Community Governance and Value in Cryptocurrency Ecosystems: Initial Evidence from Tron Network

QIHONG RUAN and CHUQIAO BI*

ABSTRACT

The impact of community governance on the success of cryptocurrency ecosystems is a topic of growing interest. We analyze the role of community governance on Total Value Locked (TVL), a metric that reflects the assets locked in DeFi protocols. Our study employs a combination of Regression Discontinuity Design (RDD) and an event study to cleanly identify the causal effects of community governance on TVL. Our results, robustly tested, show the causal impact of community proposals on the growth and maturity of the DeFi space, as well as the level of trust in the DeFi market. Our findings offer valuable insights for practitioners and researchers, highlighting the importance of community governance in shaping the success of cryptocurrency ecosystems.

*Qihong Ruan (qr33@cornell.edu) is at Cornell University Department of Economics. Chuqiao Bi (cb868@cornell.edu) is at Cornell University Johnson Graduate School of Management. The contents of this article are solely the responsibility of the authors. We have read the *Journal of Finance* disclosure policy and have no conflicts of interest to disclose.

I. Introduction

The recent surge in popularity and market value of cryptocurrencies has led to increased curiosity about the factors that contribute to their success. One aspect that has received considerable attention is the role of community governance in shaping the outcomes of cryptocurrency ecosystems. Community governance refers to the process by which the community of users, developers, and stakeholders collectively make decisions about the direction and development of a particular cryptocurrency.

Community governance in the context of blockchain technology represents a distinct form of decision-making that stands apart from conventional governance models. The unique aspect of community governance lies in its decentralized structure, where power and decision-making authority are distributed among all stakeholders in the network, rather than being centralized in the hands of a few individuals or organizations. This creates a more democratic, inclusive, and transparent system of governance that allows for a wider range of perspectives and ideas to be taken into consideration.

In a community-governed blockchain, all stakeholders have a voice in determining the direction of the project through decentralized voting mechanisms. This allows for a more inclusive and equitable decision-making process compared to traditional governance structures.

Additionally, community governance promotes transparency and accountability by providing all stakeholders with access to the same information and enabling them to observe the decision-making process in real-time.

Furthermore, community governance allows for the inclusion of all stake-

holders, regardless of their location or economic status, leading to a more diverse and inclusive community and fostering innovation.

Nonetheless, the use of community governance in blockchain technology presents potential drawbacks, such as low voter turnout leading to lack of representation and poor decision-making, lack of expertise among community members, slow decision-making processes, and security risks associated with decentralized voting mechanisms.

The benefits and challenges of community governance motivate further empirical investigation to determine its causal impact on the outcomes of the cryptocurrency ecosystem. We focus on the impact of community governance on Total Value Locked (TVL), a metric that measures the assets locked in DeFi protocols. TVL serves as an indicator of the growth, maturity, and level of trust in the DeFi market. A higher TVL suggests greater adoption and usage of DeFi protocols, as well as a larger amount of capital invested into the ecosystem, indicating growth and maturity of the DeFi space. Additionally, TVL can provide insight into the level of trust in a DeFi protocol, as users are locking in their assets for extended periods of time.

Our aim is to analyze the market reaction to governance proposals that pass or fail by a close margin in community meetings. To obtain a clean identification of the causal effects of community proposals, we use a combination of Regression Discontinuity Design (RDD) and an event study. Our data source is Tron, the second largest smart contract platform in terms of TVL.

Our results are robust, having undergone a series of tests, including manipulation around the threshold, TVL measures in USD and Tron, the TVL

change before the proposals, linear and polynomial fitting, and more. Our findings offer important implications for blockchain governance and the success of Decentralized Autonomous Organizations (DAOs). By demonstrating the impact of community governance on Total Value Locked, we provide valuable insights into the role of community governance in shaping the outcomes of cryptocurrency ecosystems.

The paper is organized as follows: Literature review in Section II. Institutional background of Tron network in Section III. Empirical analysis including data, methodology, and results in Section IV. Final conclusions in Section V.

II. Literature Review

Since the community governance of cryptocurrencies is analog to corporate governance, we first review its effect on firm performance in the existing literature. Then we link the corporate regime with the crypto community, comparing their organizational similarities and distinctions. Next, we summarize how academia describes the states of cryptocurrency governance and how they are associated with crypto values and returns. Finally, we substantiate our identification strategy (RDD) with related works.

The effect of corporate governance on firm performance has been studied extensively, however, there is no unanimous sign in the relation. Cuñat, Gine, and Guadalupe (2012) used regression discontinuity design to study whether improvements in the firm's internal corporate governance create value for shareholders. They find that passing a proposal leads to significant

positive abnormal returns, and adopting one governance proposal increases shareholder value by 2.8%. On the other hand, Chhaochharia and Grinstein (2007) studied the impact of the 2002 Sarbanes-Oxley Act, which focuses on ensuring the alignment of incentives of corporate insiders with those of investors and reducing the likelihood of corporate misconduct and fraud, led to lower abnormal returns of the compliant firms. These rules especially impose suboptimal structure or excessive costs on small firms.

To infer the effect the crypto community governance on the value of cryptocurrencies, it is worth discussing the connections and distinctions between corporate governance and crypto-governance. Davidson (2021) suggested that the principles of corporate governance apply just as well in the crypto-economy as they do in the industrial economy. He argued that the control of a blockchain foundation is likely to be concentrated in a small group of individuals who are in a position to make decisive decisions. However, blockchain foundations are likely to be non-profit organizations since the services that blockchain foundations provide are complex and difficult to evaluate using traditional measures such as profits and losses. Reyes (2021) argued that blockchain architects should consider adopting governance contracts that rely on corporate governance models. Such models would enable a scheme that heightens responsibility for more actors in the ecosystem and the adoption of governance rules would appease the regulator's need for a legally recognizable and responsible hierarchy.

Several papers touch upon the crypto governance and associate it with crypto values and returns. Azouvi, Maller, and Meiklejohn (2019) analyzed quantitatively the decentralization of the governance structures of Bitcoin

and Ethereum, and it is one of the very few papers studying the features of improvement proposals (IPs). They found there is usually a concentrated handful of people who accounts for most of the discussions. And there is little intersection between the original currencies (such as Bitcoin or Ethereum Classic) and their forks (Bitcoin Cash or Ethereum). Hsieh, Vergne, and Wang (2017) studied how internal governance (at the blockchain and protocol levels) and external governance (by the broader cryptocurrency community) affect cryptocurrency returns. Internally, they found decentralization at the blockchain level affects returns positively but negatively at both the protocol and organizational levels. The underlying reason is that while investors appreciate the core value of decentralization in cryptos, they are suspicious of decentralized governance at higher levels slowing down strategic decision-making or creating information asymmetries between investors and technologists. Externally, they do not find increased community governance to be beneficial for the market returns of blockchain-based organizations because community involvement was facing intense criticism such as criticism of "The DAO". Wang and Vergne (2017) explored factors that affect crypto returns and found indicators of technological development rather than "buzz" surrounding cryptocurrencies in online media the most important factors associated with increases in cryptocurrency returns. Our research takes a novel angle to evaluate the impact of improvement proposals on crypto values. On the positive side, improvement proposals signify technological development which could positively affect crypto returns; while on the negative side, some proposals lead to hard forks – often creating a permanent chain separation,

such as Bitcoin Improvement Proposal (BIP) 148.[1] Cong, Tang, Wang, and Zhao (2022) highlight that the Ethereum Improvement Proposal EIP-1559 (featuring base fee burning) and airdrop programs are effective in fostering inclusion via monetary redistribution of tokens.

Our work relates to the literature on blockchain consensus mechanisms. Saleh (2021) investigates the conditions for efficient and persistent Proof-of-Stake consensus, while Cong and He (2019) evaluates the benefits of blockchain in reducing informational asymmetry and increasing welfare, while also recognizing the potential for collusion. Our study provides causal evidence on the effect of community governance consensus mechanisms on the blockchain ecosystem's value.

In terms of methodology, several papers applied Regression Discontinuity Design (RDD) to study voting in corporate finance. For example, Malenko and Shen (2016) studies the effect of Institutional Shareholder Services (ISS) recommendations on voting outcomes and finds a negative ISS recommendation on a say-on-pay proposal leads to a 25 percentage point reduction in say-on-pay voting support. Cuñat, Giné, and Guadalupe (2016) use RDD to estimate the effect of Say-on-Pay (SoP) and find adopting SoP leads to large increases in market value (5%) and to improvements in long-term profitability. Since our research setting is also about the marginal effects of voting,

[1]This proposal sought to implement Segregated Witness (SegWit) on the Bitcoin network instead of SegWit2x (a proposed upgrade designed to help Bitcoin scale) since it is suspected to be a contentious hard fork that made the network vulnerable to a replay attack. Some big-block supporters of SegWit2x decided to fork the Bitcoin blockchain on August 1, 2017. The result was the creation of Bitcoin Cash (BCH).

RDD is a proper tool for our identification.

III. Institutional Background

We choose to analyze the proposal and votes data from Tron network on Tronscan for our study on the effect of community governance on the outcomes of cryptocurrency ecosystems. Tron, with the second largest Total Value Locked (TVL) among smart contract platforms, is a representative example for us to examine.

TVL, as an indicator of a crypto ecosystem, provides a wealth of information about the growth, maturity, and level of trust in the DeFi market. It measures the amount of assets locked into DeFi protocols and gives insights into the level of adoption and usage of DeFi. A higher TVL implies that more capital is invested into the ecosystem, signifying growth and maturity. Moreover, users' willingness to lock in their assets for extended periods of time suggests that they have trust in the DeFi protocol. In this sense, TVL serves as a barometer of the overall health of the DeFi space and is therefore crucial in evaluating a crypto ecosystem.

Tronscan offers us well-structured data about proposals and their votes, making it a perfect platform for our analysis. The Tron network operates under a community governance system, where a committee of 27 super representatives (SRs) manages the network. SRs are elected by TRX holders and are responsible for modifying dynamic parameters such as block rewards and transaction fees on the network. You can view the details of the super representatives at https://tronscan.org//sr/representatives. With votes

from at least 18 SRs, a proposal is adopted and implemented during the next maintenance period.

TRX holders can apply to become SR candidates and have the chance to become SRs or SR partners. The top 27 most-voted candidates become SRs, while the next 100 most-voted candidates become SR partners. SRs are tasked with producing blocks and packing transactions and receive both voting rewards and block rewards. SR partners, on the other hand, receive only voting rewards without performing these tasks. All SR candidates, SR partners, and SRs have the right to initiate proposals to modify parameters on the Tron network, which are crucial for the development of the Tron ecosystem. You can access a list of proposals at https://tronscan.org//proposals.

This community governance system gives us a unique opportunity to study the impact of proposal voting on the outcomes of the Tron ecosystem and gain valuable insights into the role of community governance in shaping the success of cryptocurrency ecosystems.

IV. Data, Regression Discontinuity Design, and Empirical Results

A. Data

Figure 1 shows the steady growth of Tron network's Total Value Locked (TVL) from a low point in January 2021 to over 6 billion US dollars in 2022, despite fluctuations along the way. The red line marks the date July 17, 2021, when a proposal was rejected with only 17 votes from super representatives, one vote shy of the threshold. No significant TVL change was observed

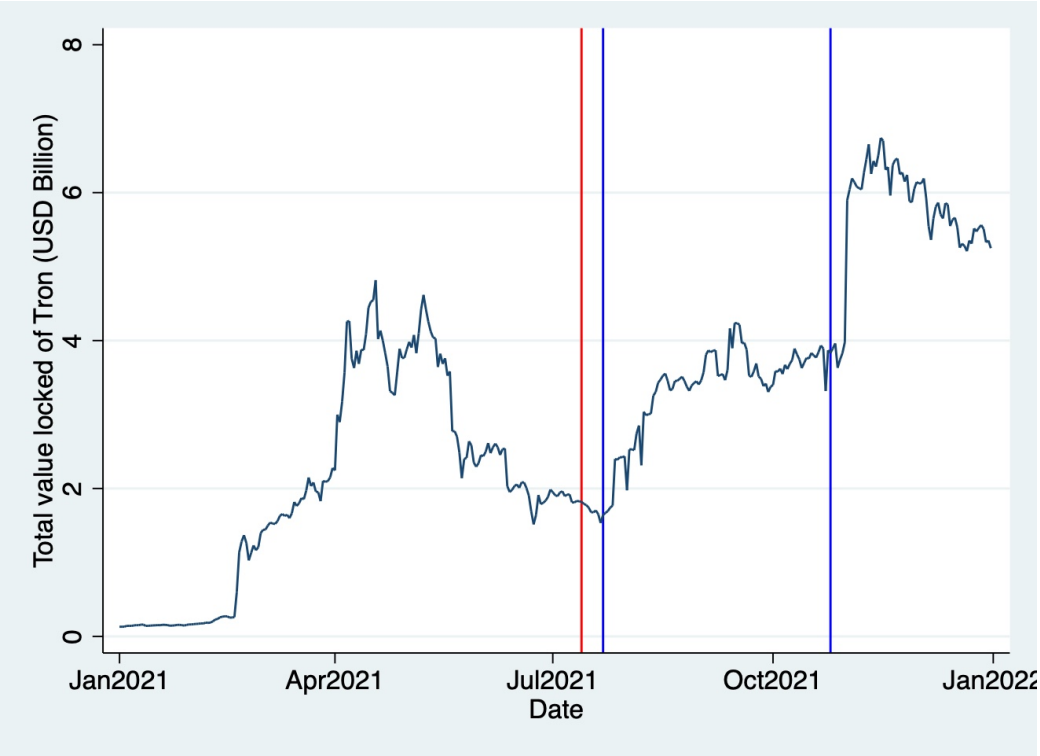

Figure 1. Total value locked of Tron (USD Billion).

Note: The red line marks the date July 17, 2021, when a proposal was rejected with only 17 votes from super representatives, one vote shy of the threshold. The two blue lines indicate the two instances of proposals that were passed on July 22, 2021 and October 25, 2021 with 18 votes from representatives.

around the proposal's rejection. The two blue lines indicate the two instances of proposals that were passed on July 22, 2021 and October 25, 2021 with 18 votes from representatives. Following these successful proposals, there was a noticeable increase in the Tron network's TVL. The close margin of votes for these proposals suggests that their outcomes are unpredictable for the market. Using this random variation, the causal effect of passing community proposals on the value of the crypto system can be determined.

A time series analysis of the percent change in TVL from day t to $t + 7$ is shown in Figure 2. The changes are generally around 0. The rejection of a proposal at the margin (red line) is followed by normal TVL changes in the 7-day window, while the successful passage of two proposals at the margin (blue lines) is followed by substantial TVL changes in the next 7-day window.

To ensure there is no manipulation of votes around the passing threshold, the distribution of votes was examined and no manipulation was found between 17 and 18 votes (frequency of 17 votes is 1, frequency of 18 votes is 2). The results are shown in Figure 3.

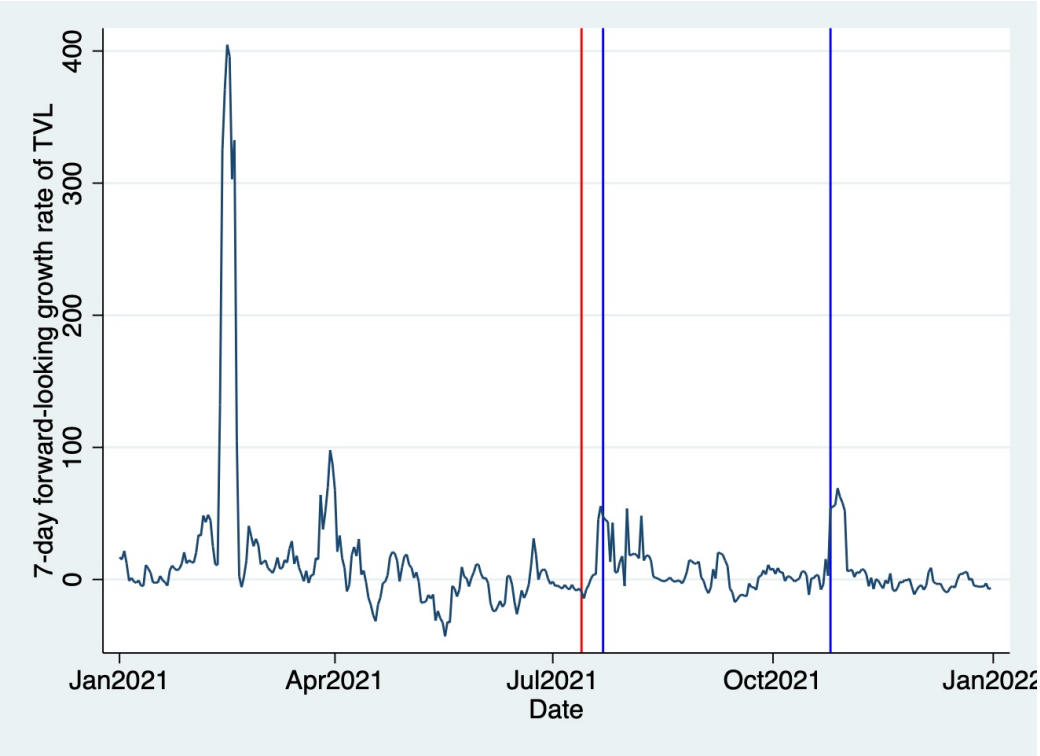

Figure 2. 7-day forward-looking growth rate of TVL.

Note: The red line marks the date July 17, 2021, when a proposal was rejected with only 17 votes from super representatives, one vote shy of the threshold. The two blue lines indicate the two instances of proposals that were passed on July 22, 2021 and October 25, 2021 with 18 votes from representatives.

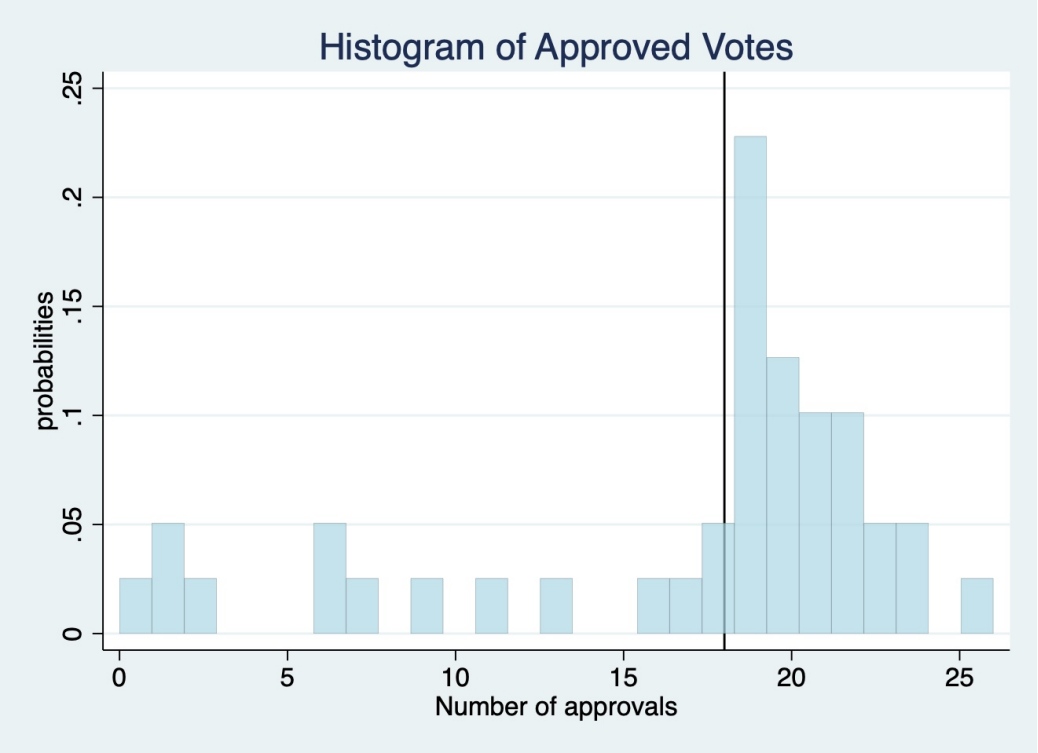

Figure 3. Histogram of Approved Votes.

Note: The black vertical bold line signifies the passing threshold of 18 votes. Proposals falling short of 18 votes are not approved, while those with 18 votes or above are passed.

Table I depicts the summary statistics of key variables in our study. The total value locked in US dollars has a mean of 2.69 billion and a standard deviation of 1.95 billion during the creation dates of the improvement proposals. The 7-day growth rate of TVL in US dollars has a mean of 7.81% and a quite significant variation ranging from -17.6% to 54%. The number of approval votes for each proposal averages around 17, with median at 19, and ranging between 0 to 26.

Table I. Summary Statistics

	Mean	SD	Min	P25	Median	P75	Max	N
TVL	2.69	1.95	0.02	0.19	3.55	4.14	6	21
7-day growth rate of TVL	7.81	20.60	-17.63	-1.96	0.45	8.56	54	21
Approved votes	16.78	7.04	0	16	19	21	26	41

[1] TVL: Total Value Locked in US dollars Billion.
[2] 7-day growth rate of TVL: 7-day growth rate of the total value locked.
[3] Approved votes: Number of approved votes in the network.

B. Regression Discontinuity Design

A Regression Discontinuity Design (RDD) method, similar to the one used in Cuñat, Gine, and Guadalupe (2012), is employed to estimate the causal impact of community governance on the outcomes of the cryptocurrency ecosystem. RDD provides a clean causal estimate and addresses the endogeneity of community governance rules. The dependent variable in this study is TVL, the independent variable is the outcome of the community governance vote (pass or fail), and control variables are the votes for the proposals. The regression specification is as follows:

$$\frac{TVL_{i,t+7} - TVL_{i,t}}{TVL_{i,t}} \times 100 = a + b \cdot (VOTES_i - 18) + c \cdot (VOTES_i - 18)^2 + d \cdot \mathbb{I}(VOTES_i \geq 18) + e \cdot \mathbb{I}(VOTES_i \geq 18) \cdot (VOTES_i - 18) + f \cdot \mathbb{I}(VOTES_i \geq 18) \cdot (VOTES_i - 18)^2 + \epsilon_i,$$

where i represents proposals, t is the creation date of the proposal, $TVL_{i,t}$ is the Tron network's TVL at day t, $TVL_{i,t+7}$ is the Tron network's TVL at day $t+7$. The reason why we use 7 days is that the decision process for each proposal takes 3 days since its creation, and we allow 4 extra days for the effect of approvals or denials to be fully captured by the changes in TVL. In baseline regressions, we used TRX, the native token of the Tron blockchain, as the unit of account instead of the TVL in US dollars to compute the growth rate, minimizing impact from other market shocks. $VOTES_i$ is the number of votes for proposal i, and $\mathbb{I}(VOTES_i \geq 18)$ is an indicator function that is 1 when $VOTES_i \geq 18$ and 0 otherwise. The analysis is centered at the passing threshold of 18 votes, following the standard RDD practice. The main coefficient of interest is d, which is expected to have a positive and significant estimate, indicating that passing a community proposal has a positive causal impact on the value of the crypto ecosystem.

C. *Empirical Results*

Our analysis of the Total Value Locked (TVL) in the Tron blockchain presents evidence of a causal impact of community proposals on the value of the crypto ecosystem. Figure 4 displays the TVL percent change versus votes and highlights a noticeable jump in the TVL at the threshold of 18 votes, beyond which proposals are deemed successful. Regression results, presented in Table II, quantify this jump and reveal statistically significant and economically meaningful increases in TVL ranging from 18.6

We consider the potential effect of cryptocurrency market volatility on our measurement of TVL changes and present an alternative scaled TVL measurement. Our results remain robust and consistent under both measurements, providing strong support for the validity of our conclusions.

In order to ensure the validity of our results and to support the use of Regression Discontinuity Design (RDD) in our analysis, we conducted a thorough examination of vote distribution for evidence of manipulation. As per the assumption of RDD, it is crucial that there is no threshold manipulation. Our review of the votes from 17 to 18 revealed no manipulation and thus supports the use of RDD in our analysis.

To further validate our findings, we conducted a falsification test to determine if there were any substantial changes in Total Value Locked (TVL) before proposals. Figure 5 displays the result of the test, which shows that the changes in TVL before the initiation of proposals were not substantial at the 18-vote threshold. This result provides further support for the conclusion that the passing of proposals is responsible for the increase in value within

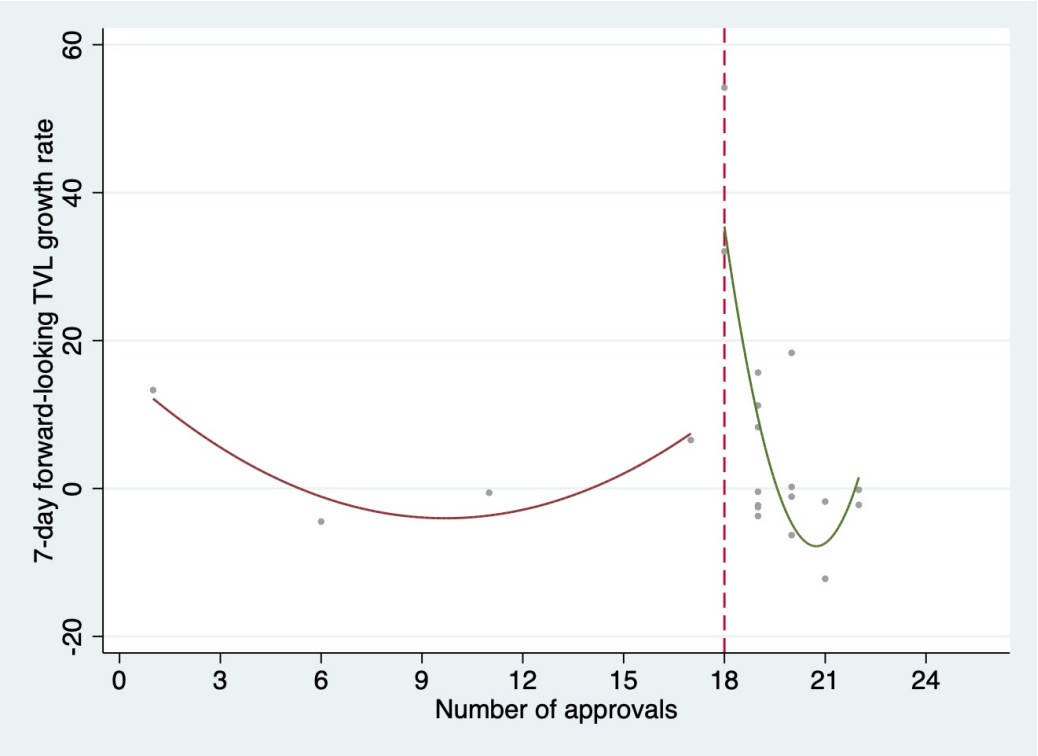

Figure 4. 7-day forward-looking TVL growth rate.

Note: The vertical axis shows the change in Total Value Locked (TVL) within a 7-day period after a proposal is created. The red vertical dashed line indicates the passing threshold of 18 votes. The fitted curve of the quadratic regression is shown for both the data points below and at/above the threshold.

Table II. Regressions Results

Dependent Variable: The 7-day % Change of TVL	TVL_TRX	TVL_TRX	TVL_USD	TVL_USD
$VOTES - 18$	-0.27	3.56^{***}	-0.45^{*}	-2.07^{***}
	(0.60)	(0.89)	(0.24)	(0.01)
$\mathbb{I}(VOTES \geq 18)$	18.59^{*}	24.66^{**}	26.72^{**}	57.35^{***}
	(9.95)	(9.42)	(12.37)	(6.51)
$\mathbb{I}(VOTES \geq 18) \cdot (VOTES - 18)$	-7.63^{**}	-35.22^{***}	-4.94	-43.72^{***}
	(3.60)	(10.15)	(6.08)	(8.26)
$(VOTES - 18)^2$		0.21^{***}		-0.09^{***}
		(0.05)		(0.00)
$\mathbb{I}(VOTES \geq 18) \cdot (VOTES - 18)^2$		5.58^{**}		9.94^{***}
		(2.11)		(2.57)
Observations	21	21	21	21
Adjusted R^2	0.217	0.516	0.002	0.422

Note: The dependent variable is the 7-day percent change of Total Value Locked (TVL) after the creation of each proposal. TVL_TRX is the total value locked of the Tron network using TRX as the unit of account. TVL_USD is the total value locked of the Tron network using USD as the unit of account. *** p<0.01, ** p<0.05, * p<0.10. Robust Standard Errors in parentheses.

the crypto ecosystem.

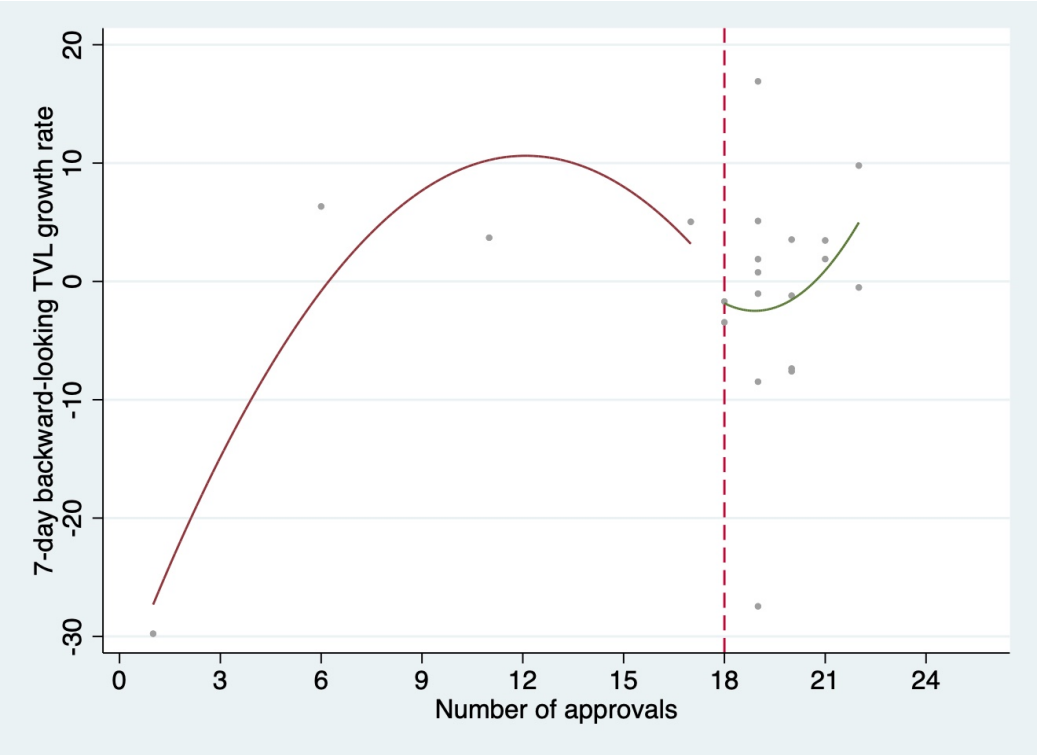

Figure 5. 7-day backward-looking TVL growth rate.
Note: The vertical axis shows the change in Total Value Locked (TVL) within a 7-day period before a proposal is created. The red vertical dashed line indicates the passing threshold of 18 votes. The fitted curve of the quadratic regression is shown for both the data points below and at/above the threshold.

V. Conclusion

In conclusion, our study provides important insights into the role of community governance in the success of cryptocurrency ecosystems. Our analysis of the proposal and vote data from the Tron network sheds light on the causal effect of community governance on the outcomes of these digital assets, as

measured by Total Value Locked (TVL). Our findings suggest that community proposals can add value to the blockchain ecosystem and support the validity of decentralized governance structures.

The results of this study have broad implications for both practitioners and researchers in the field of cryptocurrency and blockchain technology. For practitioners, our findings highlight the importance of considering community governance in the design and development of digital assets. By understanding the effects of community proposals on the outcomes of the ecosystem, practitioners can make informed decisions about the direction and growth of their projects.

For researchers, our study provides a valuable foundation for further investigation into the role of community governance in blockchain technology. In the future, we can explore the effects of more proposals in addition to those of the Tron network and compare the results across different cryptocurrencies and blockchain platforms. The Bitcoin and Ethereum community, for example, are also actively improving their ecosystems through Bitcoin Improvement Proposals (BIPs) and Ethereum Improvement Proposals (EIPs). These findings have the potential to provide valuable insights into the governance and success of decentralized autonomous organizations (DAOs) and contribute to the advancement of the field of blockchain technology.

REFERENCES

Azouvi, Sarah, Mary Maller, and Sarah Meiklejohn, 2019, Egalitarian society or benevolent dictatorship: The state of cryptocurrency governance, in *Financial Cryptography and Data Security: FC 2018 International Workshops, BITCOIN, VOTING, and WTSC, Nieuwpoort, Curaçao, March 2, 2018, Revised Selected Papers 22* pp. 127–143. Springer.

Chhaochharia, Vidhi, and Yaniv Grinstein, 2007, Corporate governance and firm value: The impact of the 2002 governance rules, *the Journal of Finance* 62, 1789–1825.

Cong, Lin William, and Zhiguo He, 2019, Blockchain disruption and smart contracts, *The Review of Financial Studies* 32, 1754–1797.

Cong, Lin William, Ke Tang, Yanxin Wang, and Xi Zhao, 2022, Inclusion and democratization through web3 and defi? initial evidence from the ethereum ecosystem, *Initial Evidence from the Ethereum Ecosystem (July 29, 2022)*.

Cuñat, Vicente, Mireia Gine, and Maria Guadalupe, 2012, The vote is cast: The effect of corporate governance on shareholder value, *The journal of finance* 67, 1943–1977.

Cuñat, Vicente, Mireia Giné, and Maria Guadalupe, 2016, Say pays! shareholder voice and firm performance, *Review of Finance* 20, 1799–1834.

Davidson, Sinclair, 2021, From corporate governance to crypto-governance, *Available at SSRN 3844304*.

Hsieh, Ying-Ying, Jean-Philippe JP Vergne, and Sha Wang, 2017, The internal and external governance of blockchain-based organizations: Evidence from cryptocurrencies, in *Bitcoin and beyond* . pp. 48–68 (Routledge).

Malenko, Nadya, and Yao Shen, 2016, The role of proxy advisory firms: Evidence from a regression-discontinuity design, *The Review of Financial Studies* 29, 3394–3427.

Reyes, Carla L, 2021, (un) corporate crypto-governance, *Russ. J. Econ. & L.* p. 135.

Saleh, Fahad, 2021, Blockchain without waste: Proof-of-stake, *The Review of financial studies* 34, 1156–1190.

Wang, Sha, and Jean-Philippe Vergne, 2017, Buzz factor or innovation potential: What explains cryptocurrenciesâ returns?, *PloS one* 12, e0169556.