

# Influence of Community Engagement on Cryptocurrency Market Valuation

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## ABSTRACT

Cryptocurrencies are volatile digital currencies based on a decentralized system. Their market behavior, shaped primarily by communal factors such as developer activity and community engagement, differs from that of traditional financial instruments, which are typically driven by intrinsic factors. This study examines the impact of community engagement, as measured by developer activity on GitHub, on the valuation and trading volume of decentralized assets. A quantitative research design is used to analyze developer data from multiple cryptocurrencies. Statistical methods, including correlation analysis, are applied to assess the strength of the relationships between developer activity, asset valuation, and trading volume. Preliminary findings indicate a consistent correlation between developer engagement and both asset valuation and trading volume, offering insight into what drives the success of cryptocurrency projects. This research contributes to the rapidly growing field of cryptocurrency market analytics, highlighting developer activity as a predictive indicator and a potential tool for anticipating shifts in both market dynamics and community sentiment.

**Keywords:** Cryptocurrency; Decentralized; Market Valuation; Developer Activity; Proxy; Indicator; Community Sentiment; Market Dynamics

## INTRODUCTION

In a world where digital economies have been increasingly prevalent, the influence of online communities and engagement has extended beyond social networks and into the financial realm. Cryptocurrency and decentralized financial systems have started to develop and become more prevalent in the 21st century. Rooted in blockchain technology, it allows peer-to-peer

transactions and trading without intermediaries (1). Since the introduction of Bitcoin in 2009, the cryptocurrency market has grown at a fast rate, with thousands of different tokens and platforms being made for many uses, such as digital payments to digital art (2). These assets have utilized the power of online communities to drive demand, create liquidity, and move markets through momentum, often bypassing traditional financial reasoning. As of 2025, the current market capitalization of cryptocurrency is worth over \$2.5 trillion, which places it firmly within the global financial narrative (3).

Unlike traditional financial markets, where mainly institutional investors, economic indicators, and regulatory policies drive market behavior, the decentralized market space works with other dynamics (4). More specifically, the decentralized nature of

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cryptocurrencies has made online communities more active and engaged. These communities, such as X, Discord, Reddit, Telegram, and TikTok, have played a strong role in shaping investor sentiment and behavior, influencing the price and growth of the cryptocurrency community (5). For many cryptocurrencies, community engagement can drive interest, liquidity surges, and dramatic price swings, often not linked to the asset's underlying technology or real-world application.

In the cryptocurrency space, community narratives, memes, influencer endorsements, and viral posts can initiate large price swings independent of technological updates or macroeconomic conditions. An example of this is the \$Libra coin, promoted by Argentine president Javier Milei, which created massive support from the general public, taking the coin to \$5 before the eventual rug-pull of the coin (6). In these cases, trading volume and price movements were largely catalyzed by digital crowd behavior, rather than fundamentals or institutional decisions.

Despite the popularity of cryptocurrency and decentralized market spaces, academic literature on the topic remains more limited due to its disconnect with traditional finance. More specifically, academic literature on the direct relationship between community engagement and market behavior in decentralized assets remains limited. While some studies have explored sentiment analysis and media impact on Bitcoin and Ethereum, fewer have attempted to quantify how community interaction correlates with or causes changes in price and volume across a broader range of decentralized tokens (7). This research paper attempts to bridge that gap by answering the question: To what extent does community engagement influence the price valuation and the trading volume of decentralized assets, more specifically, cryptocurrency?

This study plans to investigate the relationship between community activity and market response by using quantitative analysis methods, such as trading and developer data. As the cryptocurrency/decentralized market continues to grow, understanding its behavioral and social factors is essential for investors, developers, and more. This paper aims to contribute a data-driven perspective to the intersection of decentralized finance and economic behavior.

## **LITERATURE REVIEW**

The research on community engagement and cryptocurrency market dynamics has seen increased

academic interest as decentralized finance continues to evolve. Unlike traditional finance, cryptocurrency markets are influenced by public sentiment, online activity, and developer participation, making cryptocurrencies uniquely positioned for socio-technical analysis.

Cryptocurrencies have always had high volatility and non-traditional price behaviors due to their being decentralized, unlike the traditional financial market. Currencies such as Bitcoin and Ethereum have always exhibited significantly higher volatility than traditional financial instruments due to their speculative nature and decentralization. Market manipulation and herd behavior significantly contribute to the instability of cryptocurrency prices<sup>7</sup>. Additionally, cryptocurrencies tend to run on fundamental valuation models, with price movement driven by speculative trading and collective sentiment rather than intrinsic value (8). Similarly, studies found that the Bitcoin market is extremely inefficient in the short run, displaying patterns of autocorrelation inconsistent with efficient market hypotheses (9). These factors emphasize the fact that there is a need for alternative approaches to understanding how the cryptocurrency market moves, considering both technical and community-based factors. Bitcoin volatility is influenced more by macroeconomic variables, explaining how market movements are better than external financial indicators (10).

Furthermore, online communities have also played a pivotal role in the valuation and volume of cryptocurrencies. Studies published in *The Journal of Behavioral and Experimental Finance* indicate that Twitter sentiment can produce short-term bitcoin returns, highlighting collective online behavior (5). Similarly, Reddit discussion and post volumes correlate with Ethereum price and trading volume (11). These findings align with the theory that cryptocurrencies function as a socio-technical system, where user sentiment directly impacts investor behavior and market trends.

Beyond online communities and social sentiment, developer data also offers a more consistent measure of community sentiment. Projects with higher GitHub activity maintained more stable user bases and performed better during market corrections (12). Continued technical development contributes to higher investor confidence, particularly in decentralized cryptocurrencies with public open-source contributions.

Despite a growing body of academic literature about the correlation between community activity and cryptocurrency performance, relatively few studies

integrate both factors in a single model or assess their simultaneous effects on both price volatility and trading volume. Moreover, there is limited exploration of developer activity as a proxy for community engagement and its potential impact on trading volume. This research aims to fill that gap by focusing specifically on developer engagement metrics as indicators of community engagement, and by analyzing their statistical relationship with both price valuation and trading volume across multiple cryptocurrencies over time.

## METHODS AND MATERIALS

### Data Source & Proxy Selection

The research conducted is correlational research, where quantitative data is used to find correlations. This is used to examine the extent to which community engagement, determined by the percentage of total issues closed, influences the price valuation and trading volume of cryptocurrencies, determined by the natural log of the market cap.

Developer activity is one of the strongest and reliable proxies for community engagement because it reflects direct, measurable participation in the core purpose of the community: building and maintaining the software itself. Actions such as commits, pull requests, issue discussions, and code reviews capture tangible contributions rather than passive signals like likes, followers, or page views. Other metrics, such as social media posts on Reddit, Telegram, and Twitter, can possibly be inflated by spam, where developer activity requires sustained technical expertise and is harder to fake.

### Data Collection

The sampling strategy focuses on a sample of 50 cryptocurrencies with a high level of community interaction. The final analysis, however, uses 14 cryptocurrencies due to limitations in the data. Data were extracted using the “Coin Historical Data by

ID” API (13) and processed in Python using pandas. Metrics included total issues, closed issues, and market cap, which were cleaned and standardized. Developer engagement was calculated as the ratio of closed to total issues.

### Limitations

Additionally, the study will acknowledge multiple limitations. Developer data may not reflect the broader sentiment of the cryptocurrency community, including retail investors, traders, and social media participants. Variations in repository structures, such as the use of private, multiple, or third-party repositories, can lead to inconsistencies in actual developer activity. Additionally, developer milestones may not align with market reactions, as external news and macroeconomic factors often influence market movements simultaneously. Despite the limitations, the use of developer data provides a consistent, quantifiable measure of ongoing community engagement.

## RESULTS

Table 1 shows the mean, standard deviation, 1st quartile, median, and third quartile of the market cap, total developer issues, total closed developer issues, and the percentage of the issues closed from only 14 separate cryptocurrencies. Many other cryptocurrencies were excluded due to incomplete developer metrics. The summary statistics show that the percentage of issues closed is tightly clustered around a mean of 85.4%, reflected by a low standard deviation and narrow interquartile range. In contrast, both total and closed developer issues display right-skewed distributions, indicating heterogeneity in project maturity and development intensity.

Building on this, Table 2 reveals strong positive correlations between market cap and total developer issues ( $r = 0.95$ ), as well as closed issues ( $r = 0.95$ ). The

**Table 1.** Summary Statistics for 14 Chosen Cryptocurrencies

	Market Cap	Total Developer Issues	Closed Developer Issues	Percentage of Issues Closed
Mean	23.89	2501.29	2256.29	0.85
Standard Deviation	1.77	2584.35	2481.65	0.08
1st Quartile	22.81	787.50	638.00	0.82
Median	23.38	1321.00	1174.00	0.84
Third Quartile	24.69	3144.50	2604.50	0.89

percentage of issues closed showed a moderately strong correlation ( $r = 0.71$ ). Table 3 identified a significant relationship between the percentage of closed issues and market cap ( $R^2 = 0.498$ ,  $p = 0.0048$ ). The coefficient of 16.56 indicates that increasing issue closure rates correlate with higher market valuations. The t-stat (3.45) confirms the relationship.

These statistical patterns are also evident in the

graphical results. Figure 1 illustrates a statistically significant positive correlation between total developer issues and the natural logarithm of cryptocurrency market capitalization. This suggests that visible developer activity reflects internal project dynamics and possibly influences investor confidence and perceived project value. Figure 2 highlights a clear positive relationship between the number of closed developer

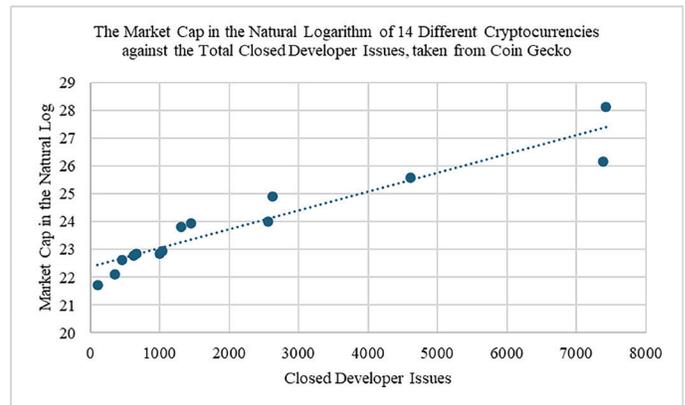
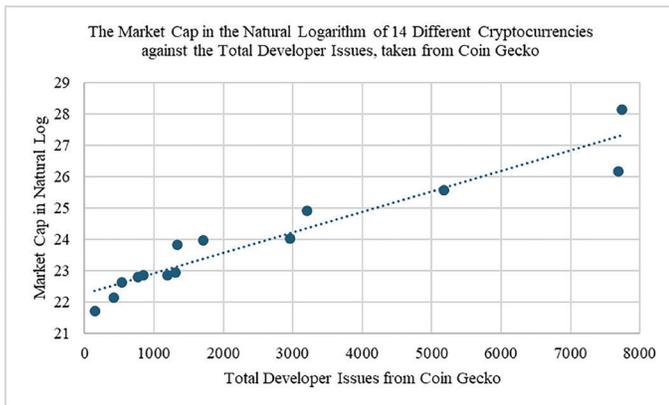
**Table 2.** Correlation Matrix for 14 Chosen Cryptocurrencies

	Market Cap	Total Developer Issues	Closed Developer Issues	Percentage of Issues Closed
Market Cap	1			
Total Developer Issues	0.95	1		
Closed Developer Issues	0.95	0.99	1	
Percentage of Issues Closed	0.71	0.66	0.68	1

**Table 3.** Regression Statistics for 14 Chosen Cryptocurrencies (Figure by Author)

Multiple R	0.71
R Square	0.50
Adjusted R Square	0.46
Standard Error	1.31
Observations	14.00

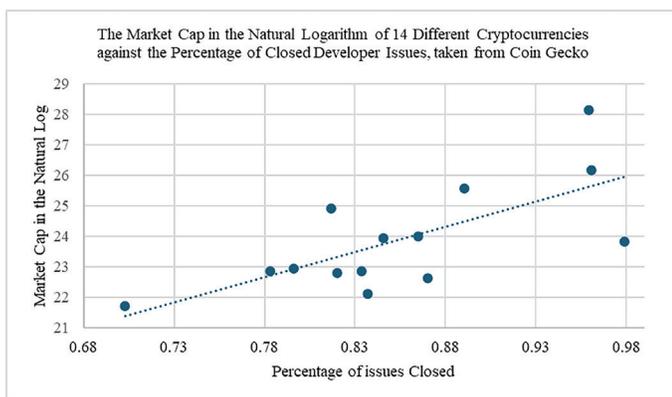
	Coefficients	Standard Error	t Stat	P-value	Lower 95%	Upper 95%	Lower 95.0%	Upper 95.0%
Intercept	9.74	4.12	2.37	0.03	0.77	18.71	0.77	18.71
Percentage of Issues Closed	16.56	4.80	3.45	0.0048	6.11	27.02	6.11	27.02



**Figure 1.** Graph Showing the Market Cap in the Natural Logarithm of 14 Different Cryptocurrencies Against the Total Developer Issues.

**Figure 2.** Graph Showing the Market Cap in the Natural Logarithm of 14 Different Cryptocurrencies Against the Total Closed Developer Issues.

issues and the natural logarithm of a cryptocurrency's market cap. This underscores that effective resolution may serve as a stronger signal of long-term project viability. Figure 3 investigates whether the percentage of closed developer issues correlates with market cap. While a positive relationship is present, it is weaker and more scattered than in previous graphs, due to the percentages being within a smaller range. However, the trend line still shows a positive slope, suggesting that a higher percentage of closed issues tends to be associated with a higher market cap.



**Figure 3.** Graph Showing the Market Cap in the Natural Logarithm of 14 Different Cryptocurrencies Against the Percentage of Closed Developer Issues.

This study's results showed compelling evidence that community engagement is significantly associated with the market valuation of decentralized assets. Specifically, the percentage of GitHub issues closed was shown to explain nearly 50% of the variance in the market capitalization of the samples of cryptocurrencies. For the summary statistics of the percentage of issues closed, it had a mean of 0.854, a standard deviation of 0.075, a median of 0.841, and an IQR of 0.0677. Again, the values are tightly clustered around a high mean, with a low IQR and deviation. This metric could be a reliable indicator of developer responsiveness or efficiency, as outliers are less likely.

From the correlation matrix, we can observe that developer engagement metrics, particularly total issues ( $r = 0.95$ ) and closed issues ( $r = 0.95$ ), are highly collinear with market cap. However, due to multicollinearity between total and closed issues ( $r = 0.998$ ), the regression focused on the percentage of issues closed, which allows

for interpretation. This was formally assessed using Variance Inflation Factors (VIFs), which for both metrics were 10, confirming redundancy and the potential inflation of regression standard errors. To address this, the regression analysis employed the percentage of issues closed as the primary predictor, a variable whose VIF remained below 2, thereby satisfying the multicollinearity diagnostic. The summary statistics further revealed that this percentage metric is symmetrically distributed and relatively stable across projects (mean  $\approx 0.85$ , STDV  $\approx 0.075$ ), enhancing its reliability as a predictor.

The regression analysis yielded a coefficient of 16.56 for the predictor variable, suggesting that a full unit increase in issue closure rate (from 0% to 100%) corresponds with a 16.56-unit increase in market cap. As there is an extremely narrow range of closed issues (81% to 89%) even a 5% increase in closure efficiency is associated with a meaningful rise in estimated market value. Additionally, the p-value of 0.0048 and t-statistic of 3.45 indicate that the relationship is powerful at significant levels.

## DISCUSSION

However, despite the strength of these findings, several limitations should still be acknowledged. First, the small sample size of 14 cryptocurrencies limits the generalizability of the results and increases sensitivity to outliers. Second, while the percentage of issues closed captures one section of community engagement, it does not account for other relevant factors, such as code quality, social sentiment, or user participation. Furthermore, the model is focused solely on market capitalization as the dependent variable. While market cap is a meaningful representation of the perceived value of a cryptocurrency, it does not capture other important market behaviors such as price volatility or trading volume, both of which may also be influenced by community engagement but require more complex models to assess accurately.

The findings of this study have important implications for developers, founders, and stakeholders involved in launching or managing early-stage cryptocurrency projects. In an increasingly competitive cryptocurrency market due to rising popularity, responsiveness to technicals may function as a signaling mechanism. A high percentage of closed issues, when made publicly visible through open-source platforms such as GitHub, may enhance a project's credibility and transparency in the eyes of both investors and users. Developer

responsiveness may matter for investor confidence by allowing them to have trust in the coin. This allows investors to invest safely without worrying about a possible exit scam or rug pull.

Additionally, for developers launching new cryptocurrencies seeking initial funding or public traction, this is particularly relevant. By investing in processes that support online resolutions, such as well-managed repositories, active maintenance teams, and well-developed feedback loops, new projects can strengthen their legitimacy and foster long-term investor confidence. Developers who have higher responsiveness allow for higher investor trust in their coins, possibly influencing a higher market valuation. Overall, developer responsiveness is not only a technical consideration but a strategic asset that can influence financial outcomes.

This study may open several avenues for future inquiry. Future studies on this should expand the scope of analysis and add additional variables to the model, such as developer count, user sentiment, and commit frequency, which can be further explored using multivariate regression models that capture the complexities of decentralized systems. A longitudinal study may also be employed to explore how changes in developer engagement over time impact market behavior, including volatility, liquidity, and investor retention, which will require the use of different variables from a more complex API. Additionally, there may be additional research done on forums and cryptocurrency spaces that may provide a further outlook into how markets may move based on engagement.

## CONCLUSION

This study examined the extent to which community engagement, specifically developer responsiveness, affects the market performance of decentralized assets. Studies have shown that community engagement, such as projects with higher GitHub activity, maintains more stable user base and performs better during market corrections (6). The results demonstrate a statistically significant relationship between the percentage of GitHub issues closed and cryptocurrency market capitalization, indicating that developer efficiency serves as a credible factor for perceived project value. These findings, therefore, suggest that technical development not only reflects internal project health but also plays a role in shaping investor confidence and market outcomes.

Given the implications of these results, firstly, developer responsiveness may function as a proxy for

both the confirmation of project legitimacy and investor trust as well. In a system where traditional valuation metrics such as ratios are unreliable, active open-source development becomes almost vital for project credibility. Secondly, this study also highlights the merging of transparency and market psychology in decentralized systems. Projects that typically demonstrate regular updates and responses to user concerns will likely develop a more resilient investor community. Hence, developer engagement is not only a metric but also important to how value is perceived in decentralized markets. For stakeholders in the project, particularly in the early stage, this research suggests that investing in maintaining public repositories, prioritizing issue management, and holding an active development community can lead to better financial performance, differentiating themselves in a saturated market.

Further work should continue to refine these insights, incorporating broader datasets, alternative engagement metrics, and qualitative data on forums and social media to better capture the effect of community engagement. By continuing to unpack these measures, researchers can enhance the predictability and sustainability of digital financial networks.

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## CONFLICT OF INTEREST

The author declares that there is no conflict of interest related to this work.

## REFERENCES

1. Catalini C, Gans J. Some simple economics of the blockchain. *NBER Working Paper Series*. 2016. Available from: [https://www.nber.org/system/files/working\\_papers/w22952/w22952.pdf](https://www.nber.org/system/files/working_papers/w22952/w22952.pdf) (accessed 2025-11-05). <https://doi.org/10.3386/w22952>
2. Chohan U. The double spending problem and cryptocurrencies. *SSRN Electron J*. 2021. Available from: <https://ssrn.com/abstract=3090174> (accessed 2025-11-05).
3. Bloomberg. Bloomberg Crypto Market Analytics. Bloomberg; 2025. Available from: <https://www.bloomberg.com/crypto> (accessed 2025-11-05).

4. Corbet S, Lucey B, Yarovaya L. The financial market effects of cryptocurrency. *J Int Financ Mark Inst Money*. 2019. Available from: <https://ssrn.com/abstract=3412194> (accessed 2025-11-05). <https://doi.org/10.2139/ssrn.3412194>
5. Mai F, Shan Z, Bai Q, Wang XS, Chiang RHL. How does social media impact Bitcoin value? A test of the silent majority hypothesis. *J Behav Exp Finance*. 2018; 20: 1-9. <https://doi.org/10.1080/07421222.2018.1440774>
6. Reuters. Argentine president's endorsement sends meme coin surging before collapse. Reuters; 2024. Available from: <https://www.reuters.com/technology/politician-linked-meme-coins-backfire-after-libra-scandal-2025-02-21/> (accessed 2025-11-05).
7. Gandal N, Hamrick JT, Moore T, Oberman T. Price manipulation in the Bitcoin ecosystem. *J Monet Econ*. 2018; 95: 86-96. <https://doi.org/10.1016/j.jmoneco.2017.12.004>
8. Corbet S, Lucey B, Yarovaya L. Datestamping the Bitcoin and Ethereum bubbles. *Finance Res Lett*. 2018; 26: 81-8. <https://doi.org/10.1016/j.frl.2017.12.006>
9. Urquhart A. The inefficiency of Bitcoin. *Econ Lett*. 2016; 148: 80-2. <https://doi.org/10.1016/j.econlet.2016.09.019>
10. Blau BM. Price dynamics and speculative trading in Bitcoin. *J Empir Finance*. 2017; 43: 159-74. <https://doi.org/10.1016/j.ribaf.2017.05.010>
11. Phillips RC, Gorse D. Predicting cryptocurrency price bubbles using social media data and machine learning. arXiv Preprint. 2018; arXiv:1703.04703. Available from: <https://arxiv.org/abs/1703.04703> (accessed 2025-04-15).
12. McGillivray A, Sinha S, Guestrin C. GitHub open-source contributions as indicators of cryptocurrency project success. arXiv Preprint. 2019; arXiv:1906.05431. Available from: <https://arxiv.org/abs/1906.05431> (accessed 2025-04-15).
13. CoinGecko. CoinGecko API authentication (public/demo). CoinGecko; 2025. Available from: <https://docs.coingecko.com/v3.0.1/reference/authentication> (accessed 2025-04-04).