

Financial micro-incentives and internet discourse: Evidence from a Bitcoin based discussion platform*

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Abstract

We study the role of financial micro-incentives in driving user behavior on a Bitcoin-based discussion platform. On the platform, users must pay Bitcoin to post but can also earn tips from other users for posting good content. We find three main results. First, when the cost to post in a subforum increases, the number of posts in that subforum decreases but the quality of the posts increases. Second, the incentive to earn tips leads to higher post quality over time as users learn what content others value. Third, unprofitable users are more likely to leave the platform while profitable users are more likely to stay. The findings suggest that financial micro-incentives may be effective tools to improve the quality of discourse in online discussion platforms. Moreover, the incentives present on the platform are only possible because of Lightning Network’s ability to instantaneously process small, global micro-payments, thus highlighting an important use case of Bitcoin.

Keywords: social media, bitcoin, market design, signaling, learning, knowledge production

JEL Classification: D82, D83, L82

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1 Introduction

Public discourse for matters both mundane and substantive is increasingly mediated through online discussion platforms. Newman et al. (2025) estimates that usage of social media as a source of news in the U.S. rose from 27% to 54% between the years 2013 and 2025, and McClain et al. (2024) shows that the most popular social media platform for political news is the discussion platform X. There is growing recognition that the incentive structures governing these platforms is a crucial factor determining whether conversations proceed in healthy or unhealthy directions (Aridor et al., 2024). Concerns about online discourse have become prevalent enough that governments around the world are exploring regulatory frameworks for moderating online content, with the EU’s Digital Services Act being a prominent example.

Most online discussion platforms are free to use. Some may charge for premium features, but these features are usually related to removing ads, content management tools, and features for gaining visibility or monetization. Few platforms charge a direct cost to post, and fewer still allow users to pay each other directly for content that they appreciate. Instead, the exchange of value between content creator and content consumer tends to be mediated through indirect mechanisms, such as ad revenue, visibility, and reputation—often referred to as “clout”—which may indirectly benefit the content creator’s endeavors outside the discussion platform proper. The indirect nature of these mechanisms may result in misaligned incentives between content creators and content consumers. For example, content creators may be more incentivized to create content that readers will *click*, rather than content that readers will actually read, digest, and ex-post appreciate the creator for producing.

There are a few reasons why online discussion platforms may not want to charge posting fees or allow users to pay each other. For one, economies of scale and network

effects suggest that platforms would want to onboard as many users with as little cost to the user as possible. But another, perhaps less appreciated reason is frictions in the payments infrastructure. The value of any individual post or comment is likely quite small, too small to cover the fixed fees for credit card transactions. Fee-less payments networks like Venmo do exist, but they usually have strict volume limits and charge fees to frequent users. Moreover, most popular discussion platforms, like X and Reddit, are international in scope. Routing payments between international users introduces multiple layers of frictions related to currency exchange and international banking regulations. Because of these frictions, no mainstream discussion platform currently charges for posts or allows users to pay each other directly via the platform.

Despite this, there is good reason to believe that charging fees for posts and allowing users to pay each other directly could increase the quality of content posted. Signaling theory suggests that posting costs can be an effective deterrent against spam (Joseph and Thevaranjan, 2008). Empirically, Tchernichovski et al. (2019) showed that introducing a small fee to an online rating system filtered out low information signals and led to higher correlation between review ratings and quality. Empirical studies from other social media platforms have also shown that financial incentives in the form of revenue sharing can influence the quantity and quality of content (Sun and Zhu, 2013; El-Komboz et al., 2023; Kerkhof, 2024), though none of these studies investigated direct peer-to-peer payments and posting costs in online discussion platforms.

To our knowledge, there is little work to date about the impact of direct monetary incentives in online discussion platforms, despite its potential impact on the quality of online discourse. This paper aims to fill that gap using a unique dataset from an online discussion platform called Stacker News. Stacker News is an internet message board in the style of Reddit that uses Bitcoin micropayments sent over the Lightning

Network. Users can send each other Bitcoin micropayments, called “zaps” (usually on the order of 1-100 satoshis, but sometimes ranging into the thousands) to reward each other for posting content that they enjoy and to encourage the production of similar content. The platform also uses micropayments as a form of sybil, spam, and bot resistance. Users must pay a fee to post, which discourages them from posting low quality content or from creating sock puppet accounts. Users who consistently post high quality content can earn enough zaps to turn a profit net of posting fees. The micropayments on Stacker News are made possible by the low cost, instantaneous transaction speed, and international connectivity of the Lightning Network.

Because payments on Stacker News are made with real money (Bitcoin), it is an ideal setting for studying how financial micro-incentives affect internet discourse. There is variation in posting fees across time and across the platform’s various sub-forums (called territories). This group-level temporal variation allows us to study how content quality and content quantity change when posting costs change. Using a difference-in-differences strategy, we find that the quality and quantity of posts are indeed responsive to territory posting fees. The results indicate that when a territory doubles its posting cost, the expected number of weekly posts is reduced by 16.8%, but the expected quality of posts (as measured by zaps received in the first 48 hours) is increased by 16.4%. These results suggest that requiring users to pay to post can improve the quality of content posted. In addition to these findings, we also find that the incentive to earn tips via zaps leads to better content quality over time, and that unprofitable users are more likely to leave the platform while profitable users are more likely to stay.

Our results suggest that equipping online discussion platforms with financial incentives in the form of posting costs and direct peer-to-peer micropayments can improve the quality of internet discourse. It also highlights a clear use case for the

utility of Bitcoin and the Lightning Network, because the small, global, low-cost, and instantaneous micropayments on Stacker News are not currently possible within the traditional banking system. This research therefore adds to the growing body of evidence showing how Bitcoin adoption enables new markets and influences real world outcomes—in this case, in the realm of internet discourse.

2 Incentive structures on Stacker News

From its outset, Stacker News was founded with the idea of using Bitcoin micropayments to incentivize quality content and good behavior. Its motto is “Stacker News is trying to fix online communities with economics.” There are a number of incentive structures built into the design of Stacker News.

Pay to post. First, users must pay to post. The posting cost is denominated in sats and varies by territory.¹ A territory is a sub-forum on Stacker News, usually topic-specific. As of October 2025, the most popular territories are `bitcoin`, which focuses on discussions about Bitcoin; `econ`, which focuses on news and discussion about economics; `Stacker_Sports`, which focuses on sports discussion; `AI`, focused on news and discussion about artificial intelligence; and `Politics_And_Law`, focused primarily on politics and current events.

Territories are created, owned, and operated by individual users on Stacker News. To create a territory, a user simply has to choose a name for the territory, write a description, and pay a monthly cost to Stacker News to maintain the territory. As of October 2025, the monthly cost to operate a territory is 50,000 sats.² If a territory

¹One sat (or Satoshi) is equal to 1/100,000,000th of a Bitcoin.

²Territory owners can also pay for 12 months at a time for 500,000 sats, or pay for a territory in perpetuity if they pay 3 million sats.

owner fails to pay the monthly cost, the territory becomes archived. Users are still able to see posts in an archived territory, but they can no longer post in it. Any user (it doesn't have to be the territory founder) can unarchive a territory simply by choosing to pay the monthly cost.

Once a new territory is founded, users can post in that territory by paying a posting fee which is set by the territory owner. The territory owner earns 70% of the posting fee as revenue, and the other 30% goes to a daily rewards pool (more on that later). Territory owners are therefore incentivized to choose a posting fee that optimizes between post quantity, post quality, and revenue earned. If the posting fee is too low, the territory may not earn enough revenue to cover costs, and it may also attract low quality posts. On the other hand, if the fee is too high, users may be deterred from posting in the territory. Users are incentivized to post in the territory that best fits the topic of their post so as to maximize engagement and sats earned net of posting fees. Territory owners can additionally attract users to post in their territories by creating engaging content or by adding value to users' posts. For example, the owner of the **Stacker_Sports** territory often runs sports prediction games for users to engage in, and the owner of **BooksAndArticles** writes a weekly newsletter to highlight the territory's best posts, thus adding visibility and additional zaps for those creators.

Value for value. Second, users can tip each other directly for content that they like. In the Bitcoin community, systems that allow users to directly tip each other are called "value-for-value" systems. On Stacker News, these tips are called "zaps". To zap an item, the user clicks a lightning bolt icon which is featured prominently on every post and comment. When the user clicks the lightning bolt, sats are sent from the user to the creator of the item. The default zap amount is 100 sats, but users can

customize their own defaults. They can also long-press the lightning bolt icon to zap a custom amount.

Like Reddit upvotes, zaps are used by the platform to surface high quality content—the default view on Stacker News ranks posts based on the trust-weighted value of zaps earned by the post (more on the trust system later). Unlike Reddit upvotes, zaps represent real monetary value transferred from the zapper to the creator of the post. The zapping system incentivizes high quality content in two ways: not only does the system surface higher quality posts to the top of the home page, but it also lets creators of high quality content get paid directly by other users for their work.

While it is clear how zapping incentivizes content creators, it is not as clear what incentives users have to zap. Economists who have studied tipping in non-digital contexts have argued that tipping is not well explained by considerations of future value (Azar, 2020) and have instead focused on altruistic “warm glow” effects (Andreoni, 1990; Crumpler and Grossman, 2008). However, these are contexts where interactions are generally not repeated and where the payment includes a deterministic price along with an optional tip. On Stacker News, users have repeated interactions with each other and there is no fixed reward for content creators other than tips. The incentive model may therefore be closer to that of a “pay-what-you-want” system, in which tipping is rationally used to ensure that producers do not switch to a less advantageous pricing model for consumers (Mak et al., 2015); in the case of Stacker News, the consequence of not tipping could be a reduction in content production that the user enjoys. Whether users zap due to an altruistic desire to reward content that they enjoy, or by a rational incentive to support the continued production of such content, we do observe a healthy amount of zapping on Stacker News. We also find that the amount of zapping is correlated to objective measures of post quality.

Two additional features of zapping are worth mentioning. First, only 70% of the

zap amount is received by the content creator. 21% of the zap amount goes to the owner of the territory where the item was posted. Through this, territory owners are additionally incentivized to encourage high quality content in their territories. The remaining 9% of the zap goes to the daily rewards pool. This 30% “tax” on zaps is a form of sybil resistance: it discourages users from creating sock puppet accounts to zap their own content.

The second feature worth noting is that prior to January 3, 2025, Stacker News acted as a custodial Lightning wallet. Users zapped each other using sats stored in their Stacker News accounts, which they could fund or withdraw at any time using the Lightning network. After January 3, 2025, Stacker News decided to stop holding custody of user funds. Instead, it allowed users to attach their own Lightning wallets to the platform. Users with attached wallets could continue zapping each other with real sats directly over the Lightning Network, but funds would not be stored on Stacker News. Users who did not attach wallets were no longer able to send or receive real sats. Instead, they would send and receive “Cowboy Credits”, tokens usable only on Stacker News whose value is pegged 1:1 to the value of a sat. Cowboy Credits (CCs) can be used on Stacker News to pay for anything a sat could pay for, including territory billing costs, posting fees, and zaps. In most of our analysis, it is appropriate to treat CCs and sats as interchangeable for user behavior on Stacker News. Where there are differences, we will highlight them in the subsequent analysis.

Daily rewards. Third, Stacker News incentivizes user behavior with a daily rewards system. As already mentioned, 30% of posting fees and 9% of zaps go to the daily rewards pool. There are three other main sources of daily rewards. First, users can donate directly to the rewards pool. This is not common, and is utilized primarily by users associated with Stacker News, like its founder and employees. Second, users

can post anonymously under a dedicated **anon** account. Any zaps earned by the **anon** account are sent to the rewards pool. Third, users can pay to boost their own posts. Boosting increases the post’s visibility based on the amount paid. When a user pays to boost a post, 70% of the amount goes to the owner of the territory that the post is in and 30% goes to the daily rewards pool.

Users are allocated sats from the daily rewards pool according a formula that depends on user behavior in that day. Users are rewarded for highly zapped posts and comments, as well as for zapping other highly zapped posts and comments early. The reward system amplifies the already present incentives to post good content, but it also incentivizes users to help identify and surface good content by zapping good content early.

Web of trust. Fourth, Stacker News maintains a user reputation system that it calls the “Web of Trust” (WoT). The WoT is a modified PageRank algorithm in which trust flows from one user to another when the first user zaps the second, or when the first user zaps an item that the second user already zapped. Trust therefore flows in the direction of preference similarity between users. The steady state of the diffusion network generated by these trust relations defines the trust level of each user.³

Trust matters on Stacker News for a number of reasons. First, the default sort order on the home page ranks posts according to trust-weighted zaps. Thus, the zaps of users with high trust scores have a greater influence on which posts surface to the top of the front page. Trust also influences the amount of rewards a user receives from the daily rewards pool.

Since trust is a metric that is calculated using the entire history of users’ interactions with each other, it is difficult for a user to unilaterally improve their trust

³See the appendix for a more detailed discussion of the Web of Trust computation.

score in a short period of time. The only way for a user to improve their trust score is through a prolonged period of good behavior, which includes posting good content and zapping good content early. The trust system therefore incentivizes user behavior over longer horizons than posting fees, zaps, and daily rewards.

Market-based content moderation. Lastly, Stacker News does not employ any content moderators, nor are there formal moderators in any territory other than the territory owners. Instead, Stacker News utilizes a form of market-based content moderation called “downzaps”. A downzap is like a zap, except the zapper pays to *downweight* the zapped item in any search or sort rankings. If enough users downzap an item, it becomes “outlawed” and will be hidden from view for most users.⁴

Getting downzapped or outlawed is not a good outcome for the item creator. It lowers the item’s visibility and makes it less likely that the post will accumulate zaps. Since posting requires fees, this makes it more likely that the poster will lose money on the post. Moreover, getting downzapped lowers a user’s trust score, which reduces their ability to earn rewards or influence other users’ post rankings.

The requirement for downzaps to be paid with sats is an important feature of this system. It prevents users from frivolously downzapping other users and it prevents users from spinning up sybil accounts to do the same. By requiring a monetary payment for downvoting, Stacker News ensures that only content which is truly objectionable to the user gets downzapped.

Hypotheses. Based on the above discussion, we hypothesize the following about the incentive structures on Stacker News. First, we hypothesize that higher posting costs will lead to fewer posts in a territory, but higher quality posts. Second, we hy-

⁴Users can opt in to seeing outlawed content in their settings.

pothesize that the types of content that are better rewarded by zaps will increase in prevalence over time, as users learn that those kinds of content are better rewarded. Third, we hypothesize that consistently unprofitable users are more likely to eventually leave the platform, whereas consistently profitable users are more likely to stay. We test these hypotheses one by one in the following sections of the paper.

3 Data

To test these hypotheses, we downloaded a snapshot of the Stacker News database on October 5, 2025. The data covers the time period from June 11, 2021 to October 5, 2025 and contains 207,219 posts and 914,266 comments (replies), for a total of 1,121,485 items posted by 11,228 users across 117 territories. Over this time period, users zapped each other 146 million sats and paid 13 million sats in posting fees.

In addition to the Stacker News data, we downloaded daily Bitcoin price data from CoinMarketCap.com. At the time of writing, the price of one Bitcoin is approximately US\$100,000, which would make 1,000 sats worth approximately \$1. This is a useful rule of thumb for converting between sats and dollars when trying to evaluate the economic significance of Stacker News micropayments.

Figure 1 shows the growth in Stacker News, as measured by weekly number of items posted, alongside the weekly Bitcoin price. In aggregate, both the Bitcoin price and the activity on Stacker News grew over this time period. Curiously, the activity on Stacker News appears to lead Bitcoin price action, which may suggest that Bitcoin discussion intensifies prior to the announcement of major news. While plausible, we do not test this particular hypothesis in this paper.

4 Pay-to-post and content quality

In this section, we consider our first hypothesis: whether higher posting costs lead to fewer posts in a territory, but higher quality posts. To test this, we consider two measures of post quality: 1) the number of sats the post earns on zaps in the first 48 hours of posting; and 2) the number of replies the post generates in the first 48 hours. We focus on the first 48 hours so as not to advantage older posts in the quality measure, and also because 94 percent of all sats and 90 percent of all comments are earned within the first 48 hours.

In addition, we apply the following sample selection criteria. We do not include posts in the **AMA** territory or the **jobs** territory because these territories seem to operate on different incentive structures than the other ones.⁵ We also do not include a number of special post types that do not follow normal posting rules.⁶ Lastly, we do not include any posts made in territories by the owner of the territory. Since 70% of posting costs go to the territory owner, the incentives for territory owners to post in their own territories differ from that of non-owners.

Let i index a post, let j index the territory that the post was made in, and let t index the week that the post was made. The basic regression that we run is as follows:

$$\ln \text{Quality}_{ijt} = \alpha \ln \text{Cost}_{ijt} + \delta_j + \gamma_t + \epsilon_{ijt} \quad (1)$$

where Quality_{ijt} is the measure of post quality, Cost_{ijt} is the cost (in sats) of the post,

⁵**AMA** is a territory where influential people can make “Ask Me Anything” posts. Because these posters are influential, posts in the **AMA** territory earn an unusually large amount of sats, and the posters are unlikely to be motivated by posting costs. **jobs** is a territory run by Stacker News in which companies can make job advertisements.

⁶These include profile posts, which users can post and edit for free, “saloon” posts, which are daily discussion threads posted by Stacker News, and freebies—a limited number of reduced-visibility posts that users are allowed to make for free.

δ_j is a set of dummy variables for each territory, and γ_t is a set of dummy variables for each week. The coefficient α identifies the elasticity between posting cost and post quality.

The regression is a difference-in-differences regression, in which the causal effect of posting cost is identified from differential changes in post quality across territories when territory posting costs change differentially. For example, if the posting cost in the `econ` territory increases while the posting cost in `bitcoin` stays the same, and subsequently the average quality of posts increases in `econ` relative to `bitcoin`, this would suggest that the change in posting cost likely caused the change in post quality. The coefficient α is identified off the many such changes present in the data.

To give the reader a sense of the variation in posting costs, we plot the posting cost histories for four representative territories in Figure 2. The figure shows that there is indeed substantial variation in posting fees both across and within territories. Altogether, the data contains 199 changes in territory posting fees across the 117 territories. In the data we use for the regression, the average posting cost is 51 sats, the average amount of sats earned in the first 48 hours is 364 sats, and the average number of comments in the first 48 hours is 3.3. There is substantial variation in all three: the standard deviation of the posting cost is 241 sats, of sats earned in the first 48 hours is 6,662, and of comments in the first 48 hours is 9.6.

Table 1 shows results for regressions of specification (1) where post quality is measured as zaps in the first 48 hours. Each column of Table 1 includes a different set of fixed effects in the regression. Column 1 includes no fixed effects, and is therefore a straight OLS regression of log zaps in the first 48 hours on log posting cost. Column 2 includes territory fixed effects to control for any heterogeneous effects between territories. Column 3 additionally includes week fixed effects to control for global time trends in zapping behavior on Stacker News. Lastly, column 4 includes

fixed effects for the identity of the territory owner to control for the zapping behavior of territory owners. For example, some territory owners zap every post that comes into their territory while others do not. Territory-owner fixed effects control for this behavior.⁷

Table 1 shows that there is a statistically significant and robust positive relationship between territory posting fees and post quality as measured by zaps in the first 48 hours. In terms of the magnitude of the effect, Table 1 column 4 (our preferred specification) suggests that if a territory doubles its posting cost, then the quality of posts, as measured by zaps in the first 48 hours, is expected to increase by 16.4 percent. The relationship is not explained by territory specific effects, such as a spurious correlation between posting fees and the popularity of a territory’s topic, nor is it explained by global time trends in posting fees and zap behavior on Stacker News. Nor is it explained by effects related to territory owners—for example, if territory owners who set high fees also tend to zap posts in their territory more generously. The best explanation for the correlation between posting cost and post quality is that users will only choose to post in a higher cost territory if they think that the post is of high enough quality to warrant the cost. One Stacker News user is quoted saying:

“If I put a lot of effort into a post, I know that the posting fee will be offset by the zaps. And even if it doesn’t, I’m just happy to show the work I’ve done and I’m ready to pay for it. On the other hand, when I share a simple link with a few quick comments and quotes, it takes me a few minutes, and I look for the cheaper territory to post it. If I don’t find any cheap territory, I’d rather not post, as I don’t think paying to post

⁷Note that territory fixed effects do not fully absorb territory owner fixed effects, since a single user can own multiple territories, and territories can change owners over time.

for links is worth the same as paying to post for actual proof-of-work.”⁸

It makes sense that users will only be willing to pay a high posting cost if they think the quality of the post justifies it—either because they will recuperate the cost through zaps or because of a stronger intrinsic desire to post high quality work. However, one may wonder why users don’t just choose a low cost territory to post in. There is no rule on Stacker News that says you must post content to the most relevant territory. Moreover, most territories on Stacker News are lightly moderated, so posting content to an irrelevant territory is not likely to result in post removal. However, in practice we observe that users tend to post in territories for which the content is most relevant. This may be for a few reasons. First, users can subscribe to or mute territories.⁹ Thus, posting in a more relevant territory will increase the visibility of your post to users who are most likely to be interested in it. Second, territory owners sometimes add value to their territories by collecting, summarizing, and rewarding top posts. Your post is less likely to be highlighted if it is not relevant to the territory. Lastly, users may have an intrinsic, aesthetic desire to post in the most relevant territory, especially if they view their content to be of high quality.

Next, we present results when the number of comments in the first 48 hours is used to measure quality instead of the number of zaps. The results are presented in Table 2. As with zaps, Table 2 demonstrates that there is a robust and statistically significant positive relationship between territory posting cost and the number of comments a post receives in the first 48 hours. Table 2 column 4 implies that when territory posting cost doubles, the number of replies a post in that territory is expected to

⁸In this statement, the user is referring to link posts, which are posts that include a link to an external URL, often without any text in the post body. Link posts usually receive less zaps and are considered to be of lower quality because the content is not produced by the user themselves, and are thus less rewarded by zaps.

⁹Subscribing to a territory means you will receive notifications when a new post is made to that territory. Muting a territory means that you will no longer see posts from that territory.

receive in the first 48 hours increases by 3.0 percent.

Now we consider whether territory posting cost also influences the number of posts a territory receives. If users are sensitive to posting cost, then we expect that territory posting fee will be negatively correlated with number of posts. To test this, we run regressions of the following form:

$$\ln \text{Posts}_{jt} = \alpha \ln \text{Cost}_{jt} + \delta_j + \gamma_t + \varepsilon_{jt} \quad (2)$$

where j indexes a territory and t indexes a week. Posts_{jt} is the number of posts posted in territory j in week t , Cost_{jt} is territory j 's posting fee in week t (measured as the average across days), δ_j is a set of territory fixed effects, and γ_t is a set of week fixed effects. The results of this regression, for various combinations of fixed effects, is presented in Table 3. As expected, there is a robust and statistically significant negative relationship between territory posting cost and the quantity of posts in a territory. Using column 4 as our preferred specification, the results imply that when the posting cost in a territory doubles, the territory can expect to receive 16.8 percent fewer posts in a week.

Taken together, the results are both surprising and unsurprising. They are unsurprising in the sense that they conform with economic theory: demand curves slope downwards (when posting costs go up, number of posts goes down), and signaling theory works (when posting costs go up, higher quality posts are made). They are surprising in the sense that even such small micro-incentives (the average posting cost is just 51 sats, or about 5 cents) are enough to influence user behavior in such a way that post quality is improved. The results suggest that pay-to-post may be an effective mechanism for mediating content quality, even at very small monetary amounts.

5 Value-for-value incentives and content quality

We now consider our second hypothesis: that the types of content better rewarded by zaps will increase in prevalence over time as users learn that these kinds of content are better rewarded.

To test this hypothesis, we first need a method for categorizing posts into different quality types. Although many classification schemes could be considered, we opted for the simplest approach of a binary classification into “high quality” and “low quality” posts based on transparently observable content characteristics. The simple and transparent classification scheme assists with the interpretability of the results.

We label posts as “high” or “low” quality based on three easily observable post characteristics: the number of words in the post, whether the post body contains images or links, and whether the post is a “link post”. On Stacker News, there are two main types of posts: “discussion posts” and “link posts”. There is no difference between the two in terms of costs. The only technical difference between a link post and a discussion post is that a link post contains a URL next to the title of the post. Users of Stacker News generally consider link posts to be of lower quality than discussion posts because link posts usually reference someone else’s work and is less likely to contain original content. The most common type of post on Stacker News is a link post with no text in the post body, i.e. a post that points to another URL with no additional commentary. Users *can* add text to the body of a link post. The most common reasons for doing this are to add quotations from the linked URL (to preview the linked content), or to add the user’s own commentary regarding the linked URL. When users add their own commentary, link posts tend to be better rewarded than if the user only adds quotations or if the user doesn’t add any text to the post body.

In contrast to a link post, a discussion post does not link to a URL. Discussion

posts are usually original content from the poster. There is a wide range of discussion posts: commentary, essays, fiction, poetry, book and movie reviews, discussion questions, math puzzles, and more. Discussion posts tend to be better rewarded than link posts because they contain more of the poster’s original thoughts. Figure 3 shows an example of a link post without body text and an example of a discussion post. The link post, which links to a news article without providing further context, has earned zero sats after three hours. By contrast, the discussion post, which is a personal reflection of the user’s time in South Africa, earned 10,000 sats in two hours.

Besides whether or not a post is a link post, we consider two additional indicators of quality: the number of words in the post body and whether the post body contains images or links. Posts with a larger number of words usually contain more original thought and more interesting content than posts with fewer words, and are thus usually better rewarded. Images in posts are also an indicator for quality as they help the reader visualize what the poster is writing about. Finally, links in the post body are usually citations or references to provide evidence and context to the matter being discussed in the post.

Table 4 shows how the amount of zaps and the amount of comments a post receives in its first 48 hours is related to the features discussed above. The table shows that all else equal, link posts are indeed more poorly rewarded than discussion posts, both in terms of zaps and in terms of comments. Posts that contain more words are also better rewarded than posts that contain fewer words. Images and links in the post body seem to improve a post’s quality when the post contains many words, but not when the post contains fewer words. This may be due to some posts being “meme posts” (i.e. a post that contains only an image meme—it would still count for words in the post body because the image URL counts as a word) or posts that are functionally like link posts in the sense that they only contain a few links with little context or

discussion.

Based on the results in Table 4, we categorize a post as “high quality” if it is either:

- a discussion post with more than 50 words, or
- a link post with more than 50 words *and* images or links in the post body;

and “low quality” otherwise. In addition, we apply the same sample selection criteria as we used in section 4 with one difference: we no longer exclude posts made by the owner of the territory the post is in. We no longer exclude these posts because territory owners receive zaps just like anyone else and face similar incentives to make high quality posts in their territory as any other user. With these definitions and sample selection criteria applied, we count 44,682 high quality posts and 146,652 low quality posts over our data period.

Figure 4 plots the share of high quality posts by week and shows that the share of high quality posts have been increasing over time. This result is consistent with our hypothesis that the value-for-value incentives on Stacker News encourage the production of higher quality content over time.

We now turn to the next part of the hypothesis: that users are more likely to make high quality posts after learning that such posts are better rewarded. If the hypothesis is true, then the data should show that users are more likely to make high quality posts after they have personally been well zapped for prior high quality posts. To test this, we run regressions of the following form:

$$\text{HighQuality}_{ijt} = \alpha \text{HQShare}_{ijt} + \mathbf{X}_{ijt}\beta + \epsilon_{ijt} \quad (3)$$

where i indexes the post, j indexes the user who made the post, and t indexes the

week the post was made. HighQuality_{ijt} is a binary indicator for whether or not post i is high quality, and HQShare_{ijt} measures the share of the user’s prior received zaps that came from high quality posts (i.e. $\text{HQShare}_{ijt} = 0.5$ indicates that half of the user’s prior zaps came from high quality posts). \mathbf{X}_{ijt} is a vector containing other controls, and ϵ_{ijt} is the error term. Our hypothesis is that $\alpha > 0$, indicating that users who earn a greater share of their zaps from high quality posts are more likely to *subsequently* also make high quality posts. In our preferred specification, \mathbf{X}_{ijt} contains the following controls:

- The log of the total amount of prior zaps,
- The share of the user’s prior posts that were high quality
- The log of the user’s number of prior posts
- Week fixed effects

The regression therefore tests the following thought experiment: imagine two users A and B with the same amount of prior zaps and prior posts, and the same share of prior posts that were of high quality. If user A received more of their prior zaps from high quality posts compared to user B, is user A more likely to subsequently make high quality posts than user B?

Table 5 reports the results for regression (3). Column 1 includes only the share of prior zaps coming from high quality posts as a regressor. Column 2 adds the log of the total amount of prior zaps as an additional control. Column 3 adds the share of the user’s prior posts that were of high quality as well as the log of the number of prior posts. Column 4 adds week fixed effects to control for global time trends in post quality. Using column 4 as the preferred specification, the results suggest that a user who has earned 75% of their prior zaps from high quality posts is 6.4 percentage

points more likely to make a high quality post as their next post than a user who has earned 25% of their prior zaps from high quality posts. The magnitude of this effect is fairly significant, since only 23.4% of all posts are high quality. Thus, the difference in the rate of making high quality posts between someone who has previously earned 75% of their zaps from high quality posts compared to someone who previously earned 25% is about one-fourth the baseline probability of making a high quality post.

6 Profitability and user retention

We now test our last hypothesis: that consistently unprofitable users are more likely to exit the platform, whereas profitable users are more likely to stay.

To measure profitability, we only consider whether the user is able to earn enough zaps and rewards to cover their posting costs. We do not consider their own zaps to other users as part of their costs, since zapping is entirely optional. Moreover, some users may have altruistic motives to zap, as discussed in the introduction, so greater zapping could indicate a greater commitment to the platform.

We define a user as inactive if they go four or more consecutive weeks without making any posts, any comments, or zapping any items. The first week of inactivity is considered the week they went inactive. Inactive users can become active again, though we treat this event as exogenous.

The goal of this section is to estimate how user profitability affects the probability of becoming inactive. We estimate linear probability models of the following form:

$$\text{Inactive}_{it} = \alpha \text{Unprofitable}_{it} + \beta \text{Unprofitable}_{it} \times \text{Growth}_t + \gamma_t + \epsilon_{it} \quad (4)$$

where i indexes a user and t indexes a week. Inactive_{it} is a binary indicator for

whether user i became inactive on week t , Unprofitable_{it} is a binary indicator for whether the user was unprofitable in the last 8 weeks, and Growth_t is the percentage growth in Bitcoin-USD price in the last 8 weeks. γ_t is a week fixed effect to capture global time trends, and ϵ_{it} is the error term. We hypothesize that $\alpha > 0$, indicating that users who have been unprofitable are more likely to become inactive, and that $\beta > 0$, that this effect is amplified when Bitcoin’s price has recently appreciated.

Table 6 reports the results for this regression. Column 1 shows the result when only profitability in the last 8 weeks is included as a regressor. Column 2 additionally controls for the number of items the user posted in the last 8 weeks. Unsurprisingly, users that have posted more items in the last 8 weeks are less likely to become inactive, as it shows a greater commitment to the platform. Including the number of items in the last 8 weeks significantly moderates the effect of unprofitability, suggesting that there are some unprofitable users who post a lot anyway. Column 3 adds week fixed effects to control for global time trends, but the coefficient of interest is not much changed. Lastly, column 4 interacts unprofitability with the Bitcoin price appreciation over the last 8 weeks.

Using column 4 as the preferred specification, the results show that users who were unprofitable in the last 8 weeks are 5.5 percentage points more likely to become inactive than users who were profitable in the last 8 weeks. This is in comparison to a baseline inactive probability of 14.1% per week. In addition, column 4 shows that unprofitable are even more likely to become inactive when the Bitcoin price has recently appreciated. If the Bitcoin price has appreciated by 10 percent in the last 8 weeks, this increases the effect of unprofitability to a 6.1 increased probability of exit. This suggests that users are sensitive to not just their profitability as measured in sats, but also their profitability as measured in purchasing power.

7 Conclusion

Our analysis of Stacker News data confirms three central hypotheses: first, that posting costs can increase the quality of posted content, consistent with signaling theory; second, that the potential to be rewarded with tips also leads users to post better content over time; and third, that unprofitable users are more likely to leave the platform while profitable users are more likely to stay. This third point suggests that content quality may further increase over time as poor quality users, such as bots or trolls, eventually leave the platform.

More broadly speaking, the results suggest that users of internet discussion platforms are responsive to financial micro-incentives, even ones of very small monetary value. Equipping a discussion platform with the proper incentive structures may therefore be an effective method to improve the quality of content and discourse on the platform, leading to fewer poor quality posts, more original content, and more respectful content.

Moreover, the incentive structures on Stacker News are only made possible by the ability of the Lightning Network to instantaneously process small micropayments across a global network of users. This highlights a very clear and compelling use case for the utility of Bitcoin.

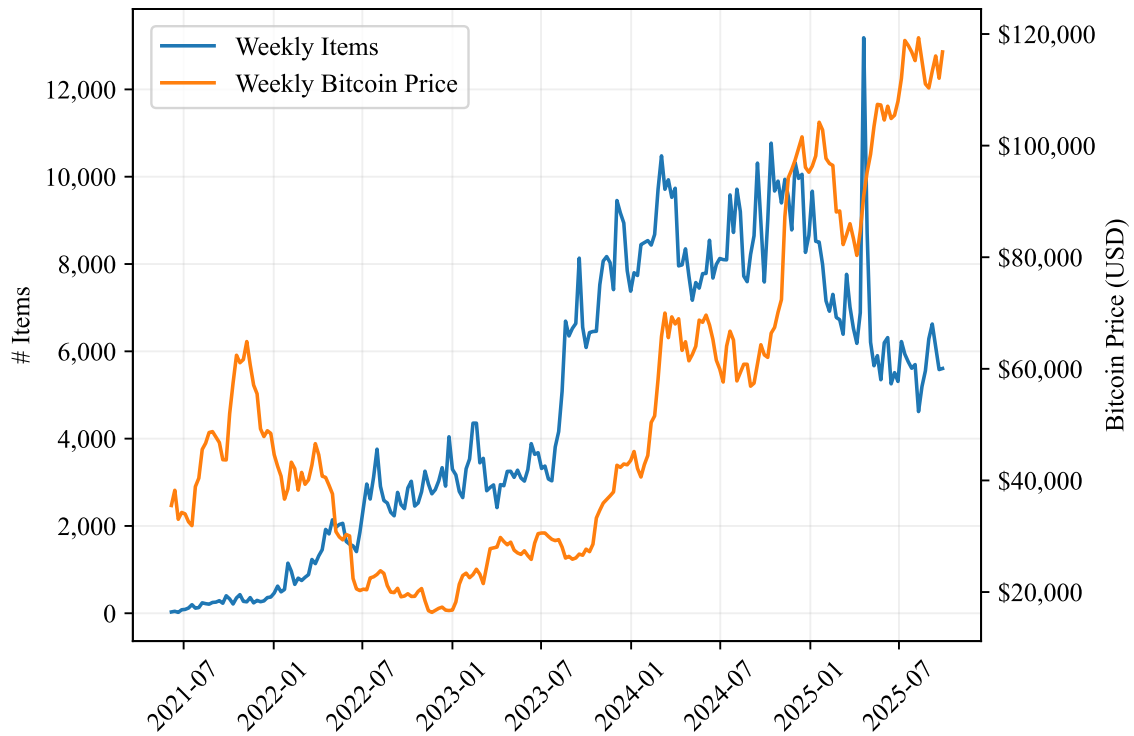
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Figure 1: Weekly Stacker News Items and Bitcoin Price



Note: Shows the number of items posted on Stacker News by week along with the weekly Bitcoin price. Weekly Bitcoin price is calculated as the average of the midpoint between daily highs and lows as reported by CoinMarketCap.com.

Figure 2: Posting Cost Histories for Select Territories

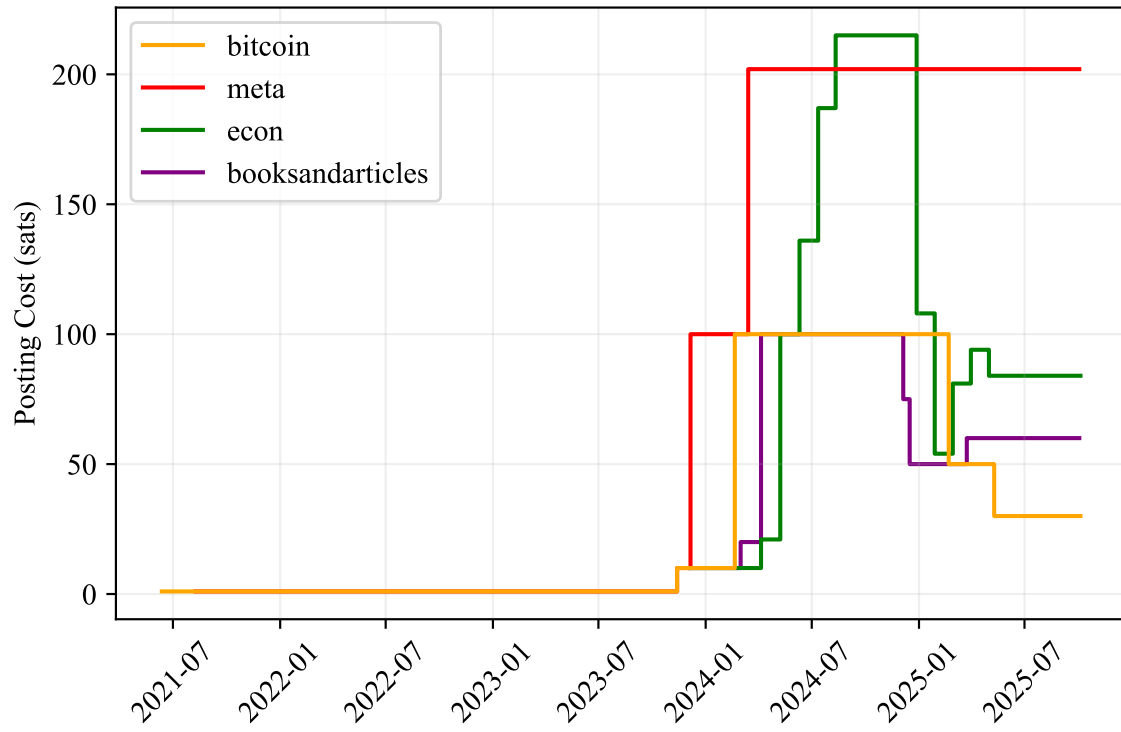
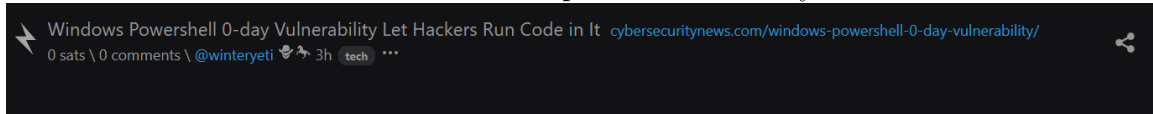
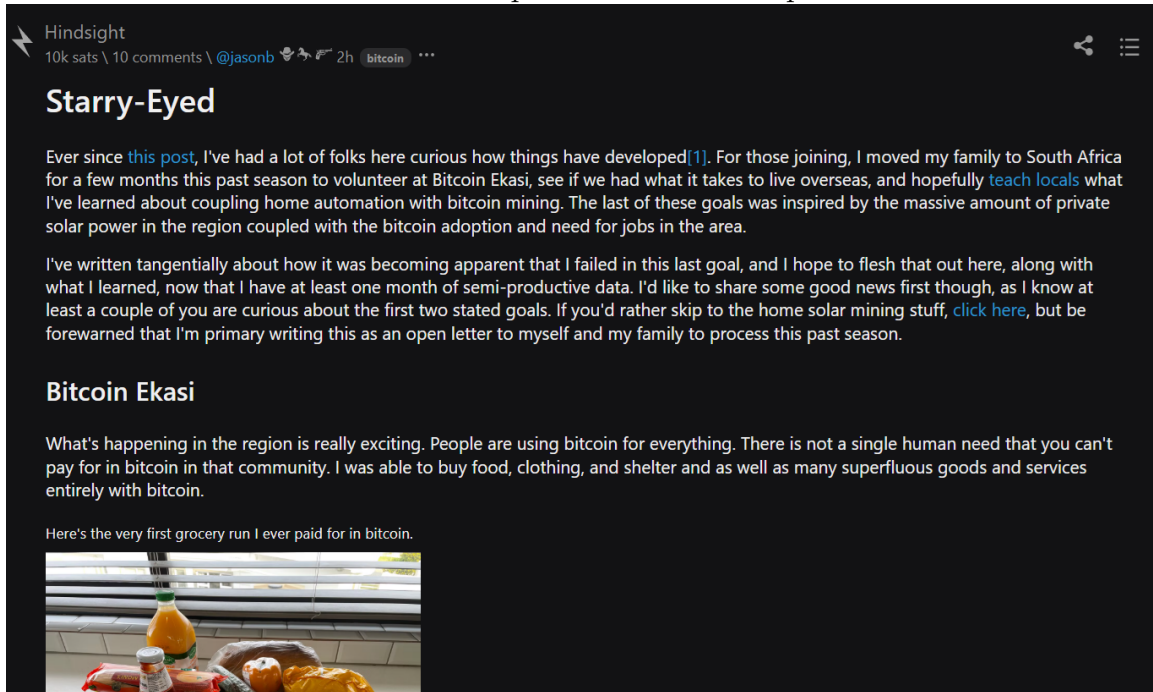


Figure 3: Link Post and Discussion Post Examples

Screenshot of a link post without body text

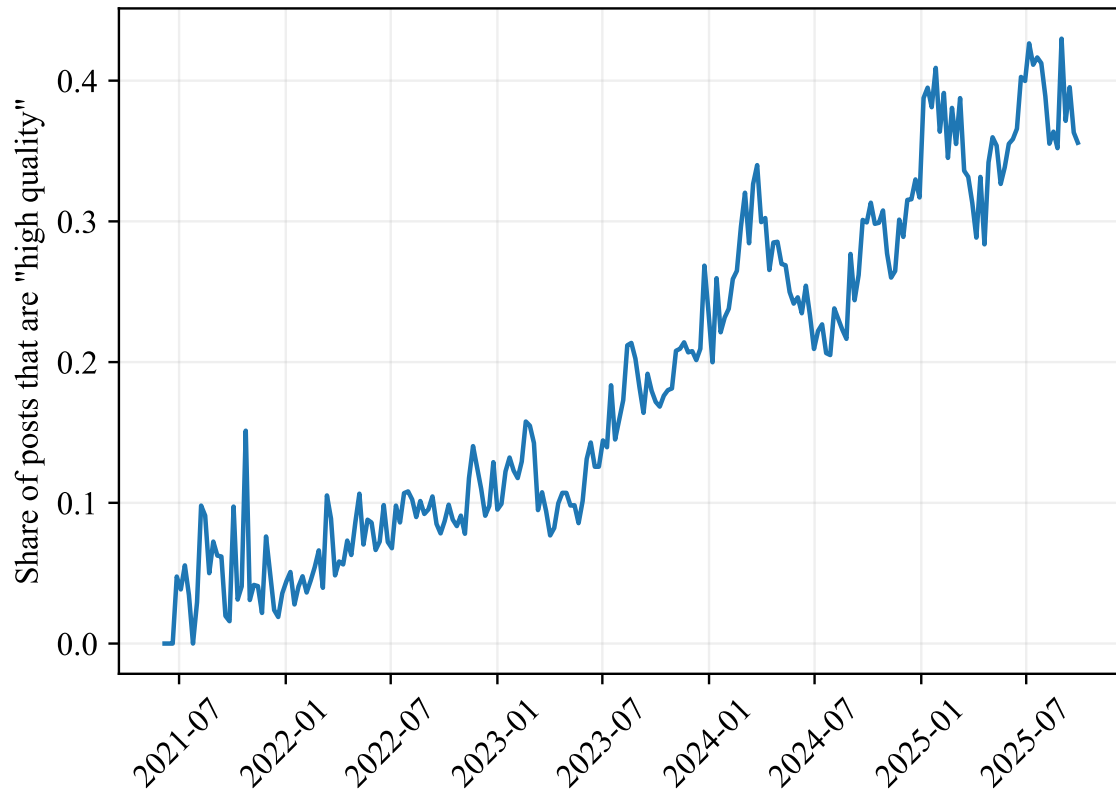


Screenshot of part of a discussion post



Note: These screenshots were taken on December 11th, 2025.

Figure 4: Post Quality Over Time



Note: Shows the share of posts each week that are categorized as “high quality”. A post is categorized as “high quality” if it is either a discussion post with more than 50 words, or if it is a link post that contains more than 50 words and has at least one image or link in the post body. See section 5 for further discussion.

Table 1: Effect of Posting Cost on Post Quality (Measured by zaps)

<i>Dependent variable:</i>				
	log(Zaps)			
	(1)	(2)	(3)	(4)
log(Posting Cost)	0.393*** (0.003)	0.266*** (0.004)	0.273*** (0.008)	0.219*** (0.009)
Constant	2.530*** (0.010)			
Territory FE	N	Y	Y	Y
Week FE	N	N	Y	Y
Territory Owner FE	N	N	N	Y
Observations	179,480	179,480	179,480	179,480

Robust standard errors in parentheses. * $p < 0.1$, ** $p < 0.05$, *** $p < 0.01$.

Notes: Regression of number of zaps a post earns in the first 48 hours on posting cost. The unit of observation is a post.

Table 2: Effect of Posting Cost on Post Quality (Measured by comments)

	<i>Dependent variable:</i>			
	log(Comments)			
	(1)	(2)	(3)	(4)
log(Posting Cost)	0.080*** (0.001)	0.051*** (0.002)	0.070*** (0.003)	0.043*** (0.004)
Constant	0.587*** (0.004)			
Territory FE	N	Y	Y	Y
Week FE	N	N	Y	Y
Territory Owner FE	N	N	N	Y
Observations	179,480	179,480	179,480	179,480

Robust standard errors in parentheses. * $p < 0.1$, ** $p < 0.05$, *** $p < 0.01$.

Notes: Regression of number of comments a post generates in the first 48 hours on posting cost. The unit of observation is a post.

Table 3: Effect of Posting Cost on Post Quantity

	<i>Dependent variable:</i>			
	log(Posts)			
	(1)	(2)	(3)	(4)
log(Posting Cost)	−0.242*** (0.010)	−0.104*** (0.009)	−0.266*** (0.011)	−0.265*** (0.013)
Constant	3.328*** (0.041)			
Territory FE	N	Y	Y	Y
Week FE	N	N	Y	Y
Territory Owner FE	N	N	N	Y
Observations	6,023	6,023	6,023	6,023

Robust standard errors in parentheses. * $p < 0.1$, ** $p < 0.05$, *** $p < 0.01$.

Notes: Regression of number of posts in a territory on posting cost for that week. The unit of observation is a territory-week.

Table 4: Some Determinants of Post Quality

		Number of words		
Has images or links in post body?		None	1-50	>50
Is link post	No	$\bar{z} = 166$	$\bar{z} = 214$	$\bar{z} = 250$
		$\bar{c} = 1.2$	$\bar{c} = 2.4$	$\bar{c} = 2.7$
		$N = 91,721$	$N = 10,392$	$N = 10,486$
	Yes		$\bar{z} = 202$	$\bar{z} = 513$
			$\bar{c} = 1.3$	$\bar{c} = 3.5$
			$N = 6,308$	$N = 5,899$
Not link post	No	$\bar{z} = 309$	$\bar{z} = 371$	$\bar{z} = 706$
		$\bar{c} = 7.0$	$\bar{c} = 8.6$	$\bar{c} = 10.1$
		$N = 1,725$	$N = 8,917$	$N = 15,251$
	Yes		$\bar{z} = 280$	$\bar{z} = 1,303$
			$\bar{c} = 3.7$	$\bar{c} = 8.0$
			$N = 17,103$	$N = 23,532$

Notes: \bar{z} is the mean amount of sats received from zaps in the first 48 hours since posting for posts in the given category. \bar{c} is the mean number of comments received in the first 48 hours. N is the number of posts in the category.

Table 5: Evidence of Learning from Prior Zaps

	<i>Dependent variable:</i>			
	Whether next post is high quality			
	(1)	(2)	(3)	(4)
High quality share of prior zaps	0.670*** (0.002)	0.690*** (0.002)	0.114*** (0.005)	0.128*** (0.005)
log(Prior zaps)		-0.013*** (0.0003)	-0.008*** (0.001)	-0.014*** (0.001)
High quality share of prior posts			0.844*** (0.006)	0.807*** (0.006)
log(Prior posts)			-0.003*** (0.001)	-0.001 (0.001)
Constant	0.032*** (0.001)	0.155*** (0.003)	0.122*** (0.003)	
Week FE	N	N	N	Y
Observations	191,334	191,334	191,334	191,334

Robust standard errors in parentheses. * $p < 0.1$, ** $p < 0.05$, *** $p < 0.01$.

Notes: Linear probability model of whether a user's next post is a high quality post as defined in section 5. The unit of observation is a post.

Table 6: Effect of Profitability on User Exit

	<i>Dependent variable:</i>			
	Whether user becomes inactive			
	(1)	(2)	(3)	(4)
Unprofitable in last 8 weeks	0.105*** (0.003)	0.062*** (0.003)	0.060*** (0.003)	0.055*** (0.003)
... \times BTC price appreciation in last 8 weeks				0.056*** (0.014)
log(Items posted in last 8 weeks)		-0.029*** (0.001)	-0.029*** (0.001)	-0.029*** (0.001)
Constant	0.079*** (0.001)	0.157*** (0.002)		
Week FE	N	N	Y	Y
Observations	92,956	92,956	92,956	92,956

Robust standard errors in parentheses. * $p < 0.1$, ** $p < 0.05$, *** $p < 0.01$.

Notes: Linear probability model of whether a user becomes inactive in a given week. A user becomes inactive if they start a greater than four week consecutive period of no activity. The unit of observation is a user-week.