SynStation Whitepaper

0. Abstract

In this paper we introduce our new prediction market protocol, SynStation, which addresses critical challenges in today's prediction markets, presenting a robust, innovative alternative. We offer detailed insights into community-owned market deployment, autopilot staking, a CLMM-based (concentrated liquidity market maker) multi-pool system, and incentives crafted to align participants' interests effectively. Through these structural elements, our protocol not only resolves existing issues but also establishes a self-reinforcing positive feedback loop—a powerful "flywheel" effect that drives sustainable growth and engagement.

1. Introduction

With the success of Polymarket, prediction markets are gaining momentum, and new platforms are emerging rapidly. However, most of these projects are merely forks of Polymarket or Gnosis, inheriting significant limitations.

Foremost among these challenges is lack of community engagement in market deployments, which limits authentic demand and the diversity of available markets. In nearly all existing protocols, teams exclusively decide which markets to open. Given the vast array of potential topics—from sports betting to entertainment, gaming, and elections—it's impractical for any team to consistently predict which topics will attract the most engagement. Conversely, leaving market creation entirely to participants introduces risks, such as inappropriate topics like assassination or markets with deliberately vague rules set by malicious actors. Effective market selection remains a critical challenge, yet no project has provided a robust solution.

The second challenge lies in the exchange's matching mechanisms. Currently, prediction markets rely on either Gnosis's CPMM model or a central limit order book like Polymarket, both of which have significant drawbacks.

The CPMM model, for instance, poses profitability issues for liquidity providers (LPs), who must offer liquidity for all possible outcomes and risk losing their entire stake if they fail to withdraw liquidity before market closure. Incentives like fee rebates fall short of addressing this issue—what's needed is a fundamental overhaul of the market structure. From a user experience perspective, in multi-outcome markets, users—whether trading or providing liquidity—must buy or sell each outcome token separately, which is cumbersome.

The order book model, while not inherently flawed, faces issues due to niche markets, low liquidity, and an over-reliance on centralized players for all but the most popular markets. This structure challenges the user experience. Moreover it fails to adequately reward LPs due to the tactic called "ghost liquidity," sometimes referred as "spoofing" and "flickering orders," where participants game the system for rewards without adding real liquidity. Additionally, as the order book model is optimized only for binary markets, multi-outcome markets require setting up separate yes/no markets for each outcome, resulting in fragmented liquidity, inefficient pricing, and unnecessary profit leakage to arbitrageurs.

In the following sections, we will explore our protocol's structural solutions and demonstrate how it effectively overcomes these challenges.

2. Community-owned Market Deployment

In this section, we introduce the first cornerstone of our next-generation prediction market: the community-owned market deployment model.

2.1. Necessity and Advantages

As noted earlier, deciding who controls the market deployment is a critical challenge. Relying solely on governance or the public brings either inefficiencies or significant risks. The ideal solution is what leverages the strengths of both. The public can rapidly identify trending topics that promise engagement, volume, and liquidity, while governance ensures alignment with the protocol's mission and long-term sustainability. This hybrid, community-owned model combines both approaches, avoiding exploitation and streamlining topic selection, ultimately enhancing user engagement and retention.

2.2. Dutch Auction for Proposing New Markets

Here, we examine the operational mechanics of a community-owned system. This approach allows the market to propose topics freely, with governance maintaining oversight. Effective governance should be able to prevent spam while incentivizing high-value topics that promise liquidity and trading volume.

Hyperliquid addressed a similar challenge by introducing dutch auctions for deploying new spot markets—a successful approach we adapt here. We conduct a dutch auction for the right to propose new topics using either a Gradual Dutch Auction (GDA) or a Variable Rate Gradual Dutch Auction (VRGDA), both of which support bulk purchasing and target rate setting. To manage demand fluctuations, multiple auctions can run concurrently.

This model ensures that each topic is proposed by a party who values it highly, with proceeds allocated to provide initial market liquidity. The GDA (or VRGDA) framework captures value effectively, allowing parameter flexibility. The target price for each auction round starts at twice the final price of the previous round, with a decay over a 24-hour half-life. The minimum bid is set at $1000, which may discourage individual users from proposing markets. To address this, we offer a pooled bidding mechanism that aggregates contributions from multiple users interested in the same topic, automatically submitting a collective bid on their behalf.

2.3. Proposal Submission, Review, and Deployment

While auction winners are unlikely to propose vague or controversial topics, governance review remains essential. The auction winner must submit a proposal for the prediction market's topic to the governance forum within 24 hours. A 3 to 7 days grace period follows, allowing proposers to refine submissions with feedback from DAO members. This ensures that the topic, market type (binary, 1-out-of-n, or spectral), outcomes, and evaluation criteria are well-defined. A final vote, lasting another 3 to 7 days, determines approval. During this period, other users may contribute funds to support initial liquidity and share in the associated emissions and swap fee tax too.

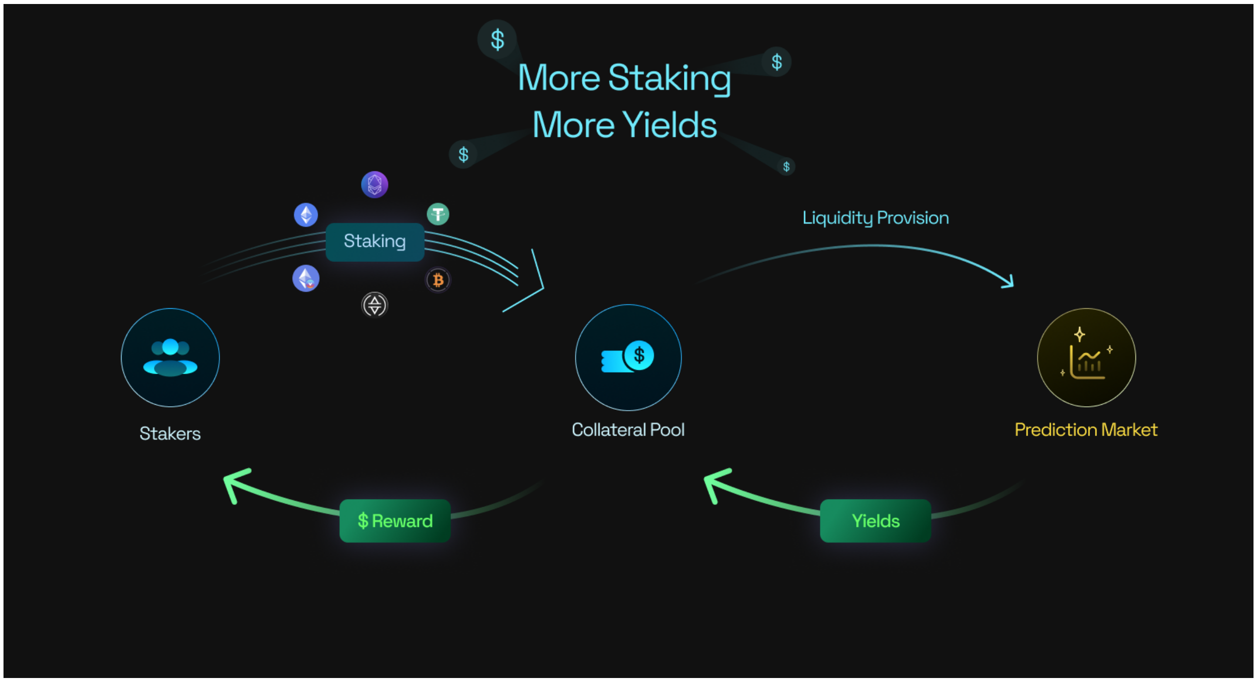
If the proposal passes, the market officially launches. If quorum is not reached, the proposer receives a full bid refund. However, if quorum is met but the proposal is rejected, the proposer forfeits 30% of the bid to an insurance fund, with the remaining 70% refunded. Future governance votes will determine the fund’s use.

Upon approval, funds from the $stGM LP module (described later) and the proposer’s bid are pooled to launch the market, ensuring initial liquidity. This liquidity remains passively until the market closes, providing a stable trading environment for participants. Lastly, the proposer will receive the portion of swap fees and $SYN emissions generated from market.

2.4. Settlement

In the early stages, result judgment and resolution will be managed solely by the SynStation team to ensure swift and reliable operations. As the protocol matures and reaches a level of robust crypto-economic security, we plan to transition the settlement process to a more decentralized framework, potentially collaborating with leading external oracle providers.

3. Autopilot Staking



In this section, we outline how user-supplied assets are managed on SynStation to achieve optimal yields. Much like the autopilot mode in self-driving cars, users can sit back while SynStation automatically seeks the best yields across DeFi protocols, eliminating the need for manual adjustments or additional research.

3.1. Multi-Asset Support

Stakers can deposit a variety of assets, including tokens from partner protocols, to earn passive yield. From the user's perspective, staking is straightforward—deposits generate returns automatically, with the protocol managing all underlying processes seamlessly.

3.2. $GM (Good Money)

SynStation collateralizes staked assets to mint SynStation's stablecoin, *$GM*. Leverage is conservatively managed based on the deposited assets, with real-time monitoring to ensure responsible issuance of $GM. Minted $GM is then converted to $stGM, a yield-bearing stablecoin that complies with the ERC-4626 standard. $GM functions as the protocol's base currency: users must purchase $GM to trade, provide liquidity, or make deposits. As protocol usage grows, demand for $GM increases, driving down interest rates and amplifying returns for participants.

3.3. $stGM (staked Good Money)

$stGM is an ERC-4626-compliant, yield-bearing stablecoin that employs a range of strategies to maximize organic yields. One strategy involves supplying liquidity to prediction market pools. Below are examples of the yield-generating modules within $stGM.

3.3.1. Prediction Market LP Module

The LP module supports liquidity across all markets, drawing funds for initial liquidity when a new market is launched. In exchange, it receives tokens representing the LP position. When the market reaches maturity, these LP tokens are burned, and funds are redeposited. The worst case loss is capped by the market proposer's dutch auction bid, eliminating the risk during liquidity provision. Any swap fees earned, along with $SYN emissions, are then distributed to depositors.

3.3.2. AMO Module

The AMO (Algorithmic Market Operations) Module manages peg stability, supplying liquidity to partnered DEX stableswap pools. When $GM's price moves beyond a specified range (e.g., ±0.5%), the module adds or removes single-sided liquidity to restore the peg, capturing arbitrage profits in the process.

For example, during an upside depegging scenario where the stableswap pool holds 1200 USDC and 800 $GM, the AMO mints up to $\min(\text{mint cap}, 400)$ $GM and deposits it into the pool in exchange for LP tokens to set the spot price within $(0.995, 1.005)$. This effectively sells $GM at a premium price above 1.005 to acquire USDC. Once the peg is restored, the AMO redeems the LP tokens, receiving $GM. This process is equivalent to repurchasing $GM at the 1.00 peg rate using the previously acquired USDC. The minted $GM is burned, and any surplus $GM is used to acquire additional USDC, either for addressing future downside depegging or for redistribution.

In a downside depegging scenario, the AMO first uses any available USDC reserves to mint LP tokens. If USDC reserves are exhausted, the interest rate on $GM debt is increased to encourage repayment, while additional fund allocations are halted. Interest accrued is channeled into $stGM, incentivizing $GM holders to deposit their tokens for passive yield. This reduces the circulating supply of $GM, facilitating peg restoration.

The precise formula and parameters for interest rate adjustments will be published after thorough simulation testing under various market conditions.

3.3.3. Lending Module

Excess liquidity is strategically allocated to external lending protocols to generate additional yield. These lending protocols are selected and whitelisted through governance votes. To mitigate risks, we will partner with leading external risk management platforms (e.g., Gauntlet, Llamarisk, Chaos Labs) to conduct simulations and determine suitable deposit caps for each protocol. This proactive approach safeguards against black swan events, such as cascading liquidations, ensuring robust fund protection.

3.4. Rehypothecation

Like $GM deposited in $stGM, which is leveraged across various modules to minimize idle capital, any excess staked assets—beyond what is required for $GM issuance and collateral maintenance—are deposited into external partner protocols. This approach generates yield and enhances capital efficiency, ensuring the protocol optimally utilizes its assets while safeguarding reserves essential for $GM issuance and stability.

4. Enhanced Market Structure for More Efficient Execution

This section details the structure of each prediction market, its advantages, and our approach to initial liquidity provision. Together, these elements foster a seamless market experience that benefits all participants.

4.1. Multiple Pool Structure

Gnosis and its forks, such as Polymarket, employ a single CPMM pool for each market, where the pool's assets are outcome tokens. As only one outcome retains value post-settlement, the value of LP tokens converges to zero as maturity approaches—discouraging LP participation. Additionally, in markets with multiple outcomes, users face significant challenges: each trade generates several tokens, and whether trading or providing liquidity, users must manually buy or sell unwanted outcome tokens. With an increase in possible outcomes, the user experience (UX) becomes increasingly cumbersome and inefficient.

To address these issues, SynStation employs a different approach. Each market has multiple concentrated liquidity market maker (CLMM) pools, each containing two assets: O_i and $GM. This setup allows LPs to concentrate liquidity on specific outcomes without risking total capital loss. LPs can also adopt diverse strategies, such as delta-neutral or outcome-skewed positions. Our router contract efficiently manages minting and swaps across pools, providing a seamless user experience without liquidity fragmentation. This multi-pool system not only enhances LP profitability but also improves UX by simplifying interaction.

This structure also optimizes markets with multiple outcomes. Existing CPMM or order book based markets typically implement multi-outcome markets by creating multiple binary markets, leading to redundant token issuance (e.g., “No” for Trump is effectively equivalent to “Yes” for Harris) and issues like liquidity fragmentation and suboptimal pricing. SynStation’s multi-pool structure eliminates the need for redundant markets, thereby preventing liquidity fragmentation, reducing arbitrage opportunities, and ensuring that LP and trader profits aren’t diluted unnecessarily.

4.2. Various Market Types Support

Depending on the topic, a binary market may either be too risky or fall short of enabling precise predictions. For instance, a market predicting whether a specific movie will reach 10 million viewers might attract little interest if the probability is low due to limited popularity of the director or franchise. On the other hand, Polymarket’s current U.S. presidential election market exemplifies an inadequate fit for a binary structure; as of now, Trump’s probability of winning is set at 64%, though many are unlikely to interpret this figure literally.

To tackle such limitations, we will also support spectral-type markets, which are generally less risky than binary markets and offer more refined predictions for certain topics. This approach may appeal to conservative users who prefer avoiding high-stakes binary options, providing a setup that aligns with their comfort level and interest in detailed predictions. A practical example is a spectral market for elections, where each candidate's token would be redeemed based on their electoral vote share. This structure would deliver more precise insights for users seeking a nuanced view.

4.3. Fair Reward Distribution

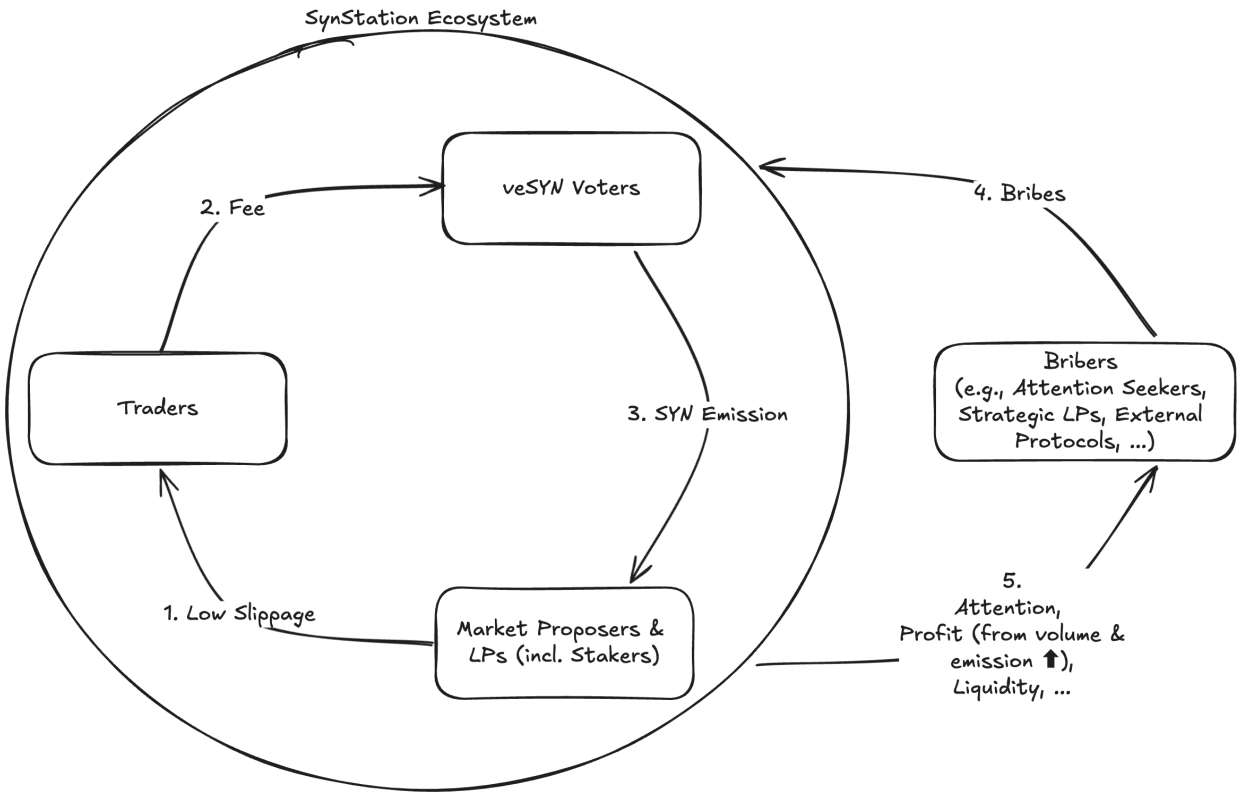
To attract liquidity, SynStation rewards LPs with our native token, $SYN. Unlike reward models in order book based protocols, which are susceptible to forementioned "ghost liquidity" problem, $SYN emissions to LPs are tied directly to the swap fees generated by each LP's position. This model ensures that only LPs who genuinely provide liquidity and take adverse selection risk are rewarded. Strategic LPs, seeking to maximize returns, will concentrate liquidity around narrow price ranges, creating denser liquidity near the market price and offering retail traders deeper liquidity. This results in a win-win: LPs are fairly compensated, and traders benefit from a more robust liquidity pool.

4.4. Initial Liquidity Provision

At market launch, liquidity is added to all outcome pools by combining the market proposer's bid with funds from the $stGM prediction market LP module. This passive liquidity remains until the market's expiration, ensuring a minimum level of liquidity for trading. Any profits from this LP position benefit the prediction market LP module, while losses are capped at the market proposer's initial bid. For detailed formulas and derivations, please refer to the appendix.

5. Incentive Structure (The Flywheel)

The protocol's success depends on a carefully designed incentive structure and a positive feedback loop to encourage ongoing user engagement and continuous asset deposits. In DeFi, where the distinction between suppliers and users is often blurred and the system operates in a permissionless environment, establishing such a framework is crucial. This section details the incentive design, examining costs and revenues from each player's perspective and evaluating long-term sustainability.



5.1. LPs (Including Stakers) & Market Proposers

Liquidity providers (LPs) and stakers are essential to the protocol's flywheel, supplying liquidity that allows traders to place substantial orders with minimal slippage. Proposers also contribute indirectly to the initial market liquidity. In return, stakers, LPs, and proposers earn trading fees and $SYN emissions. To ensure fair distribution, $SYN emissions for each pool are allocated to LPs in proportion to the swap fees generated, aligning rewards directly with market activity.

5.2. veSYN Voters

Each epoch, veSYN voters allocate $SYN emissions across various markets, receiving a share of the swap fees from supported markets. They also evaluate new market proposals and receive bribes through external bribe markets, allowing them to delegate voting power as desired. To strengthen token value and protocol stability, tokens are incentivized for long-term locking. Voting power and early withdrawal penalties scale with the remaining lock-up period, declining linearly over time to encourage sustained participation.

5.3. Traders

Traders benefit from a seamless user experience comparable to centralized exchanges (CEX) thanks to quick rollup block times, low slippage, and a streamlined interface. We are developing multiple frontends, including a Binance-like UI for advanced users and a TikTok-inspired interface for casual and mobile users. Trading fees will be shared between LPs and veSYN voters. Shortly after launch, traders will also receive $veSYN airdrops to encourage engagement. These airdrops allow traders to participate in governance and earn additional passive income.

5.4. Bribers

Bribers can incentivize veSYN voters to direct $SYN emissions toward specific markets, receiving both tangible and intangible rewards in return. These benefits include increased $SYN emissions, higher trading volumes, greater sap fees, and enhanced visibility (i.e., attention) for the targeted market topic.

5.4.1. Who Can Be a Briber?

Various entities may act as bribers. For example, a strategic LP focused on a narrow liquidity range might bribe when additional $SYN emissions justify the cost. Market proposers will also bribe to increase $SYN emissions, which drives liquidity and trading volume, boosting their own profits.

External protocols, such as liquid $veSYN lockers (e.g., Convex, Yearn, StakeDAO for Curve), auto-rolling vaults for recurring markets, or fan vaults for sports teams, may also employ bribes to increase returns and manage volatility.

5.4.2. Go-To Platform for Attention Seekers

Prediction markets provide a unique outlet for engaging with viral topics. Unlike casual speculation, these markets allow users to place bets, aligning their interests with the outcome, potentially triggering a self-fulfilling prophecy and amplifying attention. For example, betting on a movie's success incentivizes participants to watch it and encourage others to do so.

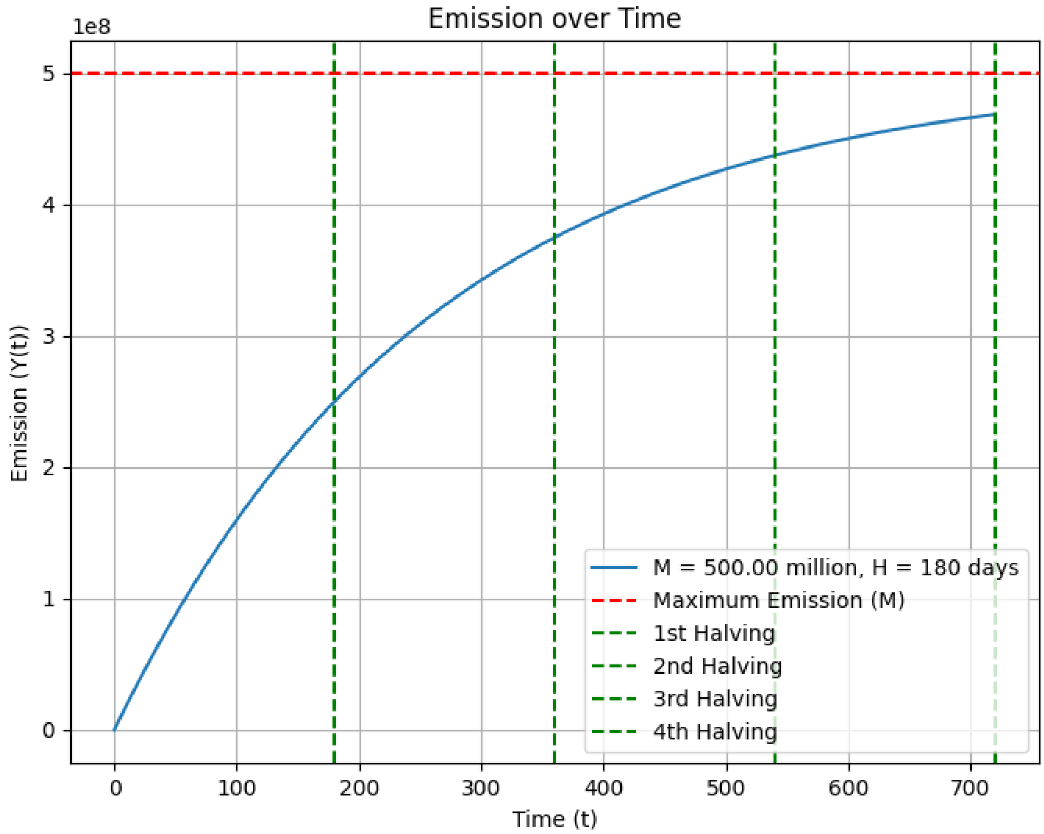
The dynamics attracts a unique type of briber: attention seekers, who leverage public interest for financial gain. By bribing, they attract liquidity and volume, propelling the topic to the platform's trending section and social media channels, creating a feedback loop that drives additional engagement. For example, an entertainment agency could create a market around an idol group's album sales and use bribes to attract liquidity, boosting both exposure and sales. Similarly, a newly launched protocol could open a market to predict its TVL in a month, using bribes to drive interest and support growth. SynStation becomes the ultimate platform for these entities, transforming public interest into actionable engagement.

5.5. Tokenomics

5.5.1. Distribution of $SYN Emissions and Swap Fees

$SYN emissions for each pool are initially allocated between the market proposer and LPs in a 1:9 ratio. Swap fees are divided among the market proposer, veSYN voters, and LPs in a 1:4:5 ratio at the beginning. These ratios are provisional and may be adjusted through governance to maintain a balanced incentive structure that ensures market profitability. The average rate of new market creation per day will serve as a key metric to evaluate the effectiveness of this revenue-sharing model, with adjustments made reactively in a manner similar to the EIP-1559 approach.

5.5.2. $SYN Emission Schedule



Like Bitcoin, $SYN emissions for LP rewards are capped by a maximum supply M, with a half-life of H. $Y(t)$, the cumulative emissions up to t days after launch are:

$$Y(t) = M(1 - 2^{-\frac{t}{H}})$$

Emissions are allocated across pools in proportion to each pool's vote share.

5.5.3. Initial Airdrop and Points program

To drive early liquidity and attention, we will launch an airdrop campaign and points program. Airdropped token amounts will increase as more users join and stake, generating initial momentum and awareness for the platform.

6. Conclusion

This paper has outlined the limitations of existing prediction market protocols and presented SynStation's innovative solutions. We provided a comprehensive overview of each component, including our community-owned market deployment, the autopilot staking module, and $GM—all designed to attract and manage liquidity across multiple assets. We also described the multi-pool structure, which minimizes market fragmentation and enhances flexibility for LPs. Finally, we introduced the flywheel incentive structure, designed to ensure long-term sustainability by retaining both users and liquidity.

We believe this design will create a next-generation prediction market that outperforms current platforms while appealing to mainstream users in entertainment, sports, and pop culture, ultimately establishing it as a truly mainstream product.

7. References

📎 References

A. Appendix

A.1. Math for Initial Liquidity Provision

Let B represent the market proposer's bid, and T represent the payment from the LP module. From the total amount $(B+T)$ $USD, X $USD will be allocated to mint outcome tokens, O_i. Let $p_1, p_2, \cdots, p_n$ represent the initial pricing, which reflects the governance's estimated probabilities for each outcome. This gives us the following equations for each i:

$$(x_i + \frac{L_i}{\sqrt{P_u}})(y_i + L_i\sqrt{P_l}) = L_i^2 \tag{1}$$

In this case, $x_i^{\text{init}} = X$, with $P_u = 1$ and $P_l = 0$, as we aim to provide liquidity across the full range. Solving equation (1) results in $x_i^{\text{final}} = 0$, $y_i^{\text{init}} = \frac{Xp_i}{1-\sqrt{p_i}}$, and $y_i^{\text{final}} = \frac{X\sqrt{p_i}}{1-\sqrt{p_i}}$, where x_i^{final} and y_i^{final} represent the remaining tokens after outcome i is confirmed as true. Summing across all i gives:

$$X(1+\sum_i \frac{p_i}{1-\sqrt{p_i}}) = B + T$$

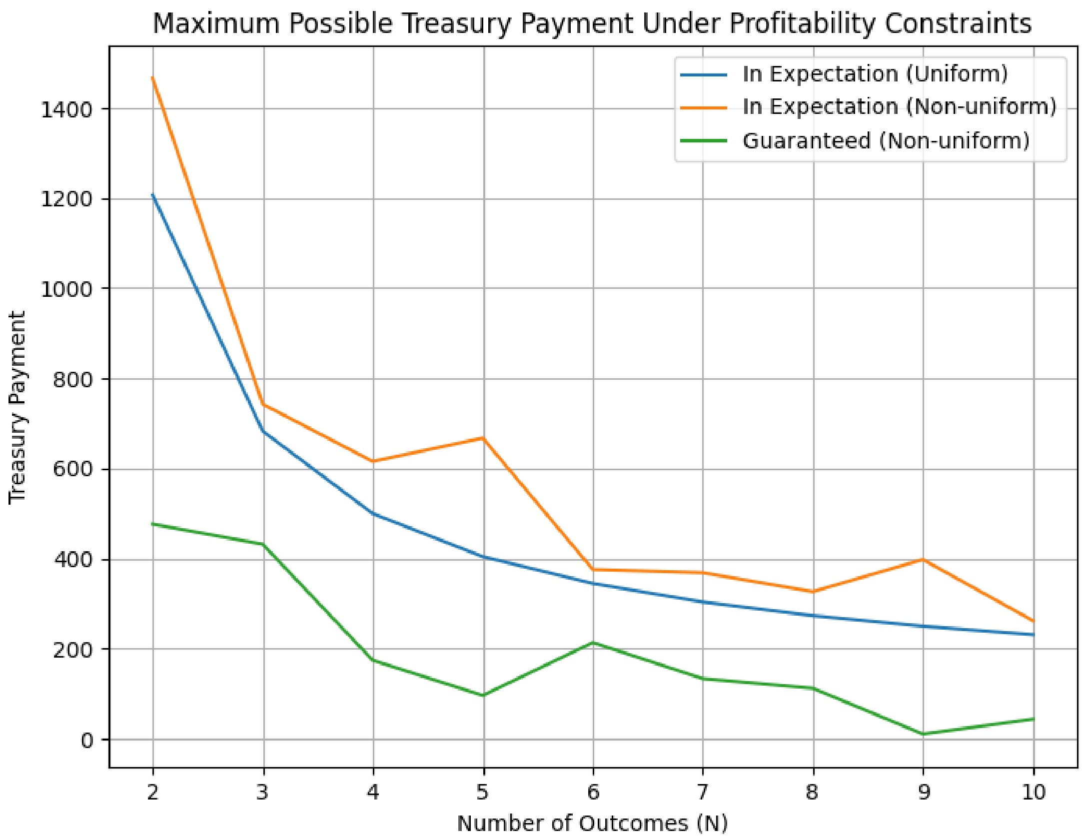
The expected leftover funds after settlement are $X\sum_i \frac{p_i\sqrt{p_i}}{1-\sqrt{p_i}}$, which must be at least equal to T. To attract traders, we aim to provide as much liquidity as possible by setting $T = X\sum_i \frac{p_i\sqrt{p_i}}{1-\sqrt{p_i}}$. In summary, given the proposer's bid B and the initial probability estimates for each outcome $\{p_i\}_{i=1,2,\cdots,n}$, the maximum possible payment from the LP module T which will experience no loss in *expectation*, is:

$$T = B \cdot \frac{\sum_i \frac{p_i\sqrt{p_i}}{1-\sqrt{p_i}}}{1+\sum_i \frac{p_i}{1-\sqrt{p_i}} - \sum_i \frac{p_i\sqrt{p_i}}{1-\sqrt{p_i}}}$$

Similarly, the maximum possible payment from LP module that is *guaranteed* to be profitable is:

$$T = B \cdot \frac{\min_{1\le i\le n} \frac{\sqrt{p_i}}{1-\sqrt{p_i}}}{1+\sum_i \frac{p_i}{1-\sqrt{p_i}} - \min_{1\le i\le n} \frac{\sqrt{p_i}}{1-\sqrt{p_i}}}.$$

A.1.1. Example



Assume the proposer contributed 1k $USD to a binary market, with initial probability estimates of 62.3% and 37.7% for the outcomes. In this scenario, the LP module can contribute up to 1.46k $USD to achieve profitability on average and 476 $USD to guarantee profitability. However, if we assume a uniform distribution, the LP module can contribute up to 1.21k $USD and still secure guaranteed profitability. For more detailed examples, please refer to the following repo: https://github.com/kosunghun317/synstation_researchs