Treasury address as the _sweepReceiver(address).

2. Sequencer gas fee reimbursement parameterization

The Arbitrum One sequencer pays the necessary gas fees for posting user transactions to Ethereum. This is done through transactions to the Sequencer inbox.

The sequencer gets reimbursed for these fees in Arbitrum One. The reimbursement is calculated by ArbOS, but two parameters are currently incorrectly configured.

1. The Sequencer Inbox has a fixed cost associated with including a transaction. The value is currently configured to 100000 Ethereum L1 gas units - this can be viewed in the ArbGasInfo precompile through the getPerBatchGasCharge function. If you inspect transactions live in the system (sample from June 15th and July 17th), it is possible to see that the fixed cost of including a batch is actually much closer to 240000 Ethereum L1 gas units.
2. The ArbOS L1 pricing system features an optional "amortization cost cap" which is intended to subsidize the fixed posting cost for chains with low activity or AnyTrust chains whose fixed cost is much larger than other data posting costs. This feature was not intended to be enabled on Arbitrum One. As such, the cap was set to its maximum value, 2^64 - 1 (this can be viewed in the ArbGasInfo precompile through the getAmortizedCostCapBips function). However, this did not fully disable the cap. As visible in the code, the amortization cap is only disabled with a value of 0. With the cap set to its maximum value, but still enabled, the cap would prevent the L1 pricer from taking into account the cost of multiple batches posted in the same L1 block. That's because it would consider the costs of all but the first batch as having a weight of zero, because no time passes since the previous batch if the batches are in the same L1 block. Setting the amortization cap to 0 fixes this issue by bypassing the previously linked if statement to fully disable the amortization code.

The combination of these two issues add up to gas funds being incorrectly charged to end users, thus not fully reimbursing sequencer operations. This fix will increase fees for users but they will now reflect the actual costs of the system - it is expected to be a minor difference.

Fix ➡️ Transaction to ArbOwner precompile calling setPerBatchGasCharge(int64) with the intended value '240000'.

➡️ Transaction to ArbOwner precompile calling setAmortizedCostCapBips(uint64) with the intended value '0'.

3. L1 Core Governance Timelock scheduleBatch Bug

When executing a batch of operations on the L1ArbitrumTimelock, if more than one operation creates a retryable ticket (i.e., more than one operation targets an L2 chain), the full msg.value value will be forwarded to each one. If not properly constructed, this can lead to retryable tickets that fail to get created. While there are workarounds, the current implementation is error-prone and the fix allows for more graceful creation of several L1 to L2 operations.

Fix Upgrade the implementation of the L1ArbitrumTimelock with the change here.

–

The fixes were implemented through Governance Action contracts and can be viewed on the Governance codebase. They have been audited by Trail of Bits and no issues were identified - the audit report will be shared publicly soon.

The Action contracts have been deployed to the following addresses and can be verified/audited by the community:

- UpdateGasChargeAction:
  https://arbiscan.io/address/0x7b1247f443359d1447cf25e73380bc9b99f2628f
- SetSweepReceiverAction:
  https://arbiscan.io/address/0xbaba4daf5800b9746f58c724f05e03880850d578
- UpdateL1CoreTimelockAction:
  https://etherscan.io/address/0xbaba4daf5800b9746f58c724f05e03880850d578

F.1.3 Purple

Proposal 23 Executed

Removing the Founder Allocation for the Founder multisig

By **ccarella.eth**

Description

tldr;

This Proposal removes the Founder allocation for 0x06B59d0b6AdCc6A5Dc63553782750dc0b41266a3 by setting the 10% allocation to 0%. The signers of this multisig are ccarella.eth, osama.eth, evaav.eth and jihad.eth.

It doest not effect the 10% allocation for farcaster.eth or the 1% allocation to Nouns.

Why do Nounish DAOs have Founder Allocations

There are 2 reasons to start a Nounish DAO with a Founder Allocation; rewarding activation energy and guiding the community.

Rewarding Activation Energy

Activation energy can be thought of as the effort, resources, and momentum needed to initiate and sustain the growth of the DAO. This term is borrowed from chemistry, where it refers to the minimum energy required for a chemical reaction to occur. Similarly, in the context of Nounish DAOs, activation energy refers to the critical threshold that must be overcome to successfully establish a community and create engagement among its members. Make no mistake; this is work. For Purple it included rallying the pre-launch community, keeping everyone aligned, deploying the smart contracts, evangelizing the DAO, educating people on the outside on how Nounish DAOs work, educating people on the inside on how Nounish DAOs work, getting the first half dozen props going and motivating our first Prop House.

Founder Allocations help align the incentives around the Activation Energy required.

Guiding the Community

Early in the lifecycle of the DAO, Activation Energy can be impeded by not having enough members or votes to make things happen or even worse, having early members with bad or misguided intentions. In the case of Purple, the Founders as individuals did not win an Auction into Token #6 and Token #8 and without the Founder allocation could not help direct the early days of the DAO. Had the demand drove the auction price of 10x, it potentially would have been much longer before the Founders could participate.

Beyond impedance to Activation Energy, Founder Allocation allows a projects Founders to guide the community towards the initial vision. While Member of Purple have been highly aligned since Day 1, you can see this guidance happening at Nouns where 650+ days in, DAO members look towards the Founders (Nounders) to see how they vote on a Proposal. This helps hold together a consistent vision for the DAO amongst a divergent membership. Part of that "Guiding" also includes a strong influence on how the Treasury is used. Zora used their Founder Allocation to vote against a Proposal with a large ETH ask, that would have otherwise passed, that they felt was not related to the Nouns Builder Protocol or ecosystem.

Why is Purple removing the Founder Allocation

Activation Energy

Incentives for the Activation Energy are behind us. The Purple flywheel is in motion. We are decentralized. The community is in complete control of the energy required to keep our perpetual motion machine moving.

Guiding the Community

This has never been a real issue for us. The DAO was highly aligned since the first token as a result of our unique vision to support a protocol that all of our Members love. 175+ tokens in and we feel comfortable with the guiding hand of the DAO's members.

What happens to the tokens in the Founder Multi-sig?

We will hold them for a while as the community develops. Our longer term plan is to give them out on a merit basis at the discretion of the Founder Multi-sig.

Summary

Remove the Founder allocation for 0x06B59d0b6AdCc6A5Dc63553782750dc0b41266a3, the Founders Multi-sig (ccarella.eth, osama.eth, evaav.eth and jihad.eth)

Proposer

ccarella.eth

Proposed Transactions

1. 0xa45662638e9f3bbb7a6fecb4b17853b7ba0f3a60
   .updateFounders(
     newFounders: [object Object],[object Object]
)

F.2 Fund-related Proposals

F.2.1 Nouns

Proposal 147 Executed

Noundry Winners & Committee Compensation

Proposed by krel.eth

Version 1 created 2 years ago

Switch to delegate view

For	Against	Abstain
140	1	0

Threshold	Ended	Snapshot
Threshold 45 votes	10:35 AM PDT October 9, 2022	Taken at block 15633885

Description

This proposal aims to retroactively compensate winning artists and the curation committee of the first Noundry. Total ask of 142.69 eth.

We believe that Noundry compensation is more than a box-ticking exercise. Pixel art is part of who we are; it's in our bones, and adding new pixels to the Descriptor contract is a big deal. It's an opportunity to celebrate nounishness, reinforce our culture, and create new traditions.

We want the Noundry to become a continuous event, a new tradition, and a significant driver of Nouns proliferation within artistic circles. In that light, the compensation outlined in this proposal is not just about the work that was completed, but also about future signaling.

We think one of the most exciting possible outcomes of the Noundry would be if every artist in the world aspires to put their artwork into the Nouns contract (and by extension, the public domain). And while high compensation may not be the primary motivator, it can help initiate the right feedback loop and create the breeding ground needed for future Noundrys to thrive.

Compensation

Winner compensation

https://nouns.wtf/vote/125 *(Integrate 8/8 Anniversary Art)*

Noundry Season 0 winners are compensated per winning trait. Artists with multiple winning submissions are rewarded for each submission.

Noun Head traits are more generously compensated as they are the most visually striking, tend to create the most excitement within the community, and are responsible for driving much of the Twitter discourse and enthusiasm around the Noundry.

- **Head trait winners**
  - Facu x 3 (Snowman, Vending Machine, Wine Barrel)
  - Gremplin x 2 (Capybara, Treasure Chest)
  - LuckyCryptoCats x 1 (Hanger)
  - Goldy x 1 (Couch)
  - Modrovsky x 1 (Index Card)
- **Accessory trait winners**
  - Fuyu x 2 (Uroko, Tatewaku)
  - JMA Nountris x 1 (Grease)

Note: Gremplin declined compensation for the two glasses traits added in the upgrade, arguing that there should be a minimum degree of effort required for compensation.

Winning traits compensation

- Heads: 15 eth / trait
  - (8 x 15 = 120 eth)
- Accessories: 4 eth / trait
  - (3 x 4 = 12 eth)
- **Total: 132 eth**

Curation committee compensation

The curation committee played a crucial role in making Noundry Season 0 a success. They are compensated for organizing the event, curating, and fine-tuning the winning contributions.

It's hard to put a figure value on the committee's efforts—in many ways it's priceless. We propose compensating the committee with a symbolic sum of 10.69 eth to distribute as they see fit.

- Committee members for Season 0:
  - Goldy
  - Gremplin
  - 4156
  - 9999
  - Solimander
- **Total: 10.69 eth**

Summary

- Winner compensation: 132 eth
- Committee: 10.69 eth
- **Total compensation: 142.69 eth**

Transactions

- 45 eth to Facu
  - 0x82d1f493FeB2639318045f2C5dDd4B1d0653aa29
- 30 eth to Gremplin
  - 0x4298e663517593284Ad4FE199b21815BD48a9969
- 15 eth to Goldy
  - 0x021edd67d43B365a6401a5Ee704Aa6f264F3F4e4
- 15 eth to LuckyCryptoCats
  - 0xD840369402683782263511d76C99e9D50Dc37D2C
- 15 eth to Modrovsky
  - 0xb8a9Ed8D008FA1F161809f15a11F4161FB8b717e
- 8 eth to Fuyu
  - 0x4F4bD77781cEeE4914B6bC16633D5437eaBCa5D3
- 4 eth to JMA Nountris
  - 0x55a25cce1737E4692Fc243B6C26364DAED7f2486
- 10.69 eth to Gnosis Safe with 3/5 signers
  - 0x8a4eb8f3383909a8138101F6E17cd8281a26eA3a

Multisig signers

- (maty) 0xDEAD753f9B1eb8F2f7372E8587e7C6e342daac89
- (krel) 0xFFb0E93F7e315BECcF0757845F3eF2cB9832efB9
- (elad) 0xfe9b3ab16AfeF3B28C0c3dfA6fa7C5b58f5c06aA
- (9999) 0x6223Bc5fd16a19bcFAe2281dDE47861CFE1023eE
- (142) 0xE6232ed3436C4065D38D8BFdC8EA90858ecDfa69

F.2.2 Gitcoin

EXECUTED

PGF S19 Budget Request

Proposal executed

by coachj.eth • ID 705415...5060 • Gitcoin • Proposed on: Sep 23rd, 2023

Proposal

Description

PGF S19 Budget Request

[S19 Proposal Amended]

S18 Milestone Update

We recognize a mixed landscape of achievements and challenges as we reflect on the progress of the Public Goods Funding (PGF) Workstream during Season 18. We have made notable strides in areas such as the operation of Gitcoin Grants Program rounds and the enrichment of the BD pipeline.

We plan to refine and realign some of our objectives in the coming period to better align with areas under our span of control. This strategic recalibration will enable us to focus our efforts more effectively, ensuring that we are poised to fulfill our essential intents of Protocol Adoption, Growth, and Financial Sustainability. As such, we have centered on the following three "Top Goals" to drive our focus forward. You can find detailed information on these Top Goals on the PGF: Top Goals Notion Page. The Top Goals are as follows:

Develop and Implement a Sustainable Strategy for Gitcoin Grants. Evolve BD to Drive Activity, Pipeline, and Revenue. Enhance Operational Maturity. Recognizing the dynamic nature of our work and the evolving landscape, we have identified areas where adjustments are needed. As such, we will modify some of this season's initial objectives to ensure a tighter alignment with our overarching priorities. This realignment is a strategic step towards focusing our efforts more effectively and driving success in the areas that matter most to our mission. These changes are as follows: Milestone Report for the Past Season

We will proactively track our seasonal milestones and progress on Notion moving forward.

You can see a snapshot of these milestones or access the site with detailed information at the link below.

Updated S18/19 Outcomes, Projects, and Milestones

Develop and Implement a Sustainable Strategy for Gitcoin Grants Evolve BD to Drive Activity, Pipeline, and Revenue Enhance Operational Maturity Budget Update

The S19 plan at the beginning of the budgeting cycle was $618,500, for which we had a core team of 13 across GG, BD, and Ops roles and three new hires budgeted. At the end of June, we adjusted our seasonal budget to $369,000, a reduction of 40.34%.

This amount will serve as the amended budget for PGF through Season S19 (1 Aug 2023 through 31 October 2023). As such, PGF requests $369,000 GTC* = $369,000 for S19, excluding reserves and rolled-over amounts. Below is an overview of PGF budget requests over time.

Economics

PGF Workstream is requesting 434,118 GTC = $369,000 for S19, excluding reserves and rolled over amounts. *Price of $0.85 per GTC

Target address for transfer is PGF Multisig

Wallet Address: 0xa7aC9f7087d7197e0047DB9A90562a1364bf897D

All revenue generated during the past season will flow back to the DAO treasury or be rolled over to the next season. During the season, we will transparently report to CSDO and Stewards on revenue plus efforts to remediate currency fluctuations and report on these in the subsequent budget request.

We greatly value your feedback and invite you to contribute in specific areas. Thank you for your time and insights!

F.2.3 ENS

EXECUTED

[EP4.2][Executable] Fund the Endowment (second tranche)

Proposal executed

by nick.eth • ID 106862...1444 • Proposed on: Sep 28th, 2023

Abstract

This proposal outlines the allocation of the second tranche, comprising 16,000 ETH, from the ENS DAO to the ENS Endowment. Additionally, it introduces minor adjustments to the existing permissions preset for maintenance purposes.

Motivation

In March 2023, the ENS Endowment was formally established following the joint proposal by karpatkey and @steakhouse, after the successful execution of E.P 3.4 - Fund the Endowment (first tranche). The community had expressed a preference for a phased funding approach, leading to the decision to allocate the funds in two equal tranches over a six-month interval. As we reach this pivotal milestone, this proposal seeks community approval for the second tranche.

Endowment Update

Based on the most recent monthly report detailing the Endowment's performance for August 2023, the Endowment has achieved:

- $28.03 M of ncAUM (non-custodial assets under management)
- 100% of capital utilisation
- An APY (annual percentage yield) of 4.1%
- Monthly farming results of $93,841

A comprehensive review post detailing our collaborative efforts with the ENS DAO has been recently shared on the forum. We encourage community members to consult this post for insights into our achievements and ongoing initiatives.

Cumulative Revenues

In the 182 days since the Endowment was established, 173 ETH have been accrued through ETH-neutral strategies and $136,764 in stablecoin revenues via USD-neutral strategies. Operational reports were initially shared on a weekly basis and later transitioned to monthly updates, all of which were made available on the forum for community review.

The Endowment's phased initiation should also be taken into account when interpreting these results. Full capital utilisation was only achieved 49 days after the Endowment's inception, following the completion of the earned ETH-to-stablecoin tranche swaps. This staggered approach had a discernible impact on the reported financial metrics.

Taking into consideration the revenue generated during the most recent four months—after reaching 100% capital utilisation—the projected annual revenues at the current Endowment's size stand at 367 ETH from ETH-neutral strategies and an equivalent of $351,654 in stablecoins from USD-neutral strategies. This results in a projected Annual Percentage Rate (APR) of approximately 3.4%.

Specification

Fund Transfer

Transfer 16,000 ETH to the Endowment (0x4F2083f5fBede34C2714aFfb3105539775f7FE64).

Permissions preset adjustments

In line with our commitment to streamline governance and reduce the frequency of voting events for the community, we propose targeted adjustments to the existing permissions preset within this proposal. Specifically, we are requesting three key changes:

- **Whitelisting the updated wstETH-WETH Pool and Gauge**: As part of our ongoing optimization, we propose to whitelist the updated wstETH-WETH pool on Balancer and its corresponding gauge on Aura.
- **Revoking Permissions for Aura's bb-a-usd Pool**: In light of the recent vulnerability disclosed by Balancer on August 24, 2023, we recommend revoking all permissions associated with potentially compromised pools. It's important to note that the Endowment had no exposure to these compromised pools at the time the vulnerability was made public.
- **Whitelisting the *delegatecall* function on Cow Swap**: A minor bug was found in the existing preset configuration. Specifically, the *signOrder* function within Cow Swap's order signer contract is designed to be executed solely via a delegate call, a capability not currently supported by the preset. This oversight not only hindered functionality but also revealed a flaw in the SDK preset testing framework. The issue has been swiftly addressed and rectified in a recent commit to the codebase.

As is customary, we are presenting an updated version of the "Preset permissions - ENS Endowment" document. This document comprehensively lists all permissions granted to karpatkey, with newly requested permissions highlighted in green and any revocations marked in red.

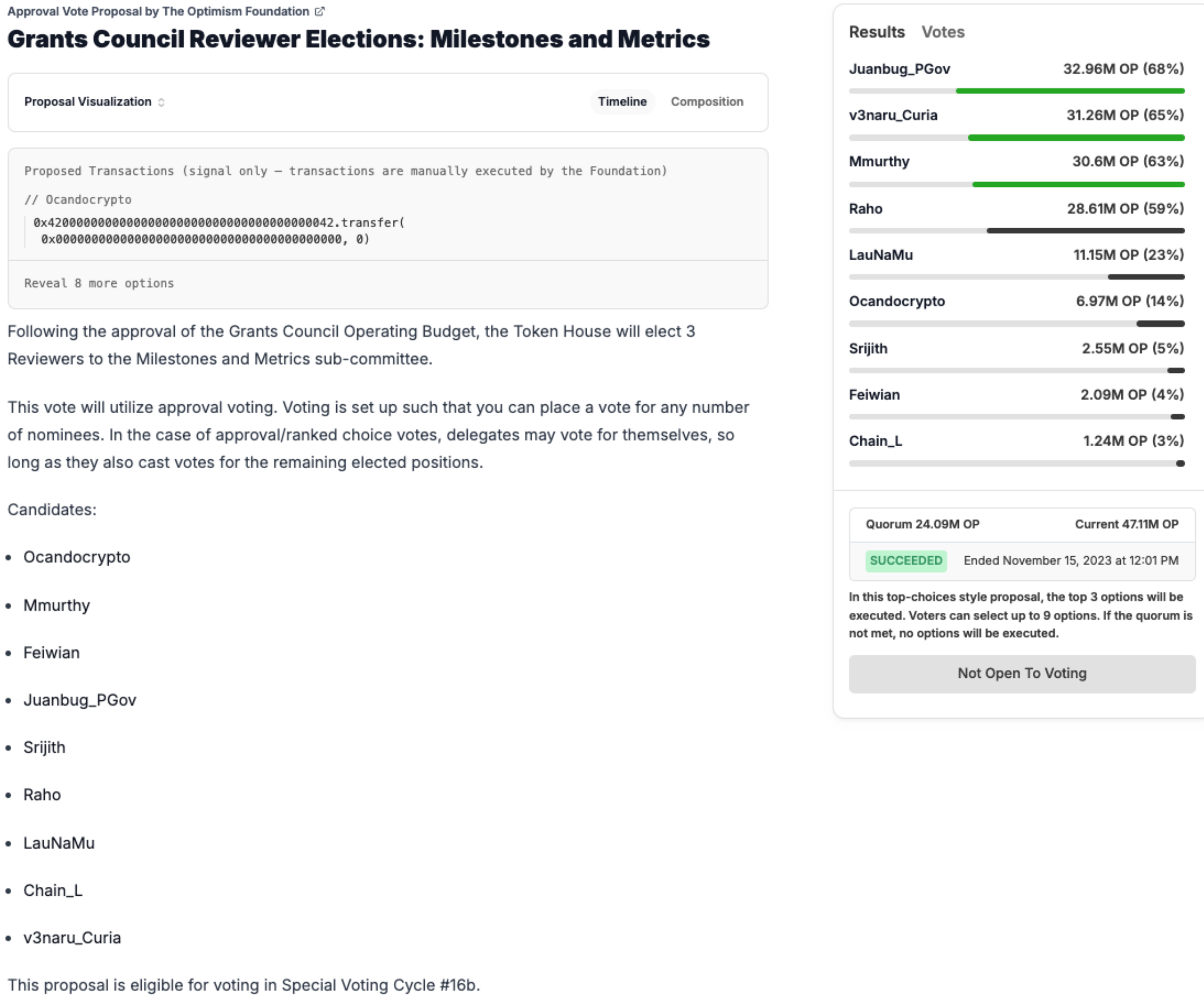
We are also sharing the payload to apply the proposed changes for your review. We strongly encourage community members with the required technical expertise to scrutinise the content and share their invaluable feedback.

Transactions

All transactions can be found in the following payload.

F.3 Election Related Proposals

F.3.1 Optimism



Approval Vote Proposal by The Optimism Foundation

Grants Council Reviewer Elections: Milestones and Metrics

Proposal Visualization | Timeline | Composition

```
Proposed Transactions (signal only – transactions are manually executed by the Foundation)
// Ocandocrypto
0x4200000000000000000000000000000000000042.transfer(
 0x0000000000000000000000000000000000000000, 0)
Reveal 8 more options
```

Following the approval of the Grants Council Operating Budget, the Token House will elect 3 Reviewers to the Milestones and Metrics sub-committee.

This vote will utilize approval voting. Voting is set up such that you can place a vote for any number of nominees. In the case of approval/ranked choice votes, delegates may vote for themselves, so long as they also cast votes for the remaining elected positions.

Candidates:

- Ocandocrypto
- Mmurthy
- Feiwian
- Juanbug_PGov
- Srijith
- Raho
- LauNaMu
- Chain_L
- v3naru_Curia

This proposal is eligible for voting in Special Voting Cycle #16b.

Results | Votes

Candidate	Votes
Juanbug_PGov	32.96M OP (68%)
v3naru_Curia	31.26M OP (65%)
Mmurthy	30.6M OP (63%)
Raho	28.61M OP (59%)
LauNaMu	11.15M OP (23%)
Ocandocrypto	6.97M OP (14%)
Srijith	2.55M OP (5%)
Feiwian	2.09M OP (4%)
Chain_L	1.24M OP (3%)

Quorum 24.09M OP | Current 47.11M OP

SUCCEEDED | Ended November 15, 2023 at 12:01 PM

In this top-choices style proposal, the top 3 options will be executed. Voters can select up to 9 options. If the quorum is not met, no options will be executed.

Not Open To Voting

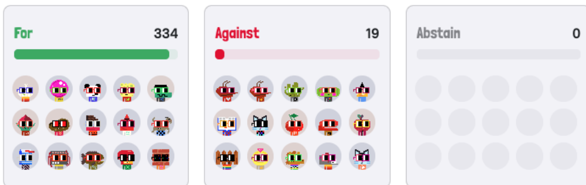
F.3.2 Lil Nouns

Proposal 15 Executed

Residency for lilal409

Proposed by al409.⌐◨-◨ at 0x5836d

Switch to delegate view



Threshold — Threshold 158 votes	Ended — 6:25 AM PDT Jul 1, 2022	Snapshot — Taken at block 14912639

Description

Description Votes

Hey all, my name is Albert or lilal409. Through this proposal I will be able to dedicate myself to LilNouns and assume responsibility as a project manager/core contributor to the DAO. I currently contribute multiple hours a day and I spend multiple hours every evening contributing in the discord and looking for where I can contribute my efforts.

Experience:

My background out of college is in consulting and software development. My title is "Business Analyst" where I work with different insurance companies to implement a software suite called guidewire. I've been tasked with traveling to our client's office and conducting meetings where I learned how their legacy systems operated, I demo'd the guidewire suites' out of the box functionality, and then held a variety of requirement gathering sessions for us to come up with a custom solution to tailor their business needs and build out OOTB Guidewire. I have worked on each aspect of this role from requirement gathering, translating requirements to our offshore development team, and demoing newly built functionality to the client and end users of the software, and lastly was responsible for QA testing and bug triage.

- Started working as a content creator/contributor to the NounPunks community.
- Requested to become a mod for lilnouns and have been getting involved since inception to help build value and structure for the community.

What I will do going forward:

1. Discord revamp and scope redefining. - I believe we have some overlap in scope between channels and there can be confusion as to where folks should be communicating where. I'd like to help overhaul the process and build out onboarding documentation for newcomers assuming they are new to the space and new to being involved in a DAO. My goals when this is complete are to have a clearly defined scope of each channel and clearly defined processes for all aspects of communicating/collaborating/and building within the DAO. I will also continue moderating the discord on a daily basis and being available in the #ask-a-mod channel to help new users.

2. Contributing to any proposals that will build value for the community. - I would like to contribute to organizing and facilitating our lilnouns townhalls alongside my fellow mods. I'd like to help enable and build our community alongside contributors who have ideas to better the DAO as a whole. The first contribution I was involved in was the creation of the first 1000 lilnouns POAP and I am continuing to work along side @souravinsights.eth @mfrs @fabioseva and any other contributors on the next phase of our lilnounspoap.com website. I would like to be involved in the Educational Video Series proposal by helping write scripts for content to help onboard new users and give them a one stop shop for everything they need to know about the DAO and how we operate/how they can get involved.

3. Prop House - I would like to volunteer to lead our prophouse committee and help answer questions/guide people/teams who are looking to get their ideas up for prophouse rounds. I have been involved in prophouse since inception as NounPunks were the first nounish community that had governance abilities in the prophouse rounds. I really enjoy working with people and helping guide them to build their ideas and bring them to life.

4. General QA/Requirement gathering to build/test/bug triage future functionality. This experience directly relates to my current job and it's something I've always enjoyed. As we conceptualize new ideas to create value adding functionality on our website, I'd like to help in any way I can.

Funds requested:

- 8 eth paid for the month of June 2022
- 42 eth paid over ~5.7 months (July 1, 2022 through December 22, 2022) which equates to 7.36E/month

Recipient:
al409.eth address: 0x8BecD7EbF3F910090f9264DFD0Bb221Ea04af8c3

Proposed Transactions

1. 0x8becd7ebf3f910090f9264dfd0bb221ea04af8c3.transfer(
   8.0 ETH
)
2. 0xc02aaa39b223fe8d0a0e5c4f27ead9083c756cc2.deposit(
   42.0 ETH
)
3. 0xc02aaa39b223fe8d0a0e5c4f27ead9083c756cc2.approve(
   0xCD18eAa163733Da39c232722cBC4E8940b1D8888,
   42000000000000000000
)
4. 0xcd18eaa163733da39c232722cbc4e8940b1d8888.createStream(
   0x8BecD7EbF3F910090f9264DFD0Bb221Ea04af8c3,
   42000000000000000000,
   0xC02aaA39b223FE8D0A0e5C4F27eAD9083C756Cc2,
   1656676800,
   1671676800
)

F.3.3 ENS

EXECUTED

TBR-Q4-2022 - PT Inc Protocol Team

Proposal executed

by 0x9aBad5d367565425a11aB0446cdc1CD3F... • ID 47 • PoolTogether (deprecated) • Proposed on: Oct 18th, 2022

Proposal

Description | Executable Code

Team Name	**PT Inc Protocol Team**
Quarter and Year	**Q4 2022**
Payout Address	**0x3927E0642C432A934a4EAA64C79bC8a1D8ac5Fb7**
Total USD Value Requested (approx)	**$43,041.44 USD**

Purpose

The protocol team is tasked with designing, developing, and managing the core PoolTogether prize protocol. This includes:

- Designing and developing upgrades to the protocol
- Working with partners to support protocol integrations
- Implementing security best practices to ensure the protocol is safe
- Automating operational transactions to ensure the protocol runs smoothly

Merging Existing Teams

There are two existing "teams" that the protocol team will include: the Ethereum Operations Team and the informal security team.

The existing Ethereum Operations Team will be turned into the Protocol Team, with the only two active members being Brendan and Pierrick. The Eth Ops Team currently holds ~$250k in USDC held directly and across two Sablier streams. These funds will be re-purposed for use by the Protocol Team, and the other two signers on the multisig will be removed.

The informal security team is really just Brendan's relationship with Code Arena. Several PTIPs in the past have transferred funds to Code Arena to top-up an account used for PT protocol audits. The account is used to fund core protocol changes, and the current balance is ~$156k USDC. Brendan will be leading the protocol team, so this account will be re-purposed as the auditing account for the Protocol Team.

Q4 2022 Performance Goals and Metrics

Over the next three months, the protocol team plans to improve the core PoolTogether V4. We will:

- Upgrade PoolTogether V4 to make it fully decentralized
- Continue research and development of V5
- Hire a additional developer

Decentralizing V4

The PoolTogether protocol version 4 currently uses OpenZeppelin Defender relayers to copy information from one chain to another. This means that if someone takes control of Defender they can manipulate the protocol. We wish to upgrade the protocol so that Defender is simply automating functions that can be called by anyone.

There are several parts to the upgrade:

1. Replace Draw oracle with bridges and local VRFs. ERC-5164 is part of our efforts.
2. Replace TVL oracle by upgrading V4 to use the Draw Percentage Rate. This eliminates the need to broadcast the TVL across all chains.
3. Eliminate Timelocks. By eliminating the above attack vectors, we can improve the user experience.

Milestones

1. Install VRF 2.0 on Polygon
2. Bridge draws trustlessly to Optimism (via ERC-5164)
3. Install VRF 2.0 on Avalanche
4. Upgrade V4 Ethereum to use DPR
5. Upgrade V4 Polygon to use DPR
6. Upgrade V4 Optimism to use DPR
7. Upgrade V4 Avalanche to use DPR

PoolTogether V5

With V4 locked down, we'll be able to continue work on PoolTogether V5. This new version will extend the excellent V4 prize design with strong tokenomics that incentivize protocol growth. We will also be focusing on making the protocol **permissionless** and **autonomous**. This way no one needs to ask governance permission to extend the protocol, and we will reduce the number of PTIPs required to manage the protocol.

Performance Milestones:

- finalize V5 design
- deliver a public V5 testnet

Hire Developers

To realize these goals, we'll need more developers. Another goal will be to hire another developer so that we can build faster.

Goal: hire another protocol engineer

Budget

Requested Amount

Total
43683.68 POOL

To Be Returned

Total
156,400 ScUSDC

Budget Breakdown

Team Members

List every role on the team with the following template:

Role	Yearly USD Compensation	Commitment Percentage	Quarterly USDC	Quarterly POOL	Contributor	Contributor Discord
Team Lead	N/A	100%	0 (covered by PT Inc)	0	Brendan Asselstine	Brendan 🌊🏆 #1830
Protocol Engineer	$211,166	100%	0 (covered by PT Inc)	18,310.65	Pierrick Turelier	Pierrick#1350
Protocol Engineer	$250,000 (max)	100%	0 (covered by PT Inc)	25,373.03	**Open Role**	

We will be hiring a Protocol Engineer this quarter, so we want to be ready with compensation. The above POOL is the maximum possible quarterly ownership for an employee (see the compensation formula spreadsheet) If we do not hire this quarter, we will roll the tokens over to next quarter. If we decide we don't need to fill the role, we will return the tokens. If we hire they will likely be below the max, so we will return or roll over the remaining tokens.

Previous Budget Surplus

The Protocol Team will inherit a significant amount of budget from the Ethereum Operations Team and Brendan's relationship with Code Arena. I estimate this budget will be sufficient for Q4 stablecoin expenses, and beyond.

Description	Amount	Token
C4 outstanding account balance	156,400	USDC
Held assets	320,000	ScUSDC
Remaining in stream	30,000	ScUSDC

Note: Token prices at time of budget request are used for standardization. For simplicity the relevant token prices are provided below.

Appendix

Token Pricing

Show the token prices used for any USD calculations.

Token	USD
POOL	0.985298

F.4 Technical Proposals

F.4.1 Idle

[IIP-10] - Single Token Staking

Proposals · IIPs

8bitporkchop 2 Jun 2021

Authors

@8bitporkchop

Summary

The purpose of this proposal is to activate the single token staking program for $IDLE. With this proposal $IDLE stakers will be eligible to claim a proportion of the protocol revenues proportional to their stake amount, and locking duration.

Motivation

Staking in DeFi can add valuable utility and promote long term sustainability for the idle ecosystem, while ensuring that the community is incentivised for their continual loyalty to the protocol.

Background

Single token staking has been one of the most requested features from the idle community [1] 1 [2] 1 [3] 2. Following a number of implementation discussions with the community, the dev league has implemented staking for $IDLE using the curve staking model.

In this model users are incentivised by the amount of $IDLE staked, and the time they stake their tokens for. Tokens are staked by locking them in a contract for up to four years. Through staking $IDLE stakers are also rewarded by being eligible to claim a portion of the protocol performance fees. Governance has voted and decided that the reward distribution token for staking will be IDLE 11, which will be market bought from SushiSwap.

High level overview:

The staking implementation consists of three contracts.

- $IDLE Staking Contract: 0xaac13a116ea7016689993193fce4badc8038136f 4
- Fee Distributor: 0xBABb82456c013fD7E3f25857E0729de8207f80e2 1
- Sushiswap Exchanger: 0x1594375eee2481ca5c1d2f6ce15034816794e8a3 5

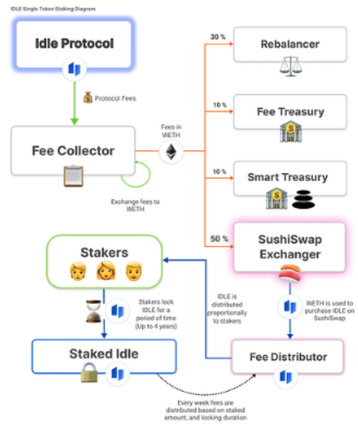
IDLE will be delegated to a community multisig. Stakers will be able to signal their preference on IIP proposals through a snapshot vote, which the multisig will then certify via an on-chain vote.

The staking contract allows users to lock their $IDLE for a certain period. While the Fee Distributor will manage paying out performance fees to stakers.

This proposal at a high level achieved the following actions.

- Add the feeDistributor as a beneficiary to the feeCollector
- Update feeCollector allocation
  - 10% Smart Treasury
  - 10% Fee Treasury
  - 30% Rebalances
  - 50% Sushiswap Exchanger

The following diagram summarises IIP 10



Specification

The contract implementation is based on the curve contracts with some minor modifications.

These modifications allow the $IDLE in the staking contract to be delegated to a community multisig located here: 0xb08696efcf019a6128ed96067b55dd7d0ab23ce4. This currently consists of members from the treasury league, but can be updated in the future to include more community members.

The source code for the single token staking is located here: GitHub - Idle-Finance/idle-staking: Idle Single Token Staking 7

Next Steps

We are going to leave this thread open for comments regarding this implementation, and in about 48hrs, if there are no objections, we will proceed with the on-chain proposal and the voting phase.

F.4.2 Uniswap

Proposal by eek.eth

Create v3deployments.uniswap.eth subdomain and populate its text fields

Proposal Visualization | Timeline | Composition

Proposed transactions

```
0x00000000000C2E074eC69A0dFb2997BA6C7d2e1e
  .setSubnodeRecord(
      0xec9ec573cf97ad1c270be71ac1de3b382790cb346036130c7d7ff844bf8f4974,
      0x2d6b2319f18a1cb76b1defe5168d9d9985326a1bc359a622136e436ef603ac61,
    0x1a9C8182C09F50C8318d769245beA52c32BE35BC,
    0x4976fb03C32e5B8cfe2b6cCB31c09Ba78EBaBa41,
      0,
  )
```

Expand transactions

Rationale

Per the discussion in the governance forums here and here, and the Snapshot poll here, canonical deployments of Uniswap v3 will be recorded in a new subdomain. This proposal seeks to create that subdomain (`v3deployments.uniswap.eth`) and populate its text records with all deployments that were granted business source license exemptions and those that have passed governance votes since the license's expiry.

One thing to note - both zkSync and Polygon zkEVM have passed governance votes and will be added to the subdomain at a date in the future when their deployments are complete.

Process

If executed, this governance proposal will make 9 function calls. At a high level, the first transaction creates the new subdomain and the next 8 add text records to it. The text records are formatted such that the key is the network number of the chain in question and the value is a string with the address of the bridge sender contract on mainnet associated with the deployment followed by the UniswapV3Factory address on the destination chain, separated by a space and a comma. Note that this is a slight departure from what was suggested in the forums; after discussing with various members of the governance community it became apparent that including the factory address would be a valuable addition.

We describe the function calls in more detail below, and a detailed simulation of the transaction's execution will be available shortly after this proposal goes live by downloading the Uniswap artifact at the bottom of this page.

1. Creates the new subdomain by calling the `setSubnodeRecord` on the ENS Registry and passing it the name hash for `uniswap.eth`, the label hash for `v3deployments`, the timelock's address, and the ENS public resolver's address.
2. Creates a new text record on `v3deployments.uniswap.eth` by calling `setText` on the subdomain and passing it the name hash for the subdomain, the key `42161` for Arbitrum and value `0x4Dbd4fc535Ac27206064B68FfCf827b0A60BAB3f, 0x1F98431c8aD98523631AE4a59f267346ea31F984`
3. Creates a new text record on `v3deployments.uniswap.eth` by calling `setText` on the subdomain and passing it the name hash for the subdomain, the key `10` for Optimism and value `0x25ace71c97B33Cc4729CF772ae268934F7ab5fA1, 0x1F98431c8aD98523631AE4a59f267346ea31F984`
4. Creates a new text record on `v3deployments.uniswap.eth` by calling `setText` on the subdomain and passing it the name hash for the subdomain, the key `137` for Polygon and value `0xfe5e5D361b2ad62c541bAb87C45a0B9B018389a2, 0x1F98431c8aD98523631AE4a59f267346ea31F984`
5. Creates a new text record on `v3deployments.uniswap.eth` by calling `setText` on the subdomain and passing it the name hash for the subdomain, the key `42220` for Celo and value `0xf7e46b233abd1edaad8dbbbda12129b97b071025, 0xAfE208a311B21f13EF87E33A90049fC17A7acDEc`
6. Creates a new text record on `v3deployments.uniswap.eth` by calling `setText` on the subdomain and passing it the name hash for the subdomain, the key `56` for Binance Smart Chain and value `0xf5F4496219F31CDCBa6130B5402873624585615a, 0xdB1d10011AD0Ff90774D0C6Bb92e5C5c8b4461F7`
7. Creates a new text record on `v3deployments.uniswap.eth` by calling `setText` on the subdomain and passing it the name hash for the subdomain, the key `100` for Gnosis and value `0xf5f4496219f31cdcba6130b5402873624585615a, 0xe32F7dD7e3f098D518ff19A22d5f028e076489B1`
8. Creates a new text record on `v3deployments.uniswap.eth` by calling `setText` on the subdomain and passing it the name hash for the subdomain, the key `43114` Avalanche and value `0xeb0BCF27D1Fb4b25e708fBB815c421Aeb51eA9fc, 0x740b1c1de25031C31FF4fC9A62f554A55cdC1baD`
9. Creates a new text record on `v3deployments.uniswap.eth` by calling `setText` on the subdomain and passing it the name hash for the subdomain, the key `288` for Boba and value `0x6D4528d192dB72E282265D6092F4B872f9Dff69e, 0xFFCd7Aed9C627E82A765c3247d562239507f6f1B`

F.4.3 Compound

EXECUTED

Risk Parameter Updates for UNI, LINK, MKR, AAVE, YFI, and SUSHI

Proposal executed

by **Gauntlet** • ID 85 • Proposed on: Mar 4th, 2022

Proposal

Description Executable Code

Simple Summary

A proposal to adjust six (6) parameters for six (6) Compound assets.

Background

This proposal is a batch update of risk parameters to align with the Moderate risk level chosen by the Compound community. These parameter updates are the seventh of Gauntlet's regular parameter recommendations as part of Dynamic Risk Parameters.

Full proposal and forum discussion

Motivation and Specification

This set of parameter updates seeks to maintain the overall risk tolerance of the protocol while making risk trade-offs between specific assets.

Our parameter recommendations are driven by an optimization function that balances 3 core metrics: insolvencies, liquidations, and borrow usage. Our parameter recommendations seek to optimize for this objective function. For more details, please see Gauntlet's Parameter Recommendation Methodology and Gauntlet's Model Methodology.

Parameter	Current Value	Recommended Value
UNI Collateral Factor	70%	75%
LINK Collateral Factor	70%	75%
MKR Collateral Factor	55%	60%
AAVE Collateral Factor	60%	65%
YFI Collateral Factor	60%	65%
SUSHI Collateral Factor	55%	60%

Dashboard

Gauntlet has launched the Compound Risk Dashboard. The community should use the Dashboard to better understand the updated parameter suggestions and general market risk in Compound.

Value at Risk represents the 95th percentile **insolvency value** that occurs from simulations we run over a range of volatilities to approximate a tail event.

Liquidations at Risk represents the 95th percentile **liquidation volume** that occurs from simulations we run over a range of volatilities to approximate a tail event.

Value At Risk

Value at Risk conveys the capital potentially at risk due to insolvencies when markets are under duress (i.e. high volatility). The below metric is the 95th percentile insolvency value that occurs from simulations we run over a range of volatilities to approximate a tail event. While we aim to keep this number low, it may increase after Gauntlet Recommendations when there is an opportunity to increase Capital Efficiency (as measured by Borrow Usage). **Note that VaR is sensitive to model inputs and can change day to day.** This is due to changes in volatility, user borrow positions, asset correlation structure, and the nature of the statistic (being a long tail approximation). See this post for more detail on the metric.

Liquidations At Risk

Liquidations at Risk conveys the amount of capital potentially at risk for liquidation when markets are under duress (i.e. high volatility). This metric (similar to VaR) is the 95th percentile liquidation volume that occurs from simulations we run over a range of volatilities to approximate a tail event. We note that while liquidations can affect borrower UX, **healthy liquidations are a critical part of a capitally efficient protocol.** The below numbers may seem large, however, this is meant to capture a 'catastrophic' tail scenario where many liquidations must occur in order to ensure the ongoing operation of the protocol. See this post for more detail on the metric.

Borrow Usage

This metric provides information about how aggressively suppliers of collateral borrow against their supply. This is a measure of capital efficiency and gives a sense of how borrows behave relative to supply. More details on the computation of this metric can be found here. All else being equal, we seek to maximize Borrow Usage

Borrow Usage 45.84% → with recommendations → Borrow Usage 45.85%