Centralized Governance in Decentralized Organizations[*]

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Abstract

We systematically document governance centralization in decentralized autonomous organizations (DAOs) and examine its drivers and economic implications. Using multiple data sources and granular on-chain transaction data, we find that DAOs—including most Decentralized Finance (DeFi) projects—exhibit low participation rates and highly concentrated voting power, with the top decile of voters controlling 76.2% of total votes. Analyzing pre-proposal trading, we observe significant abnormal trading activity: blockvoters accumulate tokens to influence outcomes, while proposal managers engage in insider trading, earning average market-adjusted returns of 9.5%. These conflicts of interest can be value-destructive, particularly during crises when effective governance is critical to organizational survival. Yet, recent innovations such as quadratic voting and delegation mechanisms show promise in advancing the goals of decentralization by empowering minority token holders and mitigating agency conflicts. Overall, our study highlights both the persistence of agency problems in DAOs and the potential for well-designed governance mechanisms to improve outcomes in these emerging digital organizations.

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1 Introduction

Traditional firms typically face inherent conflicts of interest, often framed as agency problems, between principals (e.g., shareholders) and agents (e.g., managers or insiders). The design of governance systems—especially the degree of decentralization in decision-making—thus remains a central theme in organizational economics (e.g., Jensen and Meckling, 1976, 1992). In theory, decentralized structures may alleviate agency frictions but exacerbate collective action and information costs. Levit et al. (2024) advances this debate by formalizing the dual role of trading and voting in shaping shareholder welfare.[1] One critical implication is that decentralized voting rights—if poorly designed or insufficiently representative—can fail to deliver efficient outcomes even in frictionless and transparent markets.

Our study extends the discussion by investigating governance in Decentralized Autonomous Organizations (DAOs), an emergent digital organizational form enabled by blockchain infrastructure. DAOs are governed by programmable smart contracts, in which organizational rules are encoded into software and automatically self-executed when pre-specified conditions (e.g., voting outcomes subject to quorum) are met, and decentralized decision-making through their token holders (Cong and He, 2019; Harvey and Rabetti, 2024). Governance token holders can directly participate in decision-making by creating and voting on proposals, which include critical organizational choices from product design to treasury disbursements and voting procedures. Voting outcomes are automatically enforced through smart contracts on the blockchain. All decisions are recorded on the blockchain, enabling a high level of operational transparency.

This digital organizational form appears to be gaining traction. As of early 2025, the number of active DAOs has surpassed 10,000, with more than 3.3 million voters. From 2021 to 2025, the total value of assets in DAO treasuries increased dramatically from $520.7 million to $22.5 billion, with substantial increases occurring in 2023 (i.e., Figure 1).[2]

[Figure 1]

[1] Notably, the study shows that delegation to boards—a hallmark of traditional governance—can in some cases enhance welfare by insulating decision-making from extreme shareholder preferences.

[2] Monthly total assets owned, based on statistics from DeepDAO, a tracking platform: https://deepdao.io/organizations. A few DAOs were launched in 2017—2019, a period characterized by token offerings and frauds (e.g., Howell et al., 2020; Lyandres et al., 2022; Davydiuk et al., 2023; Lyandres and Rabetti, 2024; Gefen et al., 2024; Cong et al., 2024).

If DAOs represent a truly novel organizational form to the extent that they simultaneously allow for decentralization of decision-making at scale, it should, by design, also effectively suppress agency costs. Such digital infrastructure could limit self-interested behavior through mechanisms of aligned incentives, broad stakeholder involvement, and operational transparency (Davidson et al., 2016; Reijers et al., 2016; De Filippi and Wright, 2018; Laturnus, 2023). Yet, some suggest that DAOs simply be "the blockchain equivalent of a company" (e.g., Berg et al., 2019): instead of a revolutionary shift, they are merely a technologically-enabled variation of traditional organizational and governance practices. This raises a fundamental question: How novel are DAOs in practice? If DAOs are truly novel and capable of overcoming the traditional organizational trade-offs, they should empirically exhibit decentralized decision-making at scale and demonstrate that their proposed mechanisms (smart contracts, token governance) effectively suppress agency costs, leading to minimal observable agency conflicts and more efficient and governance outcomes.

Yet, mounting evidence suggests that conflicts of interest may be pervasive in DAOs. A notable illustration occurred in the Uniswap DAO—a leading decentralized exchange—where a single delegate wallet tied to a major venture capital firm effectively controlled the outcome of a proposal to activate the protocol fee switch, raising industry-wide concerns about the integrity of decentralized governance.[3] Motivated by such episodes, we begin our empirical analysis by assessing the actual degree of decentralization in DAO governance. Using granular proposal and voting data from a widely used voting platform, we find that overall participation rates in DAOs are low, averaging just 6.3%. This low turnout reflects the combined effects of the free-rider problem—where individual token holders have little incentive to bear the cost of voting since they can benefit from others' efforts—and the absence of regulatory requirements obligating token holders to vote. Further analysis reveals a striking concentration of voting power: the top decile of voters controls 76.2% of the total realized voting power. Our initial findings support concerns raised by practitioners and regulatory agencies.[4]

We continue our analysis by mapping the main players in the DAO governance and fetching stylized facts. Applying blockchain forensics with the Ethereum Name Service (ENS), we classify the top voters into four primary categories: core team members, institutional investors, third-party service providers,

[3] See, e.g., "Uniswap DAO's vote ignites decentralization debate," *The Defiant*, October 2023: https://thedefiant.io/uniswap-decentralization-a16z.

[4] In a recent roundtable in Washington, D.C., organized by the Wharton Initiative on Financial Policy and Regulation, the protection of stakeholders in decentralized ecosystems was a central topic of debate among both academics and regulators (https://wifpr.wharton.upenn.edu/roundtables/).

and key opinion leaders—prominent figures, including active community members and industry experts.[5] The average Gini coefficient and the share of voting power held by the top decile of voters start at high levels— largely attributed to the token allocation schemes—and exhibit a clear upward trend over time, indicating growing concentration of voting power as DAOs mature. At the cross-section of DAO characteristics, we find that Yield and Lending protocols exhibit significantly lower participation rates than other protocol types, and larger DAOs show reduced voter engagement overall. Finance-related proposals attract higher participation, while the complexity and contentiousness of proposals do not significantly affect turnout. Regarding voting power concentration, larger DAOs tend to be more centralized, with decentralized exchanges (DEXs) showing the highest concentration and Yield protocols the lowest. Proposal characteristics also play a role in shaping voting concentration. Proposal complexity is associated with greater concentration, whereas contentious proposals exhibit lower concentration of voting power.[6]

Having established stylized facts shaping voting power concentration in DAOs, we move next to analyze governance token trading before proposal creation. Prior research suggests that shareholders acquire voting rights ahead of key proposals to increase their influence, typically through direct spot market trading (Fos and Holderness, 2023; Bethel et al., 2009) or stock borrowing in the equity loan market (Christoffersen et al., 2007; Hu and Black, 2007; Aggarwal et al., 2015). Inspired by this literature, we examine the pre-governance proposals' token trading behavior of two groups of governance participants—proposal managers and top decile voters—around proposal events on Snapshot, a widely used off-chain voting platform. Leveraging on-chain transaction data from BigQuery, we find evidence of abnormal trading of tokens during the month leading up to DAO proposal creation. Specifically, we observe that total trading volume increases by 16.8% during this period. Proposal managers and top-decile voters are the primary contributors to this volume spike, with their trading volumes increasing by 59.2% and 52.5%, respectively.

A key manifestation of the conflicts of interest arising from voting power centralization is the potential for insider trading. Active participants are deeply involved in the decision-making process and wield substantial influence over its outcomes. As shown by Cornelli and Li (2002), where risk arbitrageurs

[5] The Ethereum Name Service (ENS) is a decentralized naming protocol built on the Ethereum blockchain that links user identities to wallet addresses. Blockchain forensics refers to the analysis of on-chain data to draw economic inferences.

[6] Additionally, we observe that both participation and concentration metrics are higher in DAOs that experience governance hacking events compared to those that do not. Specifically, DAOs affected by hacks show participation rates, Gini index values for concentration, and shares of votes held by top voters at 14.2%, 8.94%, and 8.41%, respectively, versus 5.9%, 7.97%, and 7.58% in unaffected DAOs, suggesting that elevated risk awareness may be associated with more active and concentrated governance engagement.

gain an information advantage by choosing to enter takeover contests, governance participants in DAOs similarly generate private information through their active involvement in proposal and voting processes. Two opposing forces shape insider trading dynamics in DAOs: factors that increase its likelihood—such as limited regulatory oversight and pseudonymous transactions—and factors that constrain it, including blockchain transparency and the theoretically decentralized nature of governance (Sokolov, 2021; Amiram et al., 2022; Makarov and Schoar, 2022; DeSimone et al., 2025). This tension between opportunity and constraint makes the extent of insider trading in DAOs an open empirical question, which we systematically examine in the following analysis.

To identify insider trading driven by information asymmetry, we compare the trading patterns of proposal managers and top-decile voters ("blockvoters") around proposal creation events, examining whether trades occur selectively before proposals anticipated to yield positive or negative cumulative abnormal returns (CARs). If trading is informed, we expect increased purchases before proposals with positive CARs and increased sales before proposals with negative CARs; in contrast, trading purely to accumulate voting power should occur regardless of expected price impacts. Consistent with information-based trading, we find that proposal managers significantly increase purchases before proposals with positive CARs but show no abnormal activity before negative CARs, while blockvoters increase token purchases indiscriminately before all proposals. This distinct pattern indicates that proposal managers likely exploit private information to trade profitably, whereas blockvoters primarily accumulate tokens to influence governance outcomes.

Next, we examine whether governance influencers earn abnormal profits from their trading activities before proposal creation. We find that proposal managers achieve 9.5% higher market-adjusted returns when trading tokens prior to proposal announcements compared to trades executed shortly afterward, consistent with an information-based advantage. In contrast, blockvoters do not realize significant short-term returns, supporting our interpretation that their trading is primarily motivated by accumulating governance power rather than pursuing profits. Notably, the profitability of insider trading is more pronounced in smaller DAOs characterized by limited information transparency and concentrated voting power—environments where governance influencers are better positioned to exploit informational advantages and sway outcomes. Importantly, we show that voting mechanisms that enhance community monitoring or limit blockholders' voting power significantly reduce insider trading profitability, suggesting that well-designed governance solutions can mitigate conflicts of interest that arise from information asymmetries.

To further separate insider trading from vote accumulation, we leverage the unique setting of the Compound protocol, a lending platform where interest-bearing tokens (cTokens) are economically affected by proposal outcomes but do not confer any voting rights. This setting allows us to disentangle trading motivated by information from trading aimed at accumulating governance power. We find that Compound voters engage in 6.5 times more transactions of proposal-affected cTokens during the six days preceding proposal creation. Because these trades cannot influence governance outcomes, this behavior provides compelling evidence of informed trading based solely on anticipated price impacts, validating the presence of significant conflicts of interest in the DAO ecosystem.

So far, our analysis documents pervasive centralization in DAOs, generating conflicts of interest similar to those observed in traditional governance settings. However, whether voting power accumulation and insider trading are ultimately detrimental to DAOs is far from straightforward. On one hand, centralization may help reduce coordination costs, improving decision-making efficiency in decentralized systems (Shleifer and Vishny, 1986; Hansmann, 2000). On the other hand, it can increase the risk of rent extraction by insiders and powerful stakeholders, exposing governance inefficiencies that undermine trust and stability (Grossman and Hart, 1980; Cong and He, 2019). These opposing dynamics become especially consequential during crises, when token holders' risk aversion tends to rise sharply (Sockin and Xiong, 2023; Cong et al., 2023).

To provide empirical insights into these trade-offs, we examine the economic implications of conflicts of interest in DAOs. Following Cong et al. (2023), we analyze how the total value locked (TVL) in DAOs with varying levels of conflicts of interest responds to market-wide negative shocks.[7] Our identification strategy tests the impact of conflicts of interest on DAO economic performance during two major crises: the Luna-Terra crash and the FTX collapse. We employ a difference-in-differences design, categorizing DAOs based on whether their abnormal trading volume in the month before proposal creation is above ("treated") or below ("control") the sample median, and then comparing their TVL before and after these events. DAOs with higher conflicts of interest experienced significantly larger TVL declines following these shocks—18.9% more after the Luna crash and 44.6% more after the FTX collapse—compared to DAOs with lower conflicts of interest. Overall, our results suggest that conflicts of interest generate sub-

[7] TVL (Total Value Locked) is a key metric in crypto, representing the total dollar value of assets locked in a DeFi protocol. Conceptually, TVL is akin to a bank's total deposits, making it useful for studying decentralized finance.

stantial agency costs in DAOs, which are particularly damaging during crises when effective governance is critical for organizational survival.

We acknowledge a few caveats accompanying these insights. First, although our study analyzes one of the largest empirical samples in the DAO literature, our findings mainly reflect governance dynamics in larger, more established DAOs with sufficient publicly available data. As decentralized ecosystems evolve, future research could examine newer DAOs to capture shifting patterns in governance participation and market dynamics. Additionally, our proxy for abnormal trading volume may include transfers across wallets belonging to the same owner. Future research could develop more refined methods to filter out such internal transfers. Despite these limitations, our study provides a comprehensive assessment of the determinants and economic consequences of governance centralization in DAOs, offering a foundation for future research on decentralized governance in an increasingly complex landscape.

Our study contributes to several threads of literature, starting with the extensive one on corporate governance. We study a novel organizational form that features direct democracy without centralized authorities such as a board of directors or management. We document a low governance participation rate of 6.3%, consistent with the well-known free-rider problem in corporate governance (Grossman and Hart, 1980). At the same time, we observe a high degree of centralization, with large token holders dominating the proposal and voting processes. These findings resonate with Shleifer and Vishny (1986), who argue that the presence of a large shareholder provides a partial solution to the free-rider problem in corporate governance. Moreover, we add to the extensive literature on shareholder voting. Voting is a fundamental channel through which shareholders exercise control over corporate decisions (Yermack, 2010; Larcker and Tayan, 2020; Zachariadis et al., 2020). Existing studies have documented that shareholders strategically acquire voting rights before record dates—either through trading or borrowing shares—to sway proposal outcomes (Bethel et al., 2009; Christoffersen et al., 2007). However, most studies fail to match specific investors' trading behaviors with their voting behaviors, and thus provide only aggregate-level evidence of the correlation between trading and voting. Leveraging the transparency of blockchain data, we match investors' trading activity with their voting behavior in DAOs, providing direct evidence of vote trading.

Our study also expands the literature on insider trading. Prior research has extensively documented how various stakeholders, including corporate executives (Cohen et al., 2012; Dechow et al., 2016; Blackburne et al., 2021; Jagolinzer et al., 2020), independent directors (Arif et al., 2022; Kim and Oh, 2023), industry peers (Deuskar et al., 2024), suppliers (Alldredge and Cicero, 2015), business partners (Mehta et al., 2021), and banks (Haselmann et al., 2021), trade ahead of material, non-public information events and earn abnormal profits from such trades. Félez-Viñas et al. (2022) find evidence of insider trading in the crypto market before exchange coin listing announcements. Our paper extends the analysis to DAOs—a novel environment characterized by decentralized governance, a lack of regulatory oversight, and transparent yet anonymous trading activities. We find that information asymmetry in DAOs allows stakeholders with privileged access to exploit less-informed investors, adding to the broader literature on misconducts in the crypto space (Amiram et al., 2022; Cong et al., 2023, 2024; Li et al., 2021; Rabetti, 2023; Gefen et al., 2024). These findings offer new insights into insider trading in decentralized ecosystems, contributing to the increasing awareness of the pros and cons of decentralized emerging technologies.

Finally, we contribute to the growing literature on blockchain-based governance by examining two key aspects of governance and voting dynamics in DAOs.[8] First, while DAOs are designed to promote inclusive and democratic decision-making, we find low participation rates and highly concentrated voting power. These results align with existing studies on DAO governance (Appel and Grennan, 2023b,a; Fritsch et al., 2024; Jiang and Li, 2024; Laturnus, 2023), adding to broader discussions on economic tensions in decentralized organizations (Cong and He, 2019; Sockin and Xiong, 2023; Fracassi et al., 2024). Ferreira and Li (2024) propose a model showing that DAOs face a trilemma between autonomy, decentralization, and efficiency. Our study complements this by providing empirical evidence of centralization in DAOs and revealing the economic mechanisms driving it. Second, token-based decentralized governance can better align founders' interests with users' (Bena and Zhang, 2023) whereas centralized structures in DAOs can create conflicts of interest among stakeholders (Das et al., 2023a; Fan et al., 2024). Han et al. (2025) show that concentrated ownership fosters conflicts between large participants ("whales") and smaller ones, negatively affecting platform growth. Similarly, Bellavitis and Momtaz (2024) finds that deviations from decentralization undermine DAO value. Our paper documents a new type of conflict of interest in DAOs between informed and less informed participants, which exacerbates platform instability during market shocks.

The remainder of this study is organized as follows: Section 2 outlines the institutional background of DAOs and their governance structures; Section 3 details our data sources and sample construction; Section 4 discusses voting participation rates and voting power concentration across DAOs; Section 5 ex-

[8] Appel and Grennan (2023b) and Han et al. (2025) provide an excellent introduction to DAOs.

amines the trading behavior of governance participants around proposal events; Section 6 analyzes insider trading dynamics, including buy-sell imbalances around proposal creation, the profitability of insider trades, and the effectiveness of governance mechanisms; Section 7 evaluates the economic implications of conflicts of interest; and Section 9 concludes.

2 Background and Literature Review

2.1 Decentralized Governance

Interest in decentralized governance is not new. For more than two centuries, organizational forms such as cooperatives, mutual companies, and commons-based governance systems have promoted models in which stakeholders directly participate in decision-making, a departure from the standard corporate paradigm relying on management hierarchical control. The Rochdale Pioneers' cooperative model (1844) is a canonical early example of this idea, inspiring generations of decentralized entities with the goals of aligning ownership and control, fostering equitable benefit distribution, and promoting local accountability (Hansmann, 2000). These models gained traction not only for philosophical reasons, but also because they promised practical advantages in mitigating well-documented agency problems in traditional organizations, including managerial entrenchment, short-termism, and the marginalization of non-shareholder stakeholders (Ostrom, 1990; Birchall, 2011).

Despite their appeal, traditional decentralized organizations have long struggled with inherent frictions: collective action problems, difficulties raising capital, low participation in governance, and susceptibility to capture by vocal or strategic minorities (Holmstrom, 1999). The mechanisms that offered participatory control often introduced inefficiencies that made scaling or adaptation to dynamic environments difficult. As a result, decentralized governance models remain largely an ideal, as most organizations continue to rely on hierarchical models of governance, whereby power is concentrated in boards and executive leadership.

2.2 DAOs on the Blockchain

The recent emergence of Decentralized Autonomous Organizations (DAOs) builds on this legacy of decentralization while attempting to overcome its limitations. Enabled by blockchain technology—the "technology of decentralization" (Davidson et al., 2016)—DAOs are governed by programmable smart contracts, in which organizational rules are encoded directly into software and automatically self-executed when pre-specified conditions are met, and voting by token holders, which determine, among other things, the specific smart contracts to install. This digital infrastructure enables the automation of organizational decisions and processes from product design to treasury disbursements and voting procedures, facilitates global participation without geographic limitations, and promotes accountability by creating a transparent, immutable, and auditable record of decisions (Davidson et al., 2016; De Filippi and Wright, 2018; Laturnus, 2023; Reijers et al., 2016).

Thus, the technological advances enabling modern-day DAOs can be seen as a continuation of a centuries-long institutional trajectory: one that aspires to flatten hierarchies and reallocate control to stakeholders. Scholars suggest that DAOs offer a novel and technologically-mediated reconciliation of scale and participation, previously thought to be at odds in governance design (Hsieh et al., 2018). Unlike historical cooperatives or mutuals constrained by geography or regulatory form, DAOs operate as borderless, digitally-native entities. Anyone with internet access and governance tokens can propose, vote on, or fund organizational decisions, enabling global coordination at previously unattainable scale (Davidson, 2025).

The theoretical rationale behind DAOs rests on their potential to mitigate core governance frictions identified in traditional firms. Chief among these are principal-agent problems that arise from the separation of ownership and control (Jensen and Meckling, 1976), asymmetric information, and limited accountability of corporate insiders. DAOs propose to remedy these through the convergence of ownership and control—token holders are both residual claimants and voting participants—and through cryptographically-enforced transparency and rule enforcement. In theory, such organizations reduce the scope for managerial opportunism, insider collusion, or off-balance-sheet risk-taking.

2.3 Related Literature

In theory, DAOs offer several advantages over conventional corporations (e.g., Bena and Zhang, 2023). First, DAOs promote a direct democracy governance model, where stakeholders have decision rights proportional to their ownership of governance tokens. This overlap between principals and agents can potentially reduce the agency problems often seen in traditional corporations, where ownership and control are separated (Jensen and Meckling, 1976; Fama and Jensen, 1983). Moreover, DAOs intend to involve a broad spectrum of stakeholders—ranging from investors and developers to consumers—in the decision-making process, which can facilitate community building and promote a sustainable ecosystem (Li et al., 2021; Appel and Grennan, 2023a; Cardillo et al., 2023). Another touted benefit of DAOs is transparency: as all decisions and governance actions within a DAO are recorded on the blockchain, creating an immutable and publicly accessible ledger (Das et al., 2023b; Appel and Grennan, 2023b). This real-time transparency allows any member or outsider to audit or review the organization's activities, promoting accountability, reducing the risk of opaque decision-making, and reducing information asymmetry (Cong and He, 2019; Landsman et al., 2025).[9]

While DAOs in theory offer compelling solutions to traditional governance problems, early implementations suggest that new frictions have emerged. A growing literature has begun to explore these tensions. Bakos and Halaburda (2022) argues that despite DAOs' decentralized ideal, the tradability of tokens creates a strong tendency for control to concentrate in the hands of a few entities, effectively reintroducing intermediaries. Appel and Grennan (2023a) provide an early exploration of control dynamics within DAOs, offering one of the first empirical analyses of how governance power is distributed in these digital organizations. Using data on voting outcomes across major DAOs, they highlight the tension between theoretical decentralization and the practical concentration of control, showing that a small number of large token holders can exert disproportionate influence over governance decisions. This foundational study illustrates how centralized control can emerge even in systems designed to be decentralized, setting the stage for subsequent research on DAO governance structures and their implications for organizational efficiency and fairness. Appel and Grennan (2023b) complements this perspective by finding that features promoting inclusivity and security are associated with positive abnormal returns, whereas barriers to proposal adoption correspond to negative returns, suggesting that distinctive governance features can significantly affect organizational value.

Han et al. (2025) and Ferreira and Li (2024) deepen this line of inquiry by systematically reviewing DAO voting data across multiple ecosystems and providing evidence of whale dominance, where a small number of large token holders can unilaterally sway outcomes. They also highlight issues of off-chain coordination asymmetries, where information advantages outside the protocol—such as private group chats or venture capital networks—create unequal influence and undermine the ideal of flat, permissionless governance. Additionally, these studies document persistent strategic voting behaviors, including

[9] See Lee et al. (2024) and Luo et al. (2024) for blockchain adoption benefits in the corporate setting.

vote-buying and delegation patterns that entrench incumbents, which together complicate the narrative that DAOs naturally achieve genuine decentralization or fair collective choice. Taken together, these insights show that while DAOs innovate on governance mechanics, they also face enduring challenges in realizing democratic and distributed control.

Complementing these structural concerns, Laturnus (2023) provides evidence from over 2,000 DAOs showing that while ownership concentration has little predictive power for DAO performance, voting participation—particularly by small holders—is significantly associated with higher valuations and growth. Fritsch et al. (2024), Jiang and Li (2024) and Fracassi et al. (2024) corroborate these concerns with empirical analyses of voting power concentration in major DAOs like Compound and Ethereum, highlighting the persistent gap between theoretical decentralization and practical governance dynamics. Bellavitis and Momtaz (2024) expands the evidence by examining how deviations from decentralized ideals affect DAO value creation and resilience. Finally, Das et al. (2023b) contributes critical insights into how governance incentives and vote-trading behaviors can exacerbate agency conflicts, misaligning the interests of powerful insiders and minority stakeholders, and challenging the notion of equitable governance in decentralized systems.

While the existing literature has provided important insights into DAO governance structures, participation patterns, and ownership concentration, our study complements this work in several key ways. First, we examine how concentrated voting power creates conflicts of interest among stakeholders and facilitates insider trading. Second, we evaluate the extent to which these conflicts of interest affect the economic development and resilience of DeFi protocols, especially during times of crisis when effective governance is critical. Finally, we assess whether recent innovations designed to reduce voting power concentration—such as quadratic voting and delegation mechanisms—are effective in mitigating agency conflicts in a regulatory-free environment. Overall, our study provides a novel and comprehensive empirical evaluation of whether DAOs fulfill their theoretical promise of overcoming traditional organizational trade-offs or merely replicate familiar governance problems in a new technological context.

3 Setting

3.1 Institutional Details of DAOs

Decentralized Autonomous Organizations (DAOs) are a key innovation emerging from the cryptocurrency and blockchain ecosystem. They represent a new form of governance and coordination for blockchain-based projects. By encoding governance rules in smart contracts on the blockchain, DAOs automate governance processes, including submission of proposals, design of voting mechanisms, and execution of voting outcomes, removing the need for centralized management to lead the decision-making process. DAOs establish their own governance frameworks, which outline the rules and processes of decision-making. These frameworks typically specify participant eligibility, the methods used to calculate voting power for token holders, the criteria for proposal acceptance, and the mechanisms for implementing approved proposals on the blockchain. For instance, Gnosis DAO's governance framework allows any member to submit a proposal, but only members holding at least one governance token are eligible to vote.[10] Core teams of DAOs typically use online platforms, particularly social media channels such as Twitter and Discord, to facilitate communication with their members.

Decisions in DAOs are made through a token-based voting system with governance tokens as a central component. Most projects integrate governance functions into their native tokens, while others issue separate tokens for governance and utility purposes.[11] In DAOs that implement governance using frameworks like the Compound Governor contract, governance tokens need to be explicitly delegated—either to the token holders themselves (self-delegation) or to representatives—to activate their voting power. Stakeholders with (activated) governance tokens can participate in decision-making by creating and voting on proposals that determine DAOs' operations and allocation of resources, including which new products or features to develop, which budget structure, and which partnerships to find.

A DAO's governance process typically consists of four phases: forum discussion, off-chain voting, on-chain voting, and implementation. Figure 2 plots a DAO's governance process timeline. The process usually begins with an open discussion in a community forum. Here, a member (often referred to as the proposer) posts a detailed proposal outlining the intended changes or initiatives. This forum serves as a space for community members to provide feedback, ask questions, and suggest modifications to the

[10] https://docs.gnosis.io/docs/Goverance.

[11] Native tokens perform functions within each blockchain ecosystem and provide access to the platform's services.

proposal. The discussion usually takes a few days to several weeks, depending on the proposal's complexity. After incorporating feedback from the forum discussion, the proposer drafts the final version of the proposal. This draft is then submitted for voting. In some DAOs, an initial voting round may occur off-chain using platforms like Snapshot. Off-chain voting is typically gas-free, making it a cost-effective way for members to express their preferences. DAOs can set up voting strategies to calculate the number of votes for each voter based on the number of governance tokens in their linked wallets prior to the proposal creation date. Typically, the more tokens an investor holds, the more vote power they have. This stage usually lasts for 3-7 days. The proposal may move to the on-chain voting phase if it gains sufficient preliminary support. DAO members' votes are submitted as transactions during this phase and recorded directly on the blockchain. Once a proposal achieves a quorum and receives a majority of affirmative votes to pass, it is implemented through smart contracts, ensuring that the decisions made by the community are enforced without requiring a centralized authority.

[Figure 2]

DAOs can implement governance through either off-chain voting, on-chain voting, or a combination. In a hybrid voting scheme, off-chain voting is commonly used as a preliminary phase to gauge the community's stance on a proposal. Only proposals that pass this initial stage move on to on-chain voting. In some DAOs, representatives or trusted members may replicate the results of off-chain votes onto the blockchain to trigger the execution of smart contracts while saving transaction fees associated with on-chain activity. Therefore, for DAOs using off-chain voting, substantive decision-making often occurs during the off-chain phase. In contrast, the on-chain phase is primarily used to formalize and implement the outcome.

3.2 Data and Sample

To provide an empirical investigation of the governance in DAOs, we draw data from several sources. Information on DAO proposals and voting records is obtained from Snapshot, a popular off-chain voting platform that allows DAOs to create proposals and manage votes without gas fees. We start by downloading all DAOs available on Snapshot as of September 1, 2023. Given that Snapshot allows anyone to create and feature a DAO on its voting platform, most DAOs listed are relatively small and lack substantive underlying business activities. Therefore, we only keep DAOs with native ERC-20 tokens listed on

CoinGecko, which resulted in a reduced sample of 342 DAOs. Each DAO's Snapshot page lists proposal manager accounts (wallet addresses) that have been granted high-level permission to manage the space and its proposals. They are likely core team members engaged in the DAO's internal operations. Since the governance rules of DAOs are enforced by smart contracts, any operational changes, even minor ones, necessitate the creation of a proposal. We only keep proposals with the number of votes in the top quartile for each DAO to focus on most impactful governance activities. Finally, we ended up with 2,988 proposals in 216 DAOs on Snapshot during 2020-2024. Information on proposals includes a DAO's name, proposal title, body, and timeline (i.e., created date, start and end date of voting), voting strategy, number of votes cast, and scores for each option.

Next, we retrieve information on voting records from Snapshot using its API, which contains the addresses of voters, each voter's voting power, and selected choice. Moreover, we gather delegation data on the sample DAOs from Snapshot's delegation panels. Each delegate listed on the delegation panel provides information such as their wallet address, a statement regarding their role or intentions, the number of delegations they have received, and their total voting power. However, Snapshot's panels only display delegations facilitated through their platform. A subsample of DAOs adopts a hybrid voting scheme that combines both off-chain and on-chain voting. To account for delegations facilitated through smart contracts on the blockchain, we supplement this data with information from Tally, a popular on-chain governance platform.

To study the behavior of governance participants around proposal events, we complement the DAO voting data with on-chain transactions from BigQuery, a publicly available parsed Ethereum dataset. The dataset compiles transaction-level data covering token address, sender address, recipient address, transaction time, number of tokens transferred, and transaction hash (transaction identifier) for each on-chain transaction. We aggregate transaction volume at the daily level for each native token in our sample. We focus on on-chain volume because on-chain volume is recorded and validated on the blockchain through consensus mechanisms, ensuring high security and immutability. In contrast, off-chain volume occurs outside the blockchain and is susceptible to manipulation (Amiram et al., 2020; Cong et al., 2023). Finally, we collect price information on DAOs' native tokens from CoinMarketCap, a leading platform for tracking the market data of crypto assets. CoinMarketCap aggregates trading information from over 200 crypto exchanges, offering daily data on opening, closing, high and low prices, volume, and market capitalization (in dollars) for over 10,000 crypto assets. CoinMarketCap includes active and defunct cryptocurrencies, which helps mitigate survivorship bias (Liu and Tsyvinski, 2021). We merge DAO voting data with on-chain transactions and token price data using the token address.

4 Governance Concentration

4.1 Governance Proposals

Table 1 presents summary statistics on the characteristics of DAOs and governance proposals in our sample. On average, a typical DAO has 13.83 significant proposals listed on Snapshot. Approximately 46% of DAOs maintain an open discussion forum. Proposal initiation is concentrated, with an average of only four members submitting all proposals within a DAO. Although most investors are eligible to propose governance actions, a large share of proposals are submitted by a small subset of investors, highlighting centralization in proposal creation. Regarding proposal characteristics, the average voting period is 5.3 days, and proposals contain a combined title and body length of roughly 374.8 words. On average, 2,369 voters cast votes on each proposal, with most proposals passing by a high support ratio of 84.4%. Proposals typically employ three voting strategies to calculate the voting power of token holders. Among these, 38.8% of proposals adopt a delegation strategy, while 1.2% use quadratic voting.

We classify proposals into five categories based on their content, following the framework developed by Appel and Grennan (2023b): Finance, Governance, Management, Tokenomics, and Viability. Proposals can belong to multiple categories. Tokenomics emerges as the most frequent category, with approximately 44% of proposals addressing infrastructure, parameter adjustments, or token supply design. Viability is also prominent, comprising 40.7% of proposals related to upgrades, maintenance, security, and similar topics, followed by Governance (32.9%) and Management (20.6%). Finance, which pertains to the allocation of treasury funds, is the least common category, represented in 16.7% of proposals.

The average participation rate—defined as the proportion of votes cast relative to the total eligible votes—is approximately 6.3% per proposal in our sample.[12] Casting an informed vote in DAO governance often requires significant time and effort, as participants must understand the complex technological and economic mechanisms underlying the organization. The resulting high cognitive and participation costs

[12] Eligible votes are estimated using the number of circulating tokens on the proposal creation date (or the closest prior date if unavailable). This estimate may be imperfect, as some proposals allow voting with multiple token types beyond the governance token or apply a conversion rate other than one-to-one between governance tokens and votes. Proposals with participation rates exceeding 100% are excluded.

discourage many token holders from voting. Moreover, while voters incur these costs, the benefits of effective governance are shared by all token holders, creating a classic free-rider problem well-documented in corporate governance research (Grossman and Hart, 1980). Additionally, unlike traditional firms where institutional investors typically have fiduciary duties to vote their shares, institutions holding DAO tokens are not subject to such regulatory obligations, contributing further to low voter turnout.

4.2 Voting Power

To evaluate the degree of centralization in DAO governance, we calculate two metrics that measure the inequality in the distribution of voting power: the Gini coefficient for votes cast on a proposal and the fraction of votes controlled by top decile voters in a proposal. As a significant portion of delegated votes are unexercised, we base our calculations on votes cast on proposals to capture the distribution of voting powers that are exercised. On average, the Gini coefficient for voting power distribution in a proposal is about 0.8. The top decile voters control 76.2% of a proposal's voting power, with the largest voter alone holding 37.5%. Blockvoters—voters with votes exceeding 5% of a proposal's total votes—collectively account for 75.7% of the voting power. Despite their decentralized architecture, DAOs exhibit a high level of centralization: voting process is dominated by a few large token holders.

By analyzing the Ethereum Name Service (ENS) names linked to the wallet addresses of the top voters or reviewing their statement in the delegation page, we identify four primary categories to which they belong: core team members, institutional investors, third-party service providers, and Key Opinion Leaders (KOLs), which may be either individuals or groups. Let's use Compound, a lending protocol, as an example to understand blockvoter's composition in DAO governance. The voter with the largest voting power in Compound is a16z, a venture capital fund specializing in crypto and Web-3 startups. The second-largest voter is Geoffrey Hayes, the CTO of Compound, followed by an active community member operating under the pseudonym TennisBowling. Another prominent voter is Gauntlet, a firm employed by Compound to offer risk management services.

The left panel of Figure 3 illustrates the evolution of voting power among the top five voters in Compound. A16z consistently holds more than twice the voting power of the second-largest voter throughout the observed period. The voting power of the second-largest voter increases over time, while the power held by other voters remains relatively stable. The composition of blockvoters varies significantly across

DAOs. While some DAOs are dominated by core team members and institutional investors, others feature a substantial proportion of blockvoters who are KOLs with specialized expertise in the crypto sector. Moreover, the evolution of voting power demonstrates considerable differences across DAOs. For instance, the right panel of Figure 3 illustrates the voting power dynamics in Arbitrum, a layer-2 scaling solution built on Ethereum. Unlike Compound, where voting power remains relatively stable among top voters, Arbitrum exhibits more dynamic and upward trends in voting power among its leading participants. This highlights the diversity in voting power trajectories across different DAOs.

[Figure 3]

Figure 4 illustrates the evolution of voting power concentration over time, where the x-axis represents the chronological order of proposals within a DAO (e.g., "1" denotes the first proposal, "2" the second, and so forth). The figure shows the average Gini coefficient and the share of voting power held by the top decile voters for the first 30 proposals. Both metrics begin at high levels and exhibit a clear upward trend as DAOs grow over time, indicating an increasing concentration of voting power.

[Figure 4]

The initial concentration of voting power can be attributed to the concentrated token allocation schemes in DAOs. According to Pantera Capital, early-stage investors and core team members receive disproportionately large allocations—approximately 28.8% and 20.6%, respectively—of the tokens distributed among eligible voters. When analyzing active voters, these groups of investors hold an even greater share due to their heightened engagement in DAO governance, which grants them substantial influence over voting outcomes.

As DAOs evolve, voting power becomes increasingly concentrated, as active token holders purchase tokens from less-engaged investors to strengthen their influence over proposal outcomes. This concentration can help mitigate the free-rider problem (Shleifer and Vishny, 1986) and reduce the costs associated with collective decision-making (Hansmann, 2000), echoing findings from the corporate governance literature. However, the absence of stringent regulatory oversight on pre-proposal token trading, combined with minimal disclosure requirements for significant ownership stakes, facilitates token accumulation by blockvoters and may exacerbate agency conflicts.

4.3 Cross-sectional Variation in DAO Governance

We next investigate the cross-sectional variation in DAO governance by examining how participation rates and the concentration of voting power differ across DAOs and proposals. To do so, we regress participation rates and concentration measures on a set of DAO- and proposal-level characteristics. Figure 5 presents the estimated coefficients with 95% confidence intervals. The analysis reveals that Yield and Lending protocols tend to have significantly lower participation rates compared to other types of protocols. Moreover, DAO size—measured by the logarithm of market capitalization—is negatively correlated with participation, suggesting that larger DAOs experience lower voter engagement. Regarding proposal-level characteristics, we find that Finance-related proposals attract significantly higher participation than other categories. Other proposal features, including proposal complexity—proxied by the logarithm of the total word count in the title and body—and proposal contentiousness—defined as a support ratio between 30% and 70%—do not exhibit a significant relationship with participation rates.

[Figure 5]

Turning to the concentration of voting power, both the Gini coefficient and the share of voting power held by the top decile of voters display consistent patterns: voting power tends to be more concentrated in larger DAOs. Among protocol types, DEXs exhibit the highest levels of concentration, while Yield protocols show the lowest. Across proposal categories, the ranking of concentration levels from highest to lowest is Finance, Governance, Management, Viability, and Tokenomics. We also find that more complex proposals are associated with higher levels of voting power concentration. Finally, contentious proposals are linked to lower concentration, and this negative relationship is statistically significant at the 10% level when measured by the share of voting power held by the top decile of voters.

5 Token Trading by Governance Participants

Next, we examine the relationship between investors' voting and trading behavior by plotting the trading activities around the proposal creation of two groups of governance participants on Snapshot—proposal managers and voters. On a DAO's Snapshot settings page, there is a list of accounts (wallet addresses) that are granted permissions to manage the space and its proposals.[13] These roles range from Admin, who can edit space settings and archive proposals, to Moderators, who can manage proposals within the space and create new ones. These proposal managers are responsible for reviewing submitted proposals and facilitating the governance process, and are likely core team members engaged in the DAO's internal operations. In addition to these addresses, we also consider voters to capture token holders with an interest in a proposal.

[Figure 6]

Figure 6 plots the average abnormal trading volume and the abnormal number of transactions by proposal managers and voters in the [-30,30] window around the creation date of a proposal. Abnormal trading volume (abnormal number of transactions) is the ratio of daily trading volume (number of transactions) to the average daily trading volume (number of transactions) from 90 days to 30 days before the creation date minus one. We observe an abnormal increase in the investors' trading of native tokens before the creation of DAO proposals. Volume increases ahead of the proposal creation by about 34% above the level in the estimation period, jumps by another 45% on the proposal creation date, and then declines to the previous level 30 days after the proposal is created. The number of transactions exhibits a similar pattern: it increases by 33% 30 days before the proposal creation and then reverts to the previous level 30 days after. This pattern indicates that proposal managers and voters start to trade native tokens more intensively approximately one month before the proposal creation.

To more rigorously compare the trading behavior of different investors surrounding proposal events, we estimate the following regression model:

$$\begin{aligned} Abvol_{i,p,t,d} = \beta_0 + \beta_1 Day[-30,-1]_{i,p,t,d} + \beta_2 VotingPeriod_{i,p,t,d} + \beta_3 Day[+1,+30]_{i,p,t,d} \\ + \theta' Controls_{i,d} + \lambda_d + \sigma_i + \epsilon_{i,p,t,d} \end{aligned} \tag{1}$$

where $Abvol_{i,p,t,d}$ represents abnormal trading volume, calculated as the percentage increase in trading volume on the trading day d relative to the average trading volume during the estimation window, which is the period from 90 to 60 days before the creation of proposal p by DAO i at time t. For each proposal, we include a time window starting 60 days before the proposal creation and extending to 30 days

[13] Space is an organization's account on Snapshot. It serves as a hub for all proposals related to the organization and a source of information for the users.

after the voting ends. We introduce several indicator variables to capture the effect of proposal events on trading volume. $Day[-30,-1]_{i,p,t,d}$ equals one for the 30 days leading up to the proposal creation and zero otherwise. $VotingPeriod_{i,p,t,d}$ equals one for days during the voting period, typically 7 days, and zero otherwise. $Day[+1,+30]_{i,p,t,d}$ equals one for the 30 days following the conclusion of voting and zero otherwise. These indicator variables capture the incremental changes in abnormal trading volume relative to the control period in the [-60, -31] window. Additionally, we control for a set of variables that may influence investor trading volume, including the logarithm of market capitalization on the trading day (*Size*), return volatility (*Return Volatility*), and abnormal return (*AbReturn*) over the [-7,-1] window before the trading day. DAO fixed effects and year-quarter fixed effects are included to account for DAO-specific characteristics and time trends.

We first estimate the regression for the total trading volume. The results are reported in column (1) of Table 2. The findings show that total trading volume increases by 16.8% in the month preceding proposal creation, remains elevated during the voting period, and increases by 22.4% in the month following the conclusion of voting. To identify the investors contributing to this volume increase, we categorize investors into passive and active investors. Active investors refer to those who play a role in advancing the proposal, including proposal managers and voters. All other investors are classified as passive. Columns (2) and (3) display the results for active and passive investors, respectively. The analysis shows active investors exhibit a more pronounced increase in trading volume around proposal events than passive investors. Specifically, active investors' trading volume increases by 48.2% before proposal creation and by 76.2% during the voting period, whereas passive investors' trading volume increases by only 19.2% and 20.1% over the same periods. The difference between these groups is statistically significant, as indicated in Column (4). Furthermore, unlike passive investors, whose trading volume peaks after the voting concludes, active investors exhibit the most significant increases in trading volume before and during the voting period, indicating their tendency to accumulate votes and influence proposal outcomes.

[Table 2]

Table 3 decomposes active investors into proposal managers and voters, and investigates their trading behavior separately. Columns (2) and (3) show that proposal managers and voters significantly increase their trading activities by 59.2% and 52.7%, respectively, in the month leading up to the creation of a proposal. This heightened trading activity intensifies during the voting period, with increases of 93.8% for proposal managers and 82.5% for voters. Following the voting period, voters display an abnormal trading volume of 37.9%. In contrast, the trading volume for proposal managers returns to a statistically indistinguishable level from the control period. Column (4) compares the estimates on the time indicators for voters and proposal managers and finds no significant differences between the two groups, suggesting that both engage in token trading around proposal events.

[Table 3]

Among voters, those with greater voting power are hypothesized to engage more in token trading before the proposal creation. In Table 4, we divide voters into deciles based on their voting power on a proposal and examine their abnormal trading volumes separately. The analysis reveals a significant disparity between the two groups: top voters exhibit abnormal trading volume increases of 52.5% before the voting period and 80.2% during the voting period, whereas bottom voters show corresponding increases of 17.9% and 33.9%, respectively. These findings are consistent with our expectations.

[Table 4]

To summarize our findings, we observe a notable increase in abnormal trading volume before proposal events, primarily driven by proposal managers and top voters who actively participate in the governance process and possess significant voting power. This unbalanced trading behavior supports the hypothesis that blockvoters accumulate voting power before proposal creation, leading to the skewed distribution of voting power in DAOs.

6 Insider Trading

Proposal managers and top voters are the most active participants in DAO governance, who frequently initiate and cast votes on proposals. Their substantial token holdings through trading before proposals grant them considerable influence over the organization's trajectory. Compared to other stakeholders, these investors often possess superior information about operational developments and the organization's future direction. We refer to them as DAO insiders hereinafter.

As documented in the corporate finance literature, officers, directors, and significant shareholders who possess material nonpublic information about a listed firm have the incentive to exploit such information advantage by buying or selling the company's securities before the information is made public

(Cohen et al., 2012; Dechow et al., 2016; Blackburne et al., 2021; Jagolinzer et al., 2020). Insider trading is prohibited in financial markets under insider trading laws. There are several reasons why insider trading may exist in the context of DAOs. First, DAOs lack a standard legal structure that subjects them to a well-defined regulatory framework (Makarov and Schoar, 2020). DAOs whose tokens are classified as securities are required to comply with SEC regulations, but the classification of DAO tokens remains contentious and open to interpretation, leaving the legal status of DAOs ambiguous. As a result, insider trading regulations typically do not apply to DAOs, leading to limited regulatory oversight in this area. Moreover, the anonymity inherent in blockchain technology complicates the identification of wallets belonging to project insiders. The inability to establish users' legal identities makes holding stakeholders accountable for their actions difficult. The absence of a regulatory framework, combined with blockchain's anonymity, exacerbates the challenge of monitoring insider transactions and reduces the legal risks associated with such activities. On the other hand, DAOs' decentralized structure disperses decision-making rights among token holders, allowing the broader community to participate directly in governance and influence the organization's direction. This dispersion of power limits the effective control insiders can exert over DAO decisions and increases their uncertainty about voting outcomes and associated market reactions, which likely mitigates their incentives to front-run. In addition, the transparency offered by blockchain technology ensures that all transactions are recorded and publicly accessible in near real-time, which diminishes the potential profitability of insider trades and harms insiders' ex-ante incentive. Based on these arguments, whether insider trading occurs in DAOs remains an open question.

6.1 Buy-Sell Imbalance Around Proposal Creation

We start examining governance participants' insider trading by analyzing their token trading behavior around the time of proposal creation. We have shown that these investors exhibit abnormal trading activities before proposal creation. These trading behaviors can be driven by either the incentive to acquire votes or insider information. The two motives yield distinct predictions regarding trading directions before proposal events. Voting power accumulation suggests increased purchases prior to proposal creation, irrespective of the proposal's expected value impact. In contrast, insider trading is associated with strategic trading behaviors: more purchases before proposals with positive CARs and more sales before proposals with negative CARs. The asymmetric trading patterns between value-enhancing and value-destroying proposals provide a framework for distinguishing between vote accumulation and insider trading. To investigate this, we first estimate market-adjusted cumulative abnormal returns (CARs) within a [-3,3] window around the proposal creation date, and categorize proposals based on whether their CARs are positive or negative. The average (median) CAR for the sample proposals is 0.040 (0.018), indicating that, on average, proposals are perceived as value-enhancing.

[Table 5]

We then examine the buy-sell imbalance of proposal managers and top voters to understand their trading directions around proposal events. Buy-sell imbalance is calculated as insiders' net purchase volume (purchase volume minus sales volume) scaled by their total trading volume on a given day. The analysis includes trading days in the [-30, 30] window around the creation dates of proposals, where we regress insiders' buy-sell imbalance on the $Day[-30,-1]$ indicator along with other control variables specified in Eq. (1), conditional on whether the proposal generates positive or negative returns. The results are presented in Table 5. For proposals with positive CARs, proposal managers exhibit a 3.9% higher buy-sell imbalance in the period before proposal creation compared to the period following it. However, for proposals with negative CARs, there is no significant difference in buy-sell imbalance before and after proposal creation. This pattern indicates that proposal managers may have mixed motives when trading tokens before proposal creation. For proposals with negative CARs, the positive effects of vote accumulation are partially offset by the negative impact of insider trading, resulting in an insignificant net effect on overall trading behavior. In contrast, top voters consistently make more purchases before proposal creation regardless of whether the proposal has positive or negative CARs, indicating their strategic accumulation of voting power to influence voting outcomes.

6.2 Profitability of Insider Trades

Short-term profitability provides another way to differentiate insider trading from vote accumulation. While insiders trade before proposal creation to capitalize on short-term gains, trades driven by vote accumulation are typically motivated by the pursuit of long-term value appreciation and may not yield significant immediate profits. Thus, we compare the short-term profitability of insider trades made in the [-30,-1] window around proposal creation to those made over the [0,30] window using the specification:

$$TradeProfit_{i,j,t,d} = \beta_0 + \beta_1 Day[-30,-1]_{i,t,d} + \theta' Controls_{i,d} + \lambda_{i,j,d} + \epsilon_{i,j,t,d} \quad (2)$$

where $TradeProfit_{i,j,t,d}$ is measured as BHAR15, the 15-day market-adjusted abnormal buy-and-hold returns (multiplied by -1 for sales) of a transaction made by investor j on trading day d, around a proposal created at time t for DAO i. $Day[-30,-1]_{i,t,d}$ is an indicator that takes the value of one if the trade occurs during the [-30,-1] window before the creation of a proposal, and zero if it occurs during the [0, +30] window following it. Besides the control variables in Eq. (1), we additionally control for $TradeSize$, which is the number of tokens traded as a percentage of the token circulating supply on a trading day. $Investor \times DAO \times YearQuarter$ fixed effects are included to facilitate the comparison of trades made by the same investor within the same DAO during the same year-quarter.

We estimate Eq. (2) for the trades made by proposal managers and top voters separately, with the results reported in Table 6. The coefficients on $Day[-30,-1]$ are positive and significant for proposal managers, as shown in columns (1) and (2). Specifically, proposal managers earn 9.5% higher market-adjusted returns when trading tokens before proposal creation. In contrast, top voters do not achieve significant short-term abnormal profits from their trades before proposal events. This finding, together with the results in Table 5, further suggests that top voters and proposal managers likely have different trading motives. The fact that top voters make more purchases before proposal creation irrespective of a proposal's price impact, and earn no significant short-term gains, supports the notion that top voters purchase tokens before proposal creation to accumulate voting power, intending to achieve voting outcomes that increase platform value and lead to token appreciation in the long run. In subsequent tests, we only include proposal managers' trades to study the factors that affect insider trading profitability.

[Table 6]

6.3 DAO Characteristics and Profitability of Insider Trades

We further explore cross-sectional variations in insider trading profitability. We expect insider trades to be more profitable in small DAOs with worse information environments, where the information asymmetry between insiders and outsiders is likely higher. We use a DAO's market capitalization as a proxy for its size and the presence of an open discussion forum for the quality of the DAO's information environment. Typically, a DAO's governance process requires a proposer to post a thread on the community's discussion forum to gather members' feedback before creating a formal proposal on Snapshot. An open discussion process is crucial as it facilitates communication among community members and reduces information asymmetry between insiders and outsiders.

We divide the DAOs into two groups based on whether they have an open discussion forum, and whether their size, proxied by market capitalization, is in the top or bottom quartile of the sample DAOs. We re-estimate Eq. (2) for each subgroup of DAOs. The results are reported in column (1)-(4) of Table 7. Our results show that proposal managers in DAOs without a discussion forum and DAOs whose size is in the bottom quartile earn 66.3% and 94.7% higher abnormal returns than the sample average.[14] Furthermore, the number of insider trades around proposal events is larger in smaller DAOs and in DAOs without a discussion forum, consistent with a better information environment deterring insider trading.

[Table 7]

Furthermore, we expect insider trades to be more profitable in DAOs with concentrated voting power. The significant influence exercised by large investors reduces the uncertainty of voting outcomes, potentially translating into increased profitability of insider trades. To test this hypothesis, in columns (5) to (8) of Table 7, we divide DAOs into two groups based on whether their average Gini coefficient of voting power distributions in proposals or the average fraction of voting power held by top decile voters, falls into the top or bottom quartile of the sample. We find more insider trades and greater abnormal returns on these trades in DAOs where voting power is more concentrated.

6.4 Effects of Voting Strategies

The challenges associated with decentralized governance have garnered significant attention, prompting various mechanisms aimed at addressing issues such as low participation rates and concentrated voting power. One such mechanism is the delegation strategy, which allows community members to delegate their voting power to a representative who votes on their behalf. Delegates are held accountable to the members who have entrusted their votes, and members can revoke or reassign their delegation if they are dissatisfied with the delegate's performance. This strategy enables members who may lack the time or expertise to participate in every decision to still have their interests represented, thereby enhancing overall participation and engagement in the DAO's governance. Fan et al. (2024) evaluates the effectiveness of vote delegation mechanisms in DAOs and provides evidence that token holders actively monitor delegates and align their incentives through delegation. Therefore, delegation is anticipated to reduce the

[14] The calculation is as follows: $(0.158 - 0.095)/0.095 = 0.663$ and $(0.185 - 0.095)/0.095 = 0.947$.

insiders' ability to exploit private information. Additionally, quadratic voting is designed to overcome the limitations of traditional one-token-one-vote systems by scaling the voting power to the square root of the voter's token holdings. For example, investors with 100 tokens are granted 10 votes. By making voting power a concave function of token holdings, quadratic voting helps to protect minorities and reduce the influence of blockvoters on voting outcomes, therefore mitigating insider trading.

To evaluate the effectiveness of the two strategies, we identify proposals that utilize either the delegation or quadratic voting strategy and estimate Eq. (2) for trades made by proposal managers surrounding these proposals, compared to those associated with proposals that do not employ these strategies. As reported in Table 8, both strategies effectively reduce the profitability of insider trading. After employing the delegation (quadratic voting) strategy, abnormal returns decline from 9.7% (9.5%) to levels statistically indistinguishable from zero. These findings suggest that insider trading in decentralized governance systems can be mitigated by adopting well-designed voting mechanisms that either enhance community oversight or limit the voting power of large stakeholders.

[Table 8]

6.5 Insider Trading of External Tokens

To further separate insider trading from vote accumulation, we leverage the unique setting of a lending protocol, Compound, where the value of its interest-bearing tokens (cTokens) is influenced by proposals but do not confer any voting rights. Compound is a decentralized, Ethereum-based lending protocol that enables users to lend and borrow cryptocurrency assets. When lenders supply cryptocurrency assets to the platform's liquidity pools, they receive cTokens in return for the assets they deposit, representing their share of the liquidity pool. These cTokens accrue interest through an exchange rate mechanism: over time, each cToken can be redeemed for an increasing amount of the underlying asset. Lenders earn interest by redeeming cTokens for more underlying assets based on the exchange rate at the time of redemption. This exchange rate, automatically adjusted by the protocol, depends on the supply and demand of the underlying asset within the pool and can be altered through the governance process. While the value of cTokens is affected by governance proposals, cTokens do not grant voting power, annlowing us to differentiate informed trades from those motivated by voting power accumulation.

[Figure 7]

Taking advantage of this setting, we investigate whether voters in Compound trade cTokens whose value is influenced by a proposal before the proposal is posted. Compound has an open discussion forum where a proposer must post a thread before creating a formal proposal for on-chain voting. As illustrated in Figure 7, the number of cToken transactions by voters rises by about 6.5 times approximately six days before the forum thread is created, followed by a decline back to previous levels within six days after the discussion date, providing evidence of informed trading.[15]

7 Consequences of Conflicts of Interest

Thus far, we have shown that proposal managers and top voters engage in abnormal trading activities before proposal creation, driven both by the intention to accumulate voting power and by insider trading motives. If a DAO consistently exhibits high levels of abnormal trading before proposal events, it may indicate that its members are more aggressively engaging in insider trading or competing for voting power. Such behavior reflects conflicts of interest within the DAO. These conflicts of interest are likely to result in detrimental real consequences for the DAO's overall performance.

7.1 Identification Strategy

To assess the impact of conflicts of interest on DAO performance, we use a popular metric in the crypto sector—Total Value Locked (TVL), which refers to the total value of digital assets locked or staked in a decentralized finance (DeFi) protocol. We examine how conflicts of interest influence a DAO's TVL, mainly when governance quality is prominent. Specifically, we investigate how the TVL of DAOs with varying levels of conflicts of interest changes during two market-wide adverse shocks: the Terra-Luna crash and the FTX collapse.

Luna is the native token of the Terra blockchain. In May 2022, TerraUSD (UST), an algorithmic stablecoin that was designed to maintain a $1 peg to the US dollar through a mint-and-burn mechanism involving Luna, lost its peg and caused a massive sell-off, leading to Luna's hyperinflation and a crash in price. The Luna network collapse, the largest crypto crash ever, entails an estimated $60 billion wipeout.

[15] Although cTokens can be transferred and traded like other ERC-20 tokens, price data for cTokens is not available on CoinMarketCap. Therefore, we cannot directly test the profitability of these cToken trades. A viable alternative for assessing the economic benefits of insider trading with cTokens is to gather data on deposit and borrowing interest rates from transaction logs in blockchain records. This remains a future task on our research agenda.

FTX was a major cryptocurrency exchange founded by Sam Bankman-Fried. In November 2022, it was revealed that its sister company, Alameda Research, had heavily used FTX customer funds to cover its risky investments, causing a liquidity crisis. The exchange filed for bankruptcy after failing to meet customer withdrawal demands, leading to widespread losses and triggering broader concerns across the crypto industry regarding governance and financial management. The crypto market reacted sharply to the Luna crash and the FTX collapse, causing a substantial drop in prices and trading volumes for a wide range of crypto assets.

We hypothesize that DAOs with higher levels of conflicts of interest are more adversely affected, as investors may perceive these DAOs as having greater exposure to governance risk.

7.2 Analysis and Results

To evaluate this, we categorize DAOs into two groups based on whether their average abnormal trading volume in the month preceding proposal creation dates is above or below the sample median. Figure 8 illustrates the average daily TVL (logarithmic scale) for the two groups of DAOs over a [-60,60] window surrounding the Luna crash and FTX collapse. Overall, DAOs with higher levels of conflicts of interest exhibit lower TVL. Following these shocks, both groups experience a significant decline in TVL, with the reduction being more substantial for DAOs with greater levels of conflicts of interest.

[Figure 8]

To quantify the difference between the two groups, we estimate the following DID model:

$$\begin{aligned} \ln(TVL_{i,j,t}) = \beta_0 + \beta_1 Treatment_{i,j} \times Post_t + \beta_2 Treatment_{i,j} + \beta_3 Post_t \\ + \theta' Controls_{i,j,t} + \lambda_j + \epsilon_{i,j,t} \end{aligned} \tag{3}$$

where $\ln(TVL_{i,j,t})$ represents the natural logarithm of the Total Value Locked (TVL) for DAO i in category j on day t. The variable $Treatment_{i,j}$ is an indicator that equals one if DAO i's average abnormal trading volume before proposal creation is above the median of the sample, and zero if it is below the median. $Post_t$ is an indicator that equals one if day t is within the [0,60] window following either the Luna crash on May 9, 2022, or the FTX collapse on November 8, 2022, and zero if it is in the [-60,-1] pre-event window. We also control for several variables that may influence a DAO's TVL, including the number of blockchains on which a DAO operates ($NumofChains$), the logarithm of market capitalization ($Size$), and the daily return ($Return$). We include category fixed effects to control for differences across DAO types, which include decentralized exchanges (DEX), Lending, Yield, Staking, Derivatives, Indexes, Services, and Others.

[Table 9] [Figure 9]

Based on the estimates presented in Table 9, DAOs with higher conflicts of interest experience significantly larger decreases in TVL following the two market shocks. Specifically, these DAOs suffered an 18.9% (44.6%) greater decline in TVL after the Luna crash (FTX collapse) compared to DAOs with lower levels of conflicts of interest. Although Figure 8 shows that DAOs with higher levels of conflicts of interest generally have lower TVLs, the positive coefficients on the $Treatment$ suggest that after controlling for market capitalization and other variables, these DAOs initially have higher TVLs. The negative coefficients on $Post$ in both columns show that these market shocks negatively impacted the TVL of all DAOs. To explore how the effect unfolds over time, we disaggregate the $Post$ variable into weekly indicators from four weeks before the shocks up to seven weeks after. The coefficients on the interactions between the time indicators and the $Treatment$ dummy are plotted in Figure 9, revealing no significant pre-shock trends consistent with the parallel trend assumption. The adverse effects begin immediately after the Luna crash and four weeks after the FTX collapse, persisting throughout the sample period. This analysis suggests that DAOs with elevated levels of conflicts of interest are more vulnerable to negative market shocks than their counterparts with lower levels of conflicts of interest.

8 Robustness Checks

This section presents a series of robustness checks to evaluate the reliability and validity of our main findings. First, rather than using the proposal creation date on Snapshot as the event date, we use the date the proposal was first posted in the community discussion forum when available.[16] While this earlier date carries some uncertainty — since not all proposals ultimately reach the voting stage — it marks the first point at which the information is disclosed. We regress the abnormal trading volume on a series of time dummies and control variables, and replicate the tests in Table 2 – 4. The results are reported in Table

[16] Discussion dates are available for 574 out of 2,988 proposals, accounting for roughly one-fifth of the sample.

A1 and A2.[17] The findings closely mirror those in our main tables. Total trading volume increases by approximately 15.3% in the month prior to the proposal's posting in the discussion forum. This increase is more pronounced among active investors relative to passive investors (49.3% vs. 17.5%). Among active participants, proposal managers and top voters are the main drivers of the spike, whose trading volume rises by 62.2% and 58.2%, respectively. In contrast, voters in the bottom quartile show only a modest increase of 17%.

Next, we use the abnormal number of transactions as an alternative measure of investor trading behavior, which captures the frequency of trades rather than their size. The results, reported in Tables A3 and A4, continue to show elevated trading activity prior to proposal creation: the total number of transactions increases by approximately 13.3% in the month leading up to the proposal creation. Active investors show a more pronounced increase than passive investors (24.2% vs. 15%). However, when we further decompose active investors into proposal managers, top voters, and bottom voters, the patterns becomes a little different. Top voters exhibit the largest increase in transaction frequency, followed by bottom voters. In contrast, proposal managers, despite showing a substantial rise in overall trading volume, only increase their number of transactions moderately (by 18.5%). This suggests that proposal managers tend to increase the size of trades rather than trading more frequently. Taken together, these findings offer deeper insights into the trading behaviors of different investor groups around the time of proposal creation.

In Table A6, we examine the economic consequences of conflicts of interest in DAOs using the alternative proxy — the average abnormal number of transactions in the month preceding proposal creation. DAOs are classified into two groups based on whether their values fall above or below the sample median. The results are consistent with those in Table 9. In particular, the interaction terms remain significantly negative for both the Luna crash and the FTX collapse. Coefficients on the control variables also closely resemble those reported in Table 9, reinforcing the robustness of our findings to alternative measures of trading activity.

We also employ an alternative measure of short-term profits in Eq. 2. We replace *BHAR15* with *BHAR30*, which extends the buy-and-hold period to 30 days. The results, shown in Table A5, are broadly consistent with those in Table 6: proposal managers continue to earn significant abnormal returns, while top voters do not generate abnormal profits. This contrast underscores potential differences in the trad-

[17] To save space, we remove the duplicate columns in Table 2 – 4, and consolidate the results into two tables.

ing motives of the two groups of investors. Notably, proposal managers earn higher returns over the longer holding period — achieving a 14.6% market-adjusted abnormal return from trades made prior to proposal creation, compared to those made after. Taken together, these robustness checks support the validity of our main findings and demonstrate that they are not driven by specific methodological choices.

9 Conclusion

Our findings reveal that, contrary to the promise implied by the "D" in DAOs, governance in these organizations is often centralized, characterized by low participation rates and highly concentrated voting power. Corporate governance theory helps explain this centralization, suggesting it can arise naturally from free-rider problems and coordination costs. Our analysis shows that governance participants, including proposal managers and top voters, engage in abnormal trading activity before proposal creation. A particularly concerning implication of this centralized power structure is the prevalence of insider trading, whereby influential stakeholders exploit informational advantages to extract wealth from less-informed token holders. The profitability of insider trading is especially pronounced in smaller DAOs with poorer information environments and more concentrated voting power, where insiders possess greater informational advantages and influence over outcomes.

The broader implications of our findings highlight the potential for conflicts of interest to undermine DAO stability, particularly during periods of market-wide stress. DAOs with higher levels of conflicts of interest experience significantly larger declines in Total Value Locked (TVL) following major market shocks. Recent market innovations aimed at limiting voting power accumulation—such as quadratic voting and delegation mechanisms—appear to offer promising avenues for mitigating conflicts of interest. Overall, our study highlights the critical importance of addressing conflicts of interest in DAO governance and emphasizes the need for effective mechanisms that promote community oversight and participation.

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Figures

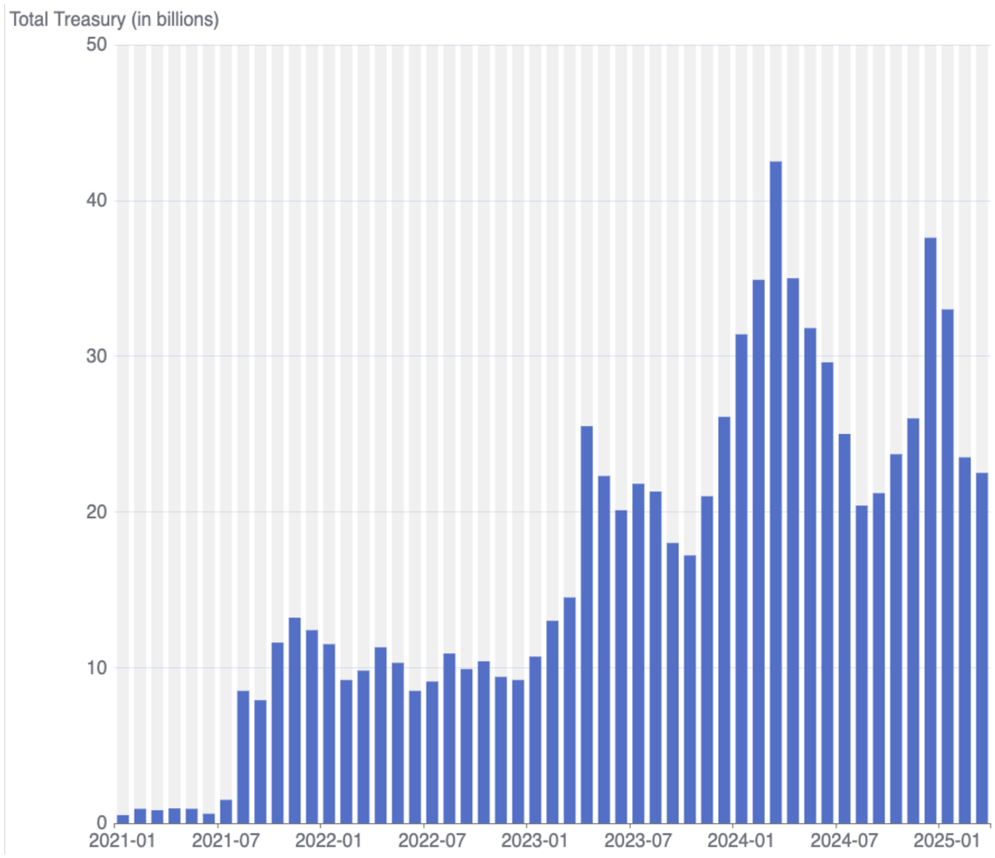


Figure 1. DAOs' Total Treasury.
The figure depicts the monthly total assets owned (in billions) and managed by DAOs listed on DeepDAO from January 2021 to March 2025.

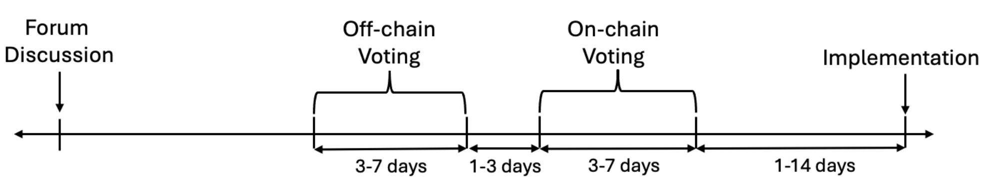


Figure 2. Timeline of DAOs' Governance Process.
The figure illustrates the typical timeline of DAOs' governance process and the intervals between each phase.

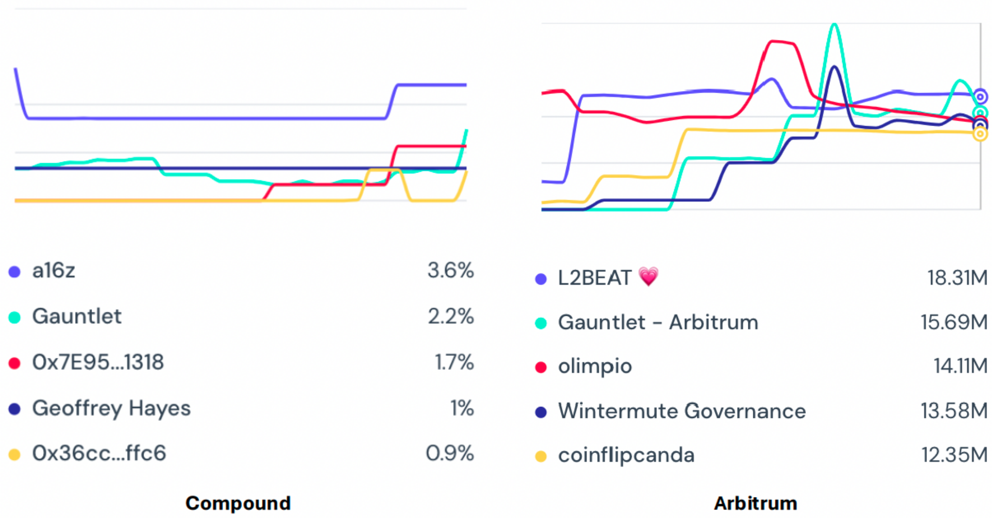


Figure 3. Evolution of Voting Power by Top Delegates.
The figure is a snapshot from Tally, which illustrates the monthly evolution of voting power held by the top five delegates in Compound and Arbitrum, respectively, from their listing on Tally (March 1, 2022, for Compound and March 1, 2023, for Arbitrum) through December 1, 2024.

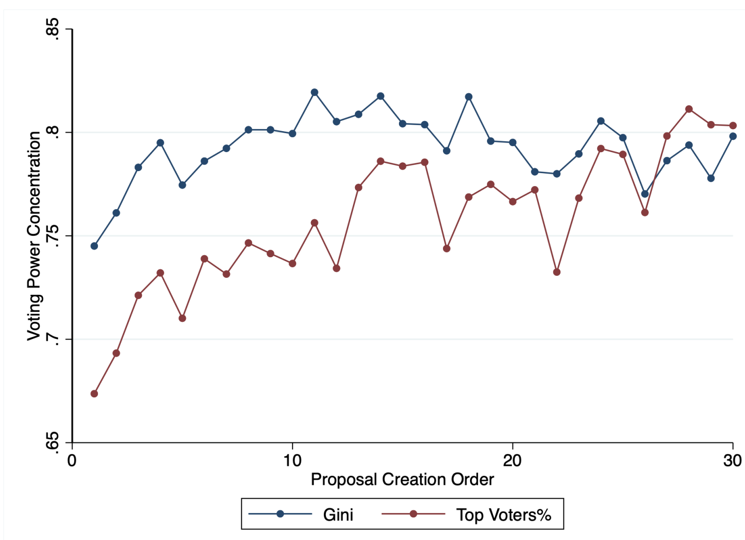
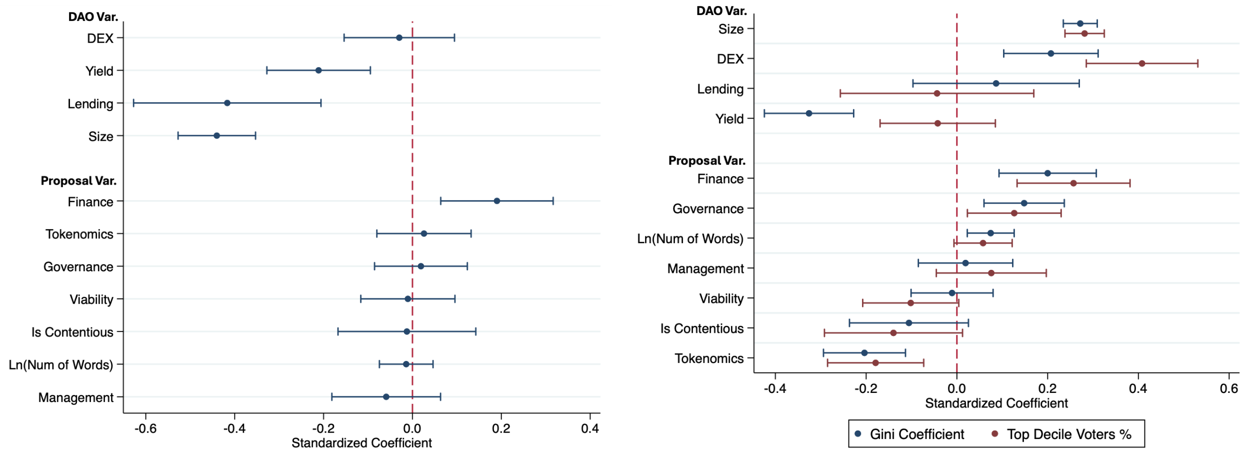


Figure 4. Evolution of Voting Power Concentration.
The figure shows the average Gini coefficient and the share of voting power held by the top decile voters for the first 30 proposals in sample DAOs. The x-axis represents the chronological order of proposals within a DAO (e.g., 1 denotes the first proposal, 2 the second, and so forth).



(a) Participation Rate

(b) Voting Power Concentration

Figure 5. Governance across DAOs/Proposals
The figure plots the standardized coefficients with 95% confidence intervals from regressions of participation rates (Panel (a)) and concentration measures (Panel (b)) on DAO- and proposal-level characteristics.

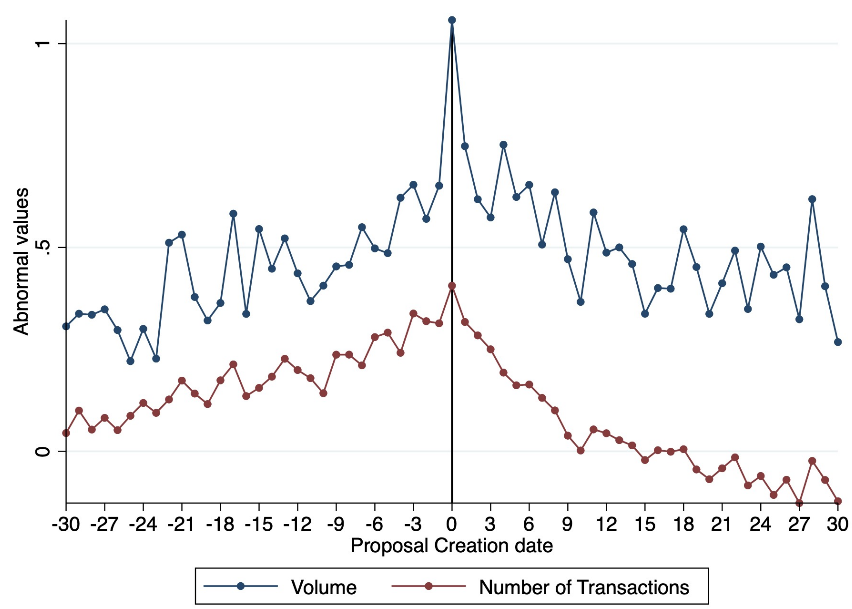


Figure 6. Abnormal Trading Volume and Number of Transactions around Proposal Creation Date.
The figure plots the average abnormal trading volume and abnormal number of transactions of proposal managers and voters on days around the creation date of proposals with votes in the top quartile in a sample DAO. Abnormal trading volume (abnormal number of transactions) is the ratio of daily trading volume (number of transactions) to the average daily trading volume (number of transactions) from 90 days to 30 days before the proposal creation minus one.

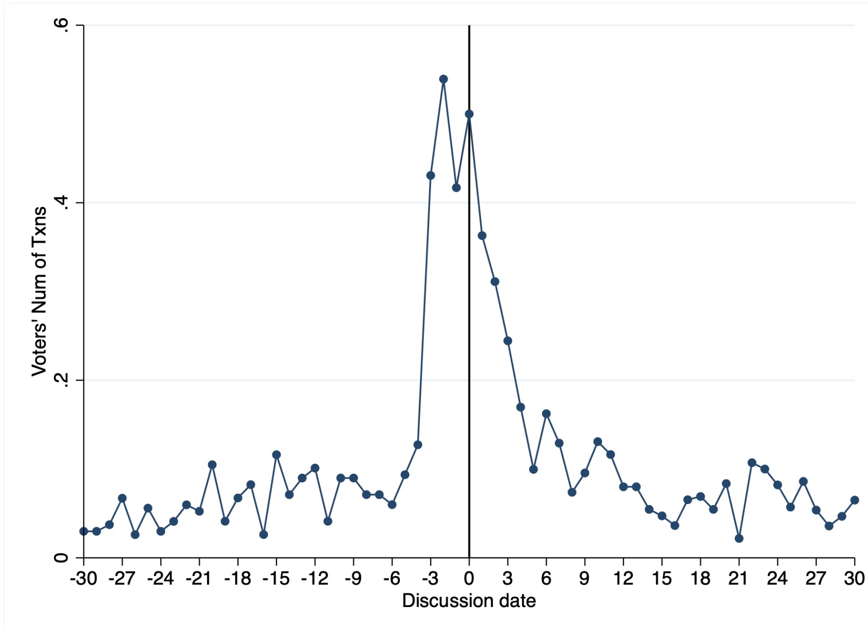


Figure 7. Voters' Number of Transactions around Compound Proposal Creation.
The figure plots Compound voters' average number of transactions of cTokens around the discussion date of proposals.

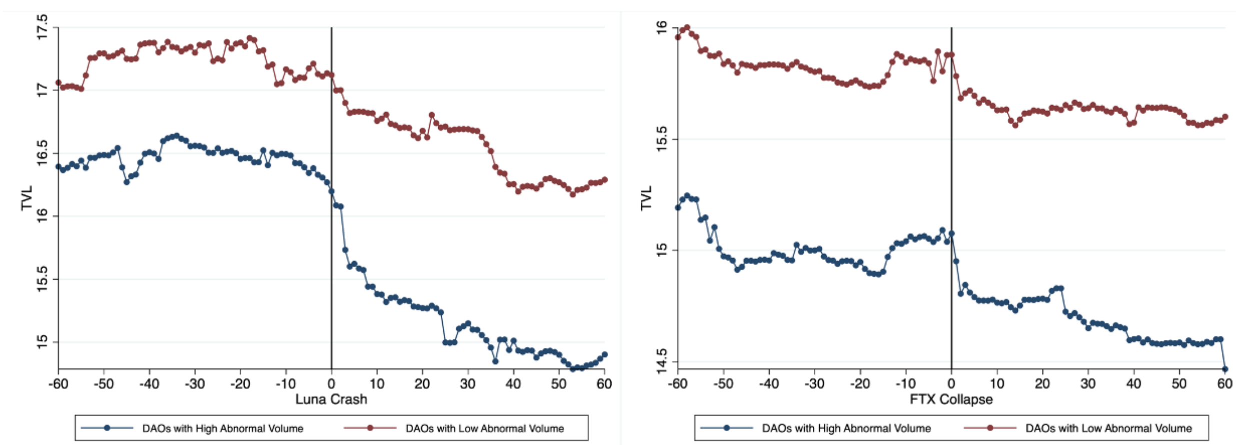


Figure 8. TVL around Luna/FTX Crash.
The figure plots the average daily TVL of two groups of DAOs – DAOs with average abnormal trading volume in the one month before proposal creation dates above or below the sample median – in the [-60d, 60d] window around the Luna crash or FTX collapse.

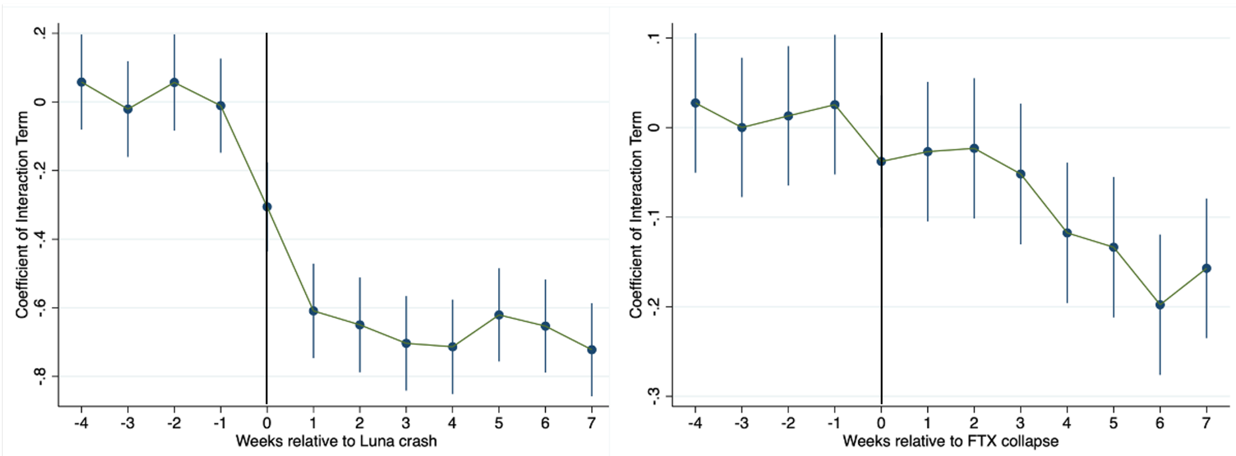


Figure 9. Parallel Trend and Dynamic Effect of Luna/FTX Crash.
The figure plots the estimated coefficients on the interaction terms of Treatment and week dummies from a Difference-in-Difference (DID) model in which the dependent variable is DAOs' daily TVL. The sample consists of days in the [-60, 56] window around two negative market shocks – Luna crash and FTX collapse – for all the DAOs with TVL data on Defillama. DAOs are divided into quartiles based on their average abnormal trading volume in the two weeks before proposal creation dates. Treatment is an indicator that equals one if a DAO is in the top quartile, and zero if a DAO is in the bottom quartile. Week dummies take the value of one for days in the week, and zero otherwise.

Tables

Table 1. Summary Statistics.
The table reports the summary statistics of the variables in the sample. All the variables are defined in Appendix A.

	Obs.	Mean	SD	Min	Median	Max
DAO Characteristics:						
Number of Proposals per DAO	216	13.833	33.313	1.000	5.000	392.000
Num of Creators per DAO	216	3.870	5.317	1.000	2.000	40.000
Has Forum	216	0.458	0.499	0.000	0.000	1.000
Proposal Characteristics:						
Duration	2,988	5.306	3.226	0.000	5.000	16.000
Num of Words	2,988	374.831	404.595	2.000	237.000	2,771.000
Num of Voters	2,988	2,369.180	27,217.686	2.000	86.000	510,523.000
Support Ratio of Winning Option	2,988	0.844	0.243	0.027	0.991	1.000
Num of Voting Strategies	2,988	3.013	2.331	1.000	2.000	8.000
Delegation	2,988	0.388	0.487	0.000	0.000	1.000
Quadratic Voting	2,988	0.012	0.108	0.000	0.000	1.000
Finance	2,988	0.167	0.373	0.000	0.000	1.000
Governance	2,988	0.329	0.470	0.000	0.000	1.000
Management	2,988	0.206	0.405	0.000	0.000	1.000
Tokenomics	2,988	0.440	0.496	0.000	0.000	1.000
Viability	2,988	0.407	0.491	0.000	0.000	1.000
Participation Rate	2,554	0.063	0.115	0.000	0.022	0.994
Gini	2,900	0.801	0.202	0.000	0.863	0.999
Top Decile Voters (%)	2,569	0.762	0.230	0.029	0.828	1.000
Blockvoters (%)	2,900	0.762	0.240	0.000	0.839	1.000
Largest Voter (%)	2,900	0.375	0.242	0.002	0.312	1.000
Daily Market Metrics:						
Abvol	252,331	0.305	2.604	−1.000	−0.394	24.402
Size	252,331	17.844	3.794	0.000	18.457	23.641
AbReturn	252,331	0.001	0.191	−1.037	−0.023	6.099
Return Volatility	252,331	0.093	1.471	0.000	0.049	80.394
Trade Size	244,334	0.046	0.151	0.000	0.012	8.590
TVL	117,846	355.222	1,175.815	0.000	18.542	8,724.258
Insider Trades:						
BHAR15	374,326	−0.024	0.484	−5.994	−0.016	5.975

Table 2. Abnormal Trading around Proposal Creation.
The table reports the estimates from OLS regressions of abnormal trading volume of DAOs' native tokens for different groups of investors. The sample consists of trading days from 60 days before the creation date of a proposal to 30 days after the voting end date of the proposal for all proposals with votes in the top quartile in a sample DAO. The dependent variable is *Abvol*, which is the ratio of daily trading volume to the average daily trading volume from 90 days to 60 days before the proposal creation minus one. *Day[-30,-1]* is an indicator that takes the value of one for trading days in the [-30,-1] window before the proposal creation, and zero otherwise. *Voting Period* is an indicator that takes the value of one for trading days in the voting window, and zero otherwise. *Day[+1,+30]* is an indicator that takes the value of one for trading days in the [+1,+30] window after the voting end date, and zero otherwise. Trading days in the [-60,-31] window are used as the control period. All the control variables are defined in Appendix A. Column (1) presents the estimates for all investors' abnormal trading volume. Column (2) presents the estimates for the abnormal trading volume of active investors involved in advancing the proposal, including proposal managers listed in the administrator section on the DAO's Snapshot page and individuals who cast votes on the proposal. Column (3) presents the estimates for the abnormal trading volume of all other investors, classified as passive investors. Differences between the coefficients in column (2) and (3) are displayed in column (4). The regressions control for year-month fixed effects and DAO fixed effects. The standard errors are clustered by DAO. P-values are reported in parentheses. The symbols *, **, and *** denote significance at the 10%, 5%, and 1% levels, respectively.

	(1) All Investors	(2) Active Investors	(3) Passive Investors	(4) Diff.(2)-(3)
Variables of interest:				
Day[−30,−1]	0.168**	0.482***	0.192**	0.290***
	(0.033)	(0.000)	(0.049)	(0.001)
Voting Period	0.176**	0.762***	0.201*	0.561***
	(0.047)	(0.000)	(0.067)	(0.000)
Day[+1,+30]	0.224**	0.422***	0.263**	0.159*
	(0.026)	(0.001)	(0.039)	(0.075)
Controls:				
Size	−0.022	−0.052	−0.020	
	(0.487)	(0.281)	(0.539)	
Return Volatility	0.019**	0.014*	0.019**	
	(0.014)	(0.057)	(0.022)	
AbReturn	0.870***	0.720**	0.992***	
	(0.000)	(0.039)	(0.001)	
Year-Month FE	Yes	Yes	Yes	
DAO FE	Yes	Yes	Yes	
Adj. R^2	0.101	0.030	0.099	
Obs.	252,331	245,075	252,156	

Table 3. Active Investors' Abnormal Trading around Proposal Creation.
The table reports the estimates from OLS regressions of abnormal trading volume of DAOs' native tokens for different groups of active investors. The sample consists of trading days from 60 days before the creation date of a proposal to 30 days after the voting end date of the proposal for all proposals with votes in the top quartile in a sample DAO. The dependent variable is *Abvol*, which is the ratio of daily trading volume to the average daily trading volume from 90 days to 60 days before the proposal creation minus one. *Day[-30,-1]* is an indicator that takes the value of one for trading days in the [-30,-1] window before the proposal creation, and zero otherwise. *Voting Period* is an indicator which takes the value of one for trading days in the voting window, and zero otherwise. *Day[+1,+30]* is an indicator which takes the value of one for trading days in the [+1,+30] window after the voting end date, and zero otherwise. Trading days in the [-60,-31] window are used as the control period. All the control variables are defined in Appendix A. Column (1) presents the estimates for the abnormal trading volume of active investors involved in advancing the proposal, including proposal managers listed in the administrator section on the DAO's Snapshot page and individuals who cast votes. Columns (2) and (3) present the estimates for proposal managers' and voters' abnormal trading volume, respectively. Differences between the coefficients in column (2) and (3) are displayed in column (4). The regressions control for year-month fixed effects and DAO fixed effects. The standard errors are clustered by DAO. P-values are reported in parentheses. The symbols *, **, and *** denote significance at the 10%, 5%, and 1% levels, respectively.

	(1) Active Investors	(2) Proposal Managers	(3) Voters	(4) Diff.(2)-(3)
Variables of interest:				
Day[−30,−1]	0.482***	0.592*	0.527***	0.065
	(0.000)	(0.087)	(0.000)	(0.860)
Voting Period	0.762***	0.938**	0.825***	0.113
	(0.000)	(0.028)	(0.000)	(0.794)
Day[+1,+30]	0.422***	0.773	0.379***	0.394
	(0.001)	(0.182)	(0.000)	(0.504)
Controls:				
Size	−0.052	−0.579**	−0.026	
	(0.281)	(0.019)	(0.546)	
Return Volatility	0.014*	0.141***	0.009	
	(0.057)	(0.000)	(0.159)	
AbReturn	0.720**	2.088**	0.567*	
	(0.039)	(0.044)	(0.071)	
Year-Month FE	Yes	Yes	Yes	
DAO FE	Yes	Yes	Yes	
Adj. R^2	0.030	0.041	0.029	
Obs.	245,075	136,886	234,366	

Table 4. Voters' Abnormal Trading around Proposal Creation.

The table reports the estimates from OLS regressions of abnormal trading volume of DAOs' native tokens for different groups of voters. The sample consists of trading days from 60 days before the creation date of a proposal to 30 days after the voting end date of the proposal for all proposals with votes in the top quartile in a sample DAO. The dependent variable is *Abvol*, which is the ratio of daily trading volume to the average daily trading volume from 90 days to 60 days before the proposal creation minus one. *Day[-30,-1]* is an indicator that takes the value of one for trading days in the [-30,-1] window before the proposal creation, and zero otherwise. *Voting Period* is an indicator which takes the value of one for trading days in the voting window, and zero otherwise. *Day[+1,+30]* is an indicator which takes the value of one for trading days in the [+1,+30] window after the voting end date, and zero otherwise. Trading days in the [-60,-31] window are used as the control period. All the control variables are defined in Appendix A. Column (1) presents the estimates for the abnormal trading volume of all voters who cast votes on the proposal. Column (2) presents the estimates for the abnormal trading volume of voters whose voting powers are in the top decile among all voters. Column (3) presents the estimates for the abnormal trading volume of voters whose voting powers are in the bottom decile among all voters. Differences between the coefficients in columns (2) and (3) are displayed in column (4). The regressions control for year-month fixed effects and DAO fixed effects. The standard errors are clustered by DAO. P-values are reported in parentheses. The symbols *, **, and *** denote significance at the 10%, 5%, and 1% levels, respectively.

	(1) Voters	(2) Top Voters	(3) Bottom Voters	(4) Diff.(2)-(3)
Variables of interest:				
Day[−30,−1]	0.527***	0.525***	0.179***	0.346**
	(0.000)	(0.001)	(0.002)	(0.033)
Voting Period	0.825***	0.802***	0.339***	0.463***
	(0.000)	(0.000)	(0.002)	(0.005)
Day[+1,+30]	0.379***	0.290***	−0.071	0.361**
	(0.000)	(0.009)	(0.355)	(0.010)
Controls:				
Size	−0.026	−0.103	−0.040	
	(0.546)	(0.126)	(0.330)	
Return Volatility	0.009	0.024***	0.038***	
	(0.159)	(0.000)	(0.000)	
AbReturn	0.567*	0.930***	0.549*	
	(0.071)	(0.000)	(0.090)	
Year-Month FE	Yes	Yes	Yes	
DAO FE	Yes	Yes	Yes	
Adj. R^2	0.029	0.027	0.025	
Obs.	234,366	196,613	110,325	

Table 5. Insiders' Trading Strategy.
The table reports the estimates from OLS regressions of insiders' buy-sell imbalance. The sample consists of trading days in the [-30, 30] window around the creation dates of proposals with votes in the top quartile in a sample DAO. The dependent variable is *BSI*, which is insiders' purchase volume minus sales volume divided by insiders' total trading volume on a trading day. *Day[-30,-1]* is an indicator that takes the value of one for trading days in the [-30,-1] window before the proposal creation, and zero otherwise. All the control variables are defined in Appendix A. Proposals are classified into two groups based on whether their market-adjusted cumulative abnormal returns (CARs) within a [-3,3] window around the creation date is positive or negative. Columns (1) and (2) present the estimates for proposal managers' buy-sell imbalance around the creation date of proposals with negative CARs and positive CARs, respectively. Columns (3) and (4) present the estimates for top voters' buy-sell imbalance around the creation date of proposals with negative CARs and positive CARs, respectively. The regressions control for year-month fixed effects and DAO fixed effects. The standard errors are clustered by DAO. P-values are reported in parentheses. The symbols *, **, and *** denote significance at the 10%, 5%, and 1% levels, respectively.

	Proposal Managers		Top Voters	
	(1)	(2)	(3)	(4)
	Neg. CAR	Pos. CAR	Neg. CAR	Pos. CAR
Variables of interest:				
Day[−30,−1]	−0.009	0.039**	0.125***	0.144***
	(0.544)	(0.040)	(0.003)	(0.000)
Controls:				
Size	−0.001	−0.023	−0.016***	−0.017***
	(0.924)	(0.220)	(0.000)	(0.000)
Return Volatility	−0.001	0.156	−0.009***	0.004
	(0.957)	(0.119)	(0.000)	(0.845)
AbReturn	−0.078	−0.109	−0.095*	−0.161***
	(0.144)	(0.172)	(0.097)	(0.007)
Year-Month FE	Yes	Yes	Yes	Yes
DAO FE	Yes	Yes	Yes	Yes
Adj. R^2	0.253	0.256	0.049	0.052
Obs.	6,706	8,897	25,649	31,666

Table 6. Profitability of Insider Trades.

The table reports the estimates from OLS regressions of the profitability of insiders' trades around DAO voting. The sample consists of purchases and sales made by insiders in sample DAOs between 30 days before the proposal creation and 30 days after the end of voting. The dependent variable is *BHAR15*, the 15-day market-adjusted abnormal buy-and-hold returns (multiplied by -1 for sales) to insider trades. *Day[-30,-1]* is an indicator that takes the value of one if the insider trade occurs during the [-30,-1] window before the proposal creation and zero otherwise. All the control variables are defined in Appendix A. Columns (1) and (2) present the estimates for trades made by proposal managers. Columns (3) and (4) present the estimates for trades made by top voters. The regressions control for investor-DAO-year-quarter fixed effects. The standard errors are clustered by the proposal manager. P-values are reported in parentheses. The symbols *, **, and *** denote significance at the 10%, 5%, and 1% levels, respectively.

	Proposal Managers		Top Voters	
	(1)	(2)	(3)	(4)
Variable of interest:				
Day[−30,−1]	0.131**	0.095**	−0.058	0.001
	(0.035)	(0.044)	(0.194)	(0.910)
Controls:				
Size		−0.080***		0.059***
		(0.000)		(0.000)
Return Volatility		−0.018*		−0.000
		(0.064)		(0.880)
AbReturn		−0.560***		0.242
		(0.000)		(0.143)
Trade Size		0.092***		0.022***
		(0.000)		(0.000)
Investor × DAO × YearQuarter FE	Yes	Yes	Yes	Yes
Adj. R^2	0.079	0.488	0.032	0.194
Obs.	79,131	73,487	283,527	253,024

Table 7. DAO Characteristics and Insider Trading Profitability.
The table reports the estimates from OLS regressions of the profitability of insiders' trades in different groups of DAOs. The sample consists of purchases and sales made by proposal managers in sample DAOs between 30 days before the proposal creation and 30 days after the end of voting. The dependent variable is *BHAR15*, the 15-day market-adjusted abnormal buy-and-hold returns (multiplied by -1 for sales) to insider trades. *Day[-30,-1]* is an indicator that takes the value of one if the insider trade occurs during the [30,0) window before the proposal creation and zero otherwise. All the control variables are defined in Appendix A. Columns (1) and (2) present the estimates for trades made by proposal managers in DAOs without a discussion forum versus those with a discussion forum, respectively. Columns (3) and (4) present the estimates for trades made by proposal managers in DAOs whose market capitalization is in the bottom quartile among the sample DAOs versus those whose market capitalization is in the top quartile, respectively. Columns (5) and (6) present the estimates for trades made by proposal managers in DAOs whose average Gini coefficient of voting power distributions in proposals is in the bottom quartile among the sample DAOs versus those whose average Gini coefficient is in the top quartile, respectively. Columns (7) and (8) present the estimates for trades made by proposal managers in DAOs whose average fraction of voting power held by top decile voters is in the bottom quartile among the sample DAOs versus those whose average fraction is in the top quartile, respectively. The regressions control for admin-DAO-year-quarter fixed effects. The standard errors are clustered by the administrator. P-values are reported in parentheses. The symbols *, **, and *** denote significance at the 10%, 5%, and 1% levels, respectively.

	Has Forum		DAO Size		Gini		Top Voters%	
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
	No	Yes	Low	High	Low	High	Low	High
Variable of interest:								
Day[−30,−1]	0.158***	0.036***	0.185***	0.002	−0.005	0.159***	−0.004	0.171***
	(0.000)	(0.000)	(0.000)	(0.832)	(0.713)	(0.000)	(0.765)	(0.000)
Controls:								
Size	−0.080***	−0.050	−0.085***	0.003	−0.002	−0.079***	−0.002	−0.083***
	(0.000)	(0.271)	(0.000)	(0.415)	(0.902)	(0.000)	(0.919)	(0.000)
Return Volatility	−0.096	−0.006	−0.204***	−0.725	−0.006	−0.013**	0.001	−0.169
	(0.516)	(0.131)	(0.000)	(0.185)	(0.958)	(0.013)	(0.994)	(0.118)
AbReturn	−0.627***	−0.077***	−0.661***	−0.035	−0.009	−0.659***	−0.014	−0.648***
	(0.000)	(0.000)	(0.000)	(0.363)	(0.705)	(0.000)	(0.392)	(0.000)
Trade Size	0.026	0.089***	0.159***	−0.025	0.033*	0.072	−0.076	0.104
	(0.802)	(0.000)	(0.000)	(0.593)	(0.084)	(0.166)	(0.187)	(0.170)
Investor × DAO × YearQuarter FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Adj. R^2	0.531	0.338	0.554	0.111	0.138	0.540	0.138	0.541
Obs.	44,009	29,242	41,849	4,330	5,318	44,069	4,050	44,104

Table 8. Voting Strategies and Insider Trading Profitability.

The table reports the estimates from OLS regressions of insiders' trades' profitability in different proposal groups. The sample consists of purchases and sales made by proposal managers in sample DAOs between 30 days before the proposal creation and 30 days after the end of voting. The dependent variable is *BHAR15*, the 15-day market-adjusted abnormal buy-and-hold returns (multiplied by -1 for sales) to insider trades. *Day[-30,-1]* is an indicator that takes the value of one if the insider trade occurs during the [30,0) window before the proposal creation and zero otherwise. All the control variables are defined in Appendix A. Columns (1) and (2) present the estimates for trades made by proposal managers around proposals that do not employ delegation strategy versus those that employ delegation strategy, respectively. Columns (3) and (4) present the estimates for trades made by proposal managers around proposals that do not employ quadratic voting strategy versus those that employ quadratic voting strategy, respectively. The regressions control for admin-DAO-year-quarter fixed effects. The standard errors are clustered by the administrator. P-values are reported in parentheses. The symbols *, **, and *** denote significance at the 10%, 5%, and 1% levels, respectively.

	Delegation		Quadratic Voting	
	(1)	(2)	(3)	(4)
	No	Yes	No	Yes
Variable of interest:				
Day[−30,−1]	0.097**	−0.012	0.095**	0.005
	(0.042)	(0.166)	(0.045)	(0.949)
Controls:				
Size	−0.080***	0.003	−0.080***	0.003
	(0.000)	(0.762)	(0.000)	(0.777)
Return Volatility	−0.016*	−0.072***	−0.015*	−0.071***
	(0.051)	(0.000)	(0.051)	(0.000)
AbReturn	−0.563***	−0.176***	−0.562***	−0.179***
	(0.000)	(0.000)	(0.000)	(0.000)
Trade Size	0.093***	0.136***	0.092***	0.137***
	(0.000)	(0.000)	(0.000)	(0.000)
Investor × DAO × YearQuarter FE	Yes	Yes	Yes	Yes
Adj. R^2	0.492	0.587	0.491	0.589
Obs.	70,547	29,536	73,180	26,905

Table 9. Effect of Negative Shocks on DAOs' TVL.

The table reports the estimates from a Difference-in-Difference (DID) model in which the dependent variable is DAOs' daily TVL. The sample consists of days in the [-60, 60] window around two negative market shocks – Luna crash and FTX collapse – for all the DAOs with TVL data on Defillama. DAOs are divided into quartiles based on their average abnormal trading volume one month before proposal creation dates. *Treatment* is an indicator that equals one if a DAO is above the sample median and zero if a DAO is below the sample median. *Post* is an indicator that equals one after the Luna crash on 9 May 2022 in column (1), or after the FTX collapse on 8 Nov 2022 in column (2), and zero otherwise. All the control variables are defined in Appendix A. The regressions control for industry-fixed effects. P-values are reported in parentheses. The symbols *, **, and *** denote significance at the 10%, 5%, and 1% levels, respectively.

	(1) Luna	(2) FTX
Variables of interest:		
Treatment × Post	−0.189**	−0.446***
	(0.025)	(0.000)
Treatment	0.628***	0.255***
	(0.000)	(0.002)
Post	−0.701***	0.065
	(0.000)	(0.376)
Controls:		
Num of Chains	0.242***	0.167***
	(0.000)	(0.000)
Size	0.177***	0.095***
	(0.000)	(0.000)
Return	−0.459*	−0.303
	(0.082)	(0.489)
Industry FE	Yes	Yes
Adj. R^2	0.496	0.213
Obs.	8,984	11,088

Appendix

Variable Definitions.

Variable	Definition	Source
Abvol	Ratio of daily trading volume to the average daily trading volume from 90 days to 60 days before the proposal creation minus one.	BigQuery
Buy-sell Imbalance (BSI)	Insiders' purchase volume minus sales volume divided by insiders' total trading volume on a trading day.	BigQuery
BHAR15	15-day market-adjusted abnormal buy-and-hold returns (multiplied by -1 for sales).	CoinMarketCap
Day[-30,-1]	An indicator that takes the value of one for trading days in the [-30,-1] window before the proposal creation, and zero otherwise.	Snapshot
Voting Period	An indicator that takes the value of one for trading days in the voting window and zero otherwise.	Snapshot
Day[+1,+30]	An indicator that takes the value of one for trading days in the [+1,+30] window after the voting end date, and zero otherwise.	Snapshot
Size	Logarithm of a DAO's market capitalization plus one.	CoinMarketCap
Return Volatility	Standard deviation of daily token returns during the [-7,-1] window prior to a trading day.	CoinMarketCap
AbReturn	Market-adjusted buy-and-hold abnormal return over the [-7,-1] window prior to a trading day.	CoinMarketCap
Trade Size	Number of tokens traded as a percentage of the token circulating supply on a trading day	BigQuery, CoinMarketCap
Total Value Locked (TVL)	Total value of digital assets locked or staked in a DAO's smart contracts.	Defillama
Treatment	An indicator that equals one if a DAO's average abnormal trading volume in the one month prior to proposal creation dates is in the top quartile among the sample DAOs, and zero if a DAO's average abnormal trading volume is in the bottom quartile.	BigQuery, Snapshot
Post	An indicator that equals one after the Luna crash on 9 May 2022 or after the FTX collapse on 8 Nov 2022, and zero otherwise.	CoinDesk
Num of Chains	Number of blockchains on which a DAO operates.	Defillama
Number of Proposals per DAO	Number of proposals with votes in the top quartile for a given DAO.	Snapshot
Num of Creators per DAO	Number of unique members who initiate the sample proposals in a given DAO.	Snapshot
Have Forum	An indicator that equals one if the DAO has an open discussion forum, and zero otherwise.	Snapshot
Duration	Length of a proposal's voting window (in days).	Snapshot
Num of Words	Total word count in a proposal's title and body.	Snapshot
Num of Voting Strategies	Number of voting strategies adopted in a proposal.	Snapshot
Delegation	An indicator that equals one if a proposal employs delegation strategy, and zero otherwise.	Snapshot
Quadratic Voting	An indicator that equals one if a proposal employs quadratic voting strategy, and zero otherwise.	Snapshot
Num of Voters	Number of voters that cast votes on a proposal.	Snapshot
Support Ratio of Winning Option	Proportion of votes received by the winning option relative to the total votes cast on a proposal.	Snapshot
Gini	Gini coefficient of the voting power distribution among participants within a proposal.	Snapshot
Top Voters%	Ratio of total voting power held by voters in the top decile to the total voting power cast on a proposal.	Snapshot

Table A1. Abnormal Trading around Proposal Discussion.
The table reports the estimates from OLS regressions of abnormal trading volume of DAOs' native tokens for different groups of investors. The sample consists of trading days from 60 days before the date a proposal was posted in the discussion forum to 30 days after the voting end date of the proposal for all proposals with votes in the top quartile in a sample DAO. The dependent variable is *Abvol*, which is the ratio of daily trading volume to the average daily trading volume from 90 days to 60 days before the discussion date minus one. *Day[-30,-1]* is an indicator that takes the value of one for trading days in the [-30,-1] window before the discussion date, and zero otherwise. *Voting Period* is an indicator that takes the value of one for trading days in the voting window, and zero otherwise. *Day[+1,+30]* is an indicator that takes the value of one for trading days in the [+1,+30] window after the voting end date, and zero otherwise. Trading days in the [-60,-31] window are used as the control period. All the control variables are defined in Appendix A. Column (1) presents the estimates for all investors' abnormal trading volume. Column (2) presents the estimates for the abnormal trading volume of active investors involved in advancing the proposal, including proposal managers listed in the administrator section on the DAO's Snapshot page and individuals who cast votes on the proposal. Column (3) presents the estimates for the abnormal trading volume of all other investors, classified as passive investors. The regressions control for year-month fixed effects and DAO fixed effects. The standard errors are clustered by DAO. P-values are reported in parentheses. The symbols *, **, and *** denote significance at the 10%, 5%, and 1% levels, respectively.

	(1) All Investors	(2) Active Investors	(3) Passive Investors
Variables of interest:			
Day[−30,−1]	0.153**	0.493***	0.175*
	(0.046)	(0.000)	(0.067)
Voting Period	0.191**	0.783***	0.213*
	(0.036)	(0.000)	(0.058)
Day[+1,+30]	0.220**	0.470***	0.257**
	(0.031)	(0.000)	(0.048)
Controls:			
Size	−0.018	−0.033	−0.019
	(0.536)	(0.452)	(0.561)
Return Volatility	0.019***	0.012	0.020**
	(0.007)	(0.107)	(0.011)
AbReturn	0.875***	0.669**	0.999***
	(0.000)	(0.050)	(0.000)
Year-Month FE	Yes	Yes	Yes
DAO FE	Yes	Yes	Yes
Adj. R^2	0.103	0.031	0.100
Obs	259,360	251,748	259,185

Table A2. Abnormal Trading around Proposal Discussion by Investor Type.
The table reports the estimates from OLS regressions of abnormal trading volume of DAOs' native tokens for different groups of voters. The sample consists of trading days from 60 days before the date a proposal was posted in the discussion forum to 30 days after the voting end date of the proposal for all proposals with votes in the top quartile in a sample DAO. The dependent variable is *Abvol*, which is the ratio of daily trading volume to the average daily trading volume from 90 days to 60 days before the discussion date minus one. *Day[-30,-1]* is an indicator that takes the value of one for trading days in the [-30,-1] window before the discussion date, and zero otherwise. *Voting Period* is an indicator which takes the value of one for trading days in the voting window, and zero otherwise. *Day[+1,+30]* is an indicator which takes the value of one for trading days in the [+1,+30] window after the voting end date, and zero otherwise. Trading days in the [-60,-31] window are used as the control period. All the control variables are defined in Appendix A. Column (1) presents the estimates for the abnormal trading volume of proposal managers. Column (2) presents the estimates for the abnormal trading volume of all voters who cast votes on the proposal. Column (3) and (4) presents the estimates for the abnormal trading volume of voters whose voting powers are in the top decile and bottom decile among all voters, respectively. The regressions control for year-month fixed effects and DAO fixed effects. The standard errors are clustered by DAO. P-values are reported in parentheses. The symbols *, **, and *** denote significance at the 10%, 5%, and 1% levels, respectively.

	(1) Proposal Managers	(2) Voters	(3) Top Voters	(4) Bottom Voters
Variables of interest:				
Day[−30,−1]	0.622*	0.539***	0.582***	0.170***
	(0.084)	(0.000)	(0.000)	(0.003)
Voting Period	0.742*	0.864***	0.803***	0.387***
	(0.059)	(0.000)	(0.000)	(0.000)
Day[+1,+30]	0.857	0.423***	0.355***	−0.075
	(0.158)	(0.000)	(0.002)	(0.371)
Controls:				
Size	−0.582**	−0.011	−0.078	−0.042
	(0.021)	(0.768)	(0.163)	(0.330)
Return Volatility	0.121***	0.008	0.021***	0.038***
	(0.000)	(0.241)	(0.000)	(0.000)
AbReturn	2.252**	0.517*	0.819***	0.573*
	(0.032)	(0.089)	(0.000)	(0.079)
Year-Month FE	Yes	Yes	Yes	Yes
DAO FE	Yes	Yes	Yes	Yes
Adj. R^2	0.040	0.031	0.028	0.025
Obs	140,269	240,381	201,735	113,138

Table A3. Abnormal Transactions around Proposal Creation.
The table reports the estimates from OLS regressions of abnormal number of transactions of DAOs' native tokens for different groups of investors. The sample consists of trading days from 60 days before the creation date of a proposal to 30 days after the voting end date of the proposal for all proposals with votes in the top quartile in a sample DAO. The dependent variable is *Abtxn*, which is the ratio of daily number of transactions to the average daily transactions from 90 days to 60 days before the proposal creation minus one. *Day[-30,-1]* is an indicator that takes the value of one for trading days in the [-30,-1] window before the proposal creation, and zero otherwise. *Voting Period* is an indicator that takes the value of one for trading days in the voting window, and zero otherwise. *Day[+1,+30]* is an indicator that takes the value of one for trading days in the [+1,+30] window after the voting end date, and zero otherwise. Trading days in the [-60,-31] window are used as the control period. All the control variables are defined in Appendix A. Column (1) presents the estimates for all investors' abnormal number of transactions. Column (2) presents the estimates for the abnormal transactions of active investors involved in advancing the proposal, including proposal managers listed in the administrator section on the DAO's Snapshot page and individuals who cast votes on the proposal. Column (3) presents the estimates for the abnormal transactions of all other investors, classified as passive investors. The regressions control for year-month fixed effects and DAO fixed effects. The standard errors are clustered by DAO. P-values are reported in parentheses. The symbols *, **, and *** denote significance at the 10%, 5%, and 1% levels, respectively.

	(1) All Investors	(2) Active Investors	(3) Passive Investors
Variables of interest:			
Day[−30,−1]	0.133***	0.242***	0.150***
	(0.000)	(0.000)	(0.000)
Voting Period	0.135**	0.286***	0.152***
	(0.010)	(0.000)	(0.007)
Day[+1,+30]	0.116**	0.006	0.136**
	(0.023)	(0.917)	(0.014)
Controls:			
Size	−0.016	−0.017	−0.019
	(0.560)	(0.247)	(0.554)
Return volatility	0.023***	0.009**	0.026***
	(0.000)	(0.015)	(0.001)
AbReturn	1.326***	0.690***	1.539***
	(0.000)	(0.000)	(0.000)
Year-Month FE	Yes	Yes	Yes
DAO FE	Yes	Yes	Yes
Adj. R^2	0.282	0.073	0.278
Obs	252,331	245,075	252,297

Table A4. Abnormal Transactions around Proposal Creation by Investor Type.
The table reports the estimates from OLS regressions of abnormal number of transactions of DAOs' native tokens for different groups of voters. The sample consists of trading days from 60 days before the creation date of a proposal to 30 days after the voting end date of the proposal for all proposals with votes in the top quartile in a sample DAO. The dependent variable is *Abtxn*, which is the ratio of daily number of transactions to the average daily transactions from 90 days to 60 days before the proposal creation minus one. *Day[-30,-1]* is an indicator that takes the value of one for trading days in the [-30,-1] window before the proposal creation, and zero otherwise. *Voting Period* is an indicator which takes the value of one for trading days in the voting window, and zero otherwise. *Day[+1,+30]* is an indicator which takes the value of one for trading days in the [+1,+30] window after the voting end date, and zero otherwise. Trading days in the [-60,-31] window are used as the control period. All the control variables are defined in Appendix A. Column (1) presents the estimates for the abnormal number of transactions of proposal managers. Column (2) presents the estimates for the abnormal transactions of all voters who cast votes on the proposal. Column (3) and (4) presents the estimates for the abnormal number of transactions of voters whose voting powers are in the top decile and bottom decile among all voters, respectively. The regressions control for year-month fixed effects and DAO fixed effects. The standard errors are clustered by DAO. P-values are reported in parentheses. The symbols *, **, and *** denote significance at the 10%, 5%, and 1% levels, respectively.

	(1) Proposal Managers	(2) Voters	(3) Top Voters	(4) Bottom Voters
Variables of interest:				
Day[−30,−1]	0.185**	0.262***	0.263***	0.226***
	(0.011)	(0.000)	(0.001)	(0.000)
Voting Period	0.270***	0.297***	0.370***	0.144*
	(0.005)	(0.000)	(0.000)	(0.062)
Day[+1,+30]	0.213**	0.001	0.092	−0.176***
	(0.034)	(0.989)	(0.291)	(0.003)
Controls:				
Size	−0.010	−0.013	−0.028*	0.005
	(0.721)	(0.389)	(0.075)	(0.841)
Return Volatility	0.048***	0.008**	0.013***	0.025***
	(0.000)	(0.020)	(0.005)	(0.000)
AbReturn	0.368*	0.694***	0.630***	0.540**
	(0.065)	(0.000)	(0.000)	(0.014)
Year-Month FE	Yes	Yes	Yes	Yes
DAO FE	Yes	Yes	Yes	Yes
Adj. R^2	0.029	0.080	0.062	0.050
Obs	136,982	234,366	196,711	110,325

Table A5. Profitability of Insider Trades.

The table reports the estimates from OLS regressions of the profitability of insiders' trades around DAO voting. The sample consists of purchases and sales made by insiders in sample DAOs between 30 days before the proposal creation and 30 days after the end of voting. The dependent variable is *BHAR30*, the 30-day market-adjusted abnormal buy-and-hold returns (multiplied by -1 for sales) to insider trades. *Day[-30,-1]* is an indicator that takes the value of one if the insider trade occurs during the [-30,-1] window before the proposal creation and zero otherwise. All the control variables are defined in Appendix A. Columns (1) and (2) present the estimates for trades made by proposal managers. Columns (3) and (4) present the estimates for trades made by top voters. The regressions control for investor-DAO-year-quarter fixed effects. The standard errors are clustered by the proposal manager. P-values are reported in parentheses. The symbols *, **, and *** denote significance at the 10%, 5%, and 1% levels, respectively.

	Proposal Managers		Top Voters	
	(1)	(2)	(3)	(4)
Variable of interest:				
Day[−30,−1]	0.120**	0.146***	−0.031	0.007
	(0.045)	(0.000)	(0.108)	(0.274)
Controls:				
Size		−0.043***		0.035***
		(0.000)		(0.001)
Return Volatility		−0.021		−0.000
		(0.233)		(0.933)
AbReturn		−0.457***		0.164
		(0.000)		(0.176)
Trade Size		0.006		0.015*
		(0.889)		(0.096)
Investor × DAO × YearQuarter FE	Yes	Yes	Yes	Yes
Adj. R^2	0.241	0.426	0.086	0.200
Obs.	79,126	73,482	283,519	253,021

Table A6. Effect of Negative Shocks on DAOs' TVL.

The table reports the estimates from a Difference-in-Difference (DID) model in which the dependent variable is DAOs' daily TVL. The sample consists of days in the [-60, 60] window around two negative market shocks – Luna crash and FTX collapse – for all the DAOs with TVL data on Defillama. DAOs are divided into quartiles based on their average abnormal number of transactions one month before proposal creation dates. *Treatment* is an indicator that equals one if a DAO is above the sample median and zero if a DAO is below the sample median. *Post* is an indicator that equals one after the Luna crash on 9 May 2022 in column (1), or after the FTX collapse on 8 Nov 2022 in column (2), and zero otherwise. All the control variables are defined in Appendix A. The regressions control for industry-fixed effects. P-values are reported in parentheses. The symbols *, **, and *** denote significance at the 10%, 5%, and 1% levels, respectively.

	(1) Luna	(2) FTX
Variables of interest:		
Treatment × Post	−0.156*	−0.232**
	(0.067)	(0.037)
Treatment	0.216***	0.606***
	(0.001)	(0.000)
Post	−0.724***	−0.021
	(0.000)	(0.777)
Controls:		
Num of Chains	0.235***	0.169***
	(0.000)	(0.000)
Size	0.169***	0.100***
	(0.000)	(0.000)
Return	−0.434	−0.306
	(0.102)	(0.484)
Industry FE	Yes	Yes
Adj. R^2	0.489	0.217
Obs.	8,984	11,088