

Parlay or Peril? The Incentive Pitfalls of Sports Betting

CS37 Final Project

Cristiana Murgoci, Nicole Fang, Zinn Lim, John Russell, Denny Cao

1 Abstract

The recent legalization and rapid expansion of online sports betting has seen a niche activity transform into a ten figure industry. This growth is driven by aggressive promotional tactics on the part of sportsbooks, including targeted advertising as well as promotions such as “odds boosts” used to coax both new and returning users into placing bets. This paper examines how the industry’s business model systematically exploits behavioral biases, particularly overconfidence and the gambler’s fallacy, to perpetuate long-term profitability at the expense of consumer welfare. We develop a behavioral model distinguishing between purely rational (“sophisticate”) and overconfident (“naif”) bettors, and simulate how odds boosts strategically influence bettor participation and outcomes. Our findings reveal that sportsbooks profits derive entirely from naifs, especially when deploying targeted promotions after inactivity or loss streaks. While sophisticates take advantage of free boosts and come out positive, naifs develop overconfident or addictive behavior, incurring serious financial losses. While these strategies drive user engagement and revenue, they also result in societal harms including addiction and financial distress. We argue that policy interventions, particularly in the form of public education, can mitigate harm without restricting individual freedom or industry innovation, by helping bettors make more informed, rational decisions in an increasingly persuasive and high-risk environment.

2 Introduction

The legalization of online sports betting in the United States has ushered in one of the fastest-growing sectors in digital consumer markets. Once confined to state-regulated casinos or illicit bookmakers, sports betting is now widely accessible through sleek mobile apps and aggressive advertising campaigns. Major operators (both legacy firms like Caesars and digital-first platforms such as FanDuel and DraftKings) have capitalized on this regulatory shift by engaging in intense competition to acquire and retain users. This has led to the widespread use of sign-up bonuses, odds boosts, and “no sweat” bets as tools to grow market share and deepen engagement.

What makes the rise of online sports betting especially noteworthy is its embeddedness within mainstream sports culture. Unlike traditional gambling activities, sports betting leverages the emotional investment and loyalty of sports fans. As a result, the activity is often perceived not merely as a financial risk but as a natural extension of fandom. This perception is further reinforced by heavy marketing during televised games, integration with team sponsorships, and endorsements by athletes and influencers.

However, the ease and normalization of betting have raised serious concerns. Unlike lottery tickets or casino visits, sports bets can now be placed repeatedly and impulsively throughout a single game. Promotions are often framed in ways that obscure the true cost of participation—presenting gambling as entertainment, a skill-based challenge, or even a community experience. These developments have dramatically lowered the psychological and logistical barriers to gambling, inviting participation from a broader and more demographically diverse population.

At the same time, the industry’s business model remains fundamentally zero-sum: for every dollar won by a bettor, more is lost by others. The sustainability of this model relies on consistent losses by a large user base, raising important questions about who loses, how much, and why. These questions are especially pressing in light of existing research on problem gambling, behavioral biases, and consumer misperception—all of which suggest that certain groups may be systematically more vulnerable to harm.

The rise of online sports betting is therefore not only a technological or regulatory story, but also a behavioral and economic one. It raises fundamental issues about consumer decision-making, firm incentives, and the role of the state in managing newly legalized digital markets. As the industry matures, understanding the forces that shape participation and profitability will be critical to assessing its long-term implications for individuals, households, and society at large.

3 Description of Phenomenon

3.1 What is the Phenomenon?

Online sports betting refers to the act of placing wagers on the outcome of sporting events via internet-based platforms. This includes traditional bets on game winners, as well as more complex formats such as parlays, player props, and in-game wagers that unfold in real time. Since the U.S. Supreme Court overturned the Professional and Amateur Sports Protection Act (PASPA) in 2018, dozens of states have legalized and regulated sports betting, allowing a multitude of private operators to enter the space.

The defining feature of the phenomenon is the way it blends convenience, cultural resonance, and psychological engagement. Mobile technology allows users to place bets instantly; sports integration makes betting feel intuitive to fans; and promotions reduce perceived risk, making the activity appear both exciting and low-stakes. Together, these features have accelerated the normalization of gambling and blurred the lines between entertainment and financial risk-taking.

3.2 Significance

The growth of sports betting carries significant economic, psychological, and social implications. At an economic level, the industry has attracted billions in investment, created new revenue streams for states through taxation, and spawned a competitive ecosystem of sportsbooks, affiliates, and data providers. It represents a digital frontier for entertainment and commerce. Yet this growth also raises concerns about consumer protection and societal harm. Empirical studies in gambling economics and behavioral psychology have shown that high-variance, low-probability wagers — such as parlays and proposition bets — lead to consistent long-run losses for bettors (Diemer and Rodenberg 2013). When these are heavily promoted and wrapped in persuasive framing, the risk of harm increases. The activity also disproportionately attracts younger adults, who may have less financial stability and greater susceptibility to impulsive decision-making.

The framing of bets, such as combining multiple wagers into parlays or advertising temporary profit boosts, often exploits well-documented cognitive biases. Bettors may anchor on large potential payouts, ignore base rates, or fall prey to the illusion of control. As such, what appears to be a fair and voluntary exchange may in fact rely on distorted perceptions of risk and reward. In short, sports betting sits at the intersection of three domains: legal markets, persuasive design, and human fallibility. Understanding its significance requires attention not just to the dollars wagered or the laws passed, but to the ways in which individuals interact with betting platforms and the incentives that guide their behavior.

3.3 Suboptimality of Current Outcome

Although the online sports betting industry promises economic innovation and consumer engagement, it currently produces outcomes that are inefficient, inequitable, and harmful at scale. These suboptimal outcomes arise from externalized societal costs, distorted individual decision-making, and firm strategies that deliberately exploit behavioral vulnerabilities.

3.3.1 Societal Externalities

Sports betting, as a subset of gambling, can be linked to many of the same problems that have historically been associated with gambling. Gambling creates negative externalities by

imposing costs on individuals and society that are not accounted for in the private transactions between bettors and bookmakers. Specifically, problem gambling can lead to financial distress, increased crime rates (e.g., fraud, theft to cover gambling debts), mental health issues, and family breakdowns, all of which place a burden on social services, law enforcement, and healthcare systems. Yet because these costs are not internalized by sportsbooks or reflected in the price of placing a bet, the market encourages overconsumption relative to the socially optimal level. As capital flows into the industry—such as DraftKings’ \$300 million Series D fundraising round in 2015—there is significant opportunity cost in diverting investment from more socially beneficial endeavors.

3.3.2 Behavioral Distortions and Imperfect Information

Sports bettors routinely overestimate the value of gambling and underestimate its long-term cost. This behavior leads to overconsumption relative to both individually rational and socially optimal benchmarks. Sportsbooks reinforce this pattern by emphasizing short-term excitement, offering promotions that appear risk-free, and presenting complex bets like parlays that obscure true probabilities. These practices drive persistent engagement even when outcomes are financially destructive.

3.3.3 Incentive Misalignment and Predatory Promotions

Sportsbooks profit from user losses, creating an inherent misalignment between firm success and consumer welfare. Promotional strategies (such as “no sweat” bets, profit boosts, and especially parlays) are designed to distort risk perception and encourage frequent engagement. While appearing generous, these offers are engineered to encourage over-betting, particularly among vulnerable users. Aggressive marketing of parlays exemplifies this tactic, where multi-leg bets offer high perceived payouts but have extremely low success rates, enabling sportsbooks to extract significantly higher hold percentages. These dynamics lead to concentrated harm, especially among users susceptible to addiction.

3.4 Contributing Factors

The persistence of suboptimal outcomes in the online sports betting market comes from the interaction of three core forces: individual-level behavioral biases, structural incentives within sportsbooks, and government policies that often fail to counterbalance harm. These factors reinforce one another and explain why bettors frequently engage in value-destroying behavior while firms continue to profit.

3.4.1 Behavioral Vulnerabilities

At the individual level, bettors frequently exhibit cognitive distortions that impair judgment and promote repeated engagement with wagers that have negative expected value. These

include:

- **Gambler’s fallacy:** the mistaken belief that a win is “due” after a losing streak (Tversky and Kahneman 1971),
- **Illusion of control:** overestimating the influence of personal skill on chance-based outcomes,
- **Overconfidence and optimism biases:** inflating one’s ability to beat the odds and underestimating the probability of loss (Barberis 2013).

These distortions are further compounded by the hot hand fallacy—the belief in streaks or momentum following prior wins (Gilovich, Vallone, and Tversky 1985)—and are well-explained by the framework of prospect theory, which shows that individuals overweight small probabilities and undervalue long-term losses (Kahneman and Tversky 1979).

In the context of sports betting, such biases are amplified by domain familiarity: bettors often believe they can “read the game” better than others based on team knowledge, personal hunches, or recent outcomes. This leads to overestimation of win probabilities and escalation of risk-taking under the illusion of strategic edge. Even when accurate information is accessible, many bettors lack the statistical literacy to evaluate odds, compute expected values, or grasp the cumulative effects of repeated wagering. Sportsbooks strategically exploit these cognitive vulnerabilities through promotional framing and platform design—emphasizing excitement, short-term wins, and emotionally resonant narratives over probabilistic reasoning. This environment encourages impulsive over analytical decision-making and plays a central role in sustaining betting behavior beyond rational limits.

3.4.2 Structural and Institutional Factors

Beyond psychology, structural forces within the industry and enabling government policies reinforce these behavioral patterns and amplify harm:

- **Profit Motives:** Sportsbooks profit directly from bettor losses, creating a zero-sum dynamic where “the house only wins when you lose” (Marcus 2024). The incentive structure present in the sports gambling industry leads to sportsbooks to maximize the *hold* (percentage of wagered money that the sportsbook retains), which makes bettors “lose the most amount of money in the shortest amount of time.” For instance, sportsbooks are strongly incentivized to promote *parlays*, a type of wager combining multiple bets called *legs*. In order to win, all legs must be correct. In Illinois, in 2023, parlays only had a success rate of 17.74% and allowed sportsbooks to have a hold of 18.2% compared to 4.9% for traditional single bets (Altruda 2024). Bettors are incentivized to add more legs as doing so increases payouts significantly. However, this also dramatically increases the houses odds, with a five-leg parlay increasing the

house’s edge to 35% (Altruda 2024). Thus, sportsbooks hold aggressive marketing campaigns centered around parlays, enticing bettors to play into their own demise.

- **Addiction:** People gambling at harmful levels generate around 60% of losses (*Gambling* 2024). Looking at an industry with a similar revenue incentive of encouraging frequent and prolonged gambling behaviors, in the state of Massachusetts, 90% of casino gambling revenue in 2022 came from at-risk and problem gamblers who account for 9.9% of gamblers (*Social and Economic Impacts of Casino Introduction to Massachusetts* 2024). The gambling industry as a whole relies on addicted gamblers, incentivizing them to design methods to keep them coming back through promotions, bonuses, and aggressive marketing. This conflicts with societal wellbeing; sportsbooks have no incentive to intervene when a problem gambler is identified and even benefit more by keeping them hooked.
- **Government Interventions:** Governments play a crucial role in the expansion of the sports betting industry by regulating and legitimizing it, often under the justification that without legal avenues, betting would persist in underground and unregulated markets. Betting companies exploit this reality by arguing that without tax breaks and other financial incentives, consumers would turn to offshore or illegal operators, making it harder to enforce responsible gambling measures and capture tax revenue. As a result, many governments allow deductions on promotional bets and other marketing expenses, allowing companies to invest heavily in customer acquisition while minimizing their taxable income. (Lipton and Vogel 2022) While regulation is framed as a means of consumer protection and harm reduction, these policies often prioritize industry profitability, reinforcing a cycle where governments become financially dependent on betting revenue and are reluctant to impose stricter measures that might limit its growth.

Together, these behavioral, structural, and institutional dynamics create a feedback loop that sustains high levels of irrational betting and concentrated harm. The behavioral model introduced in the following section seeks to formalize this process by simulating how distorted perceptions of value, reinforced by structural incentives and promotional tactics, produce long-run inefficiencies and social costs.

3.5 Desired Outcome

In a more efficient and equitable equilibrium, sports betting would remain accessible to adults who choose to participate, but the incentives surrounding it would be better aligned with consumer well-being. Bettors would have the tools and knowledge to assess their decisions rationally, and promotions would be transparent rather than designed to exploit cognitive biases. The most harmful products—such as high-risk parlays or misleading bonus

structures—would be limited or restructured to reflect their true risk profile.

This outcome would preserve profitability and entertainment value for sportsbooks, but without relying on long-term losses by misinformed or addicted users. Firms would shift toward strategies that reward informed engagement, targeting sustainable value rather than volume alone. Regulators, in turn, would take a more active role in identifying exploitative tactics, enforcing advertising standards, and limiting structural drivers of harm. Achieving such an equilibrium requires a deeper understanding of the behavioral and structural forces that shape better decision-making and firm strategy—precisely the motivation for the model we develop in the next section.

4 Literature Review

Our analysis builds on two key strands of research: (1) the economics and structure of the gambling industry, and (2) the behavioral distortions that underlie consumer decision-making in betting environments.

4.1 Economics of Gambling

The economics of sports gambling has evolved significantly over time, driven by legal, technological, and structural changes in the market. Two core readings — *The Economics of Sports Betting* and *The Economics of Casino Gambling* — form the foundation of this section, providing key insights into both historical and modern market dynamics.

In *The Economics of Sports Betting*, the authors trace the industry’s transition from terrestrial sportsbooks with high entry barriers to a modern, internet-driven landscape. Historically, physical sportsbooks operated as oligopolies, maintaining high margins through a 10% vig. Since setting up a terrestrial sportsbook had high barriers to entry with significant start-up costs, these sportsbooks existed in an oligopolistic industry which allowed them to maintain this high vig (Diemer and Rodenberg 2013). As a result, their goal was often assumed to be “balancing the book”—setting odds to equalize bets on each side and earn risk-free commissions (5% of total action) (Diemer and Rodenberg 2013). However, the internet drastically lowered entry costs (as low as \$10,000), allowing a flood of new operators, many operating offshore to avoid U.S. regulations. This disrupted the balance-oriented model: online sportsbooks increasingly prioritized profit maximization over risk reduction, leveraging forecasting advantages and asymmetric information against bettors.

This insight directly parallels the incentives we discuss in our project: firms promote products like parlays not to hedge bets, but to extract higher long-run margins through low-probability, high-variance wagers that exploit bettor biases. Additionally, the paper an-

anticipates the industry’s convergence to a more competitive equilibrium, where promotional offers and marketing are core differentiators rather than house-edge manipulation alone — a dynamic reflected in current U.S. markets. This more competitive equilibrium incentivizes firms to grow the overall size of the market and attract new bettors, since the size of the accessible market is no longer limited to the locality of the physical location of the sportsbook. Although competitiveness is typically a desirable trait in markets, in this case, the additional competition might counterintuitively be worsening societal outcomes.

The companion chapter, *The Economics of Casino Gambling*, extends these lessons to broader gambling markets. It outlines how casinos cross-subsidize core gambling services by offering discounted food, accommodation, and entertainment to induce more betting (Eadington 1999). This mirrors modern sportsbooks’ use of “no sweat” bets, referral bonuses, and odds boosts to deepen user engagement. Furthermore, this chapter shows how more competitive markets (like Nevada) drive down the house edge, while more monopolistic settings (e.g., government-run gambling monopolies) allow higher vigs (Eadington 1999). This highlights a regulatory tradeoff relevant to our paper: more competition can discipline margins but may also exacerbate addictive behavior via aggressive acquisition strategies.

Both chapters also touch on the long-term implications of legalization and regulation, arguing that state oversight can enhance transparency and global legitimacy while still allowing for market growth. However, such oversight often prioritizes profitability over consumer protection—precisely the concern at the heart of our project.

4.2 Betting Behavior, Incentives, and Addiction

The second strand of literature focuses on the behavioral drivers of betting and the impact of advertising and incentives. A particularly relevant article here is the Australian study *Sports Bettors’ Responses to Sports-Embedded Gambling Promotions: Implications for Compulsive Consumption*. This research investigates how embedded promotions—such as live odds commentary, celebrity endorsements, and in-game logos—affect bettor behavior. The findings are striking: problem gamblers not only engage more with sports media containing betting ads, but also report higher impulse to bet, greater frequency, and larger monetary losses as a result of these promotions (Hing et al. 2015).

This aligns with our paper’s argument that sportsbooks strategically exploit cognitive biases and addiction pathways to retain customers. The study also reveals how these tactics disproportionately affect young men, a demographic commonly targeted by U.S. marketing efforts (e.g., during NFL or March Madness campaigns). Unlike general advertising, which may raise brand awareness, these embedded promotions are shown to intensify harmful behavior among those already at risk—highlighting the potential for worsening negative externalities.

Further support for the cognitive distortion angle comes from classic behavioral economics literature cited in our project, including Tversky and Kahneman’s work on gambler’s fallacy (Tversky and Kahneman 1971) and prospect theory (Kahneman and Tversky 1979), as well as Barberis (Barberis 2013) on overconfidence. Together, these theories explain why bettors misjudge the odds, underestimate losses, and overvalue promotions like parlay boosts or “no-sweat” bets. The result is systematic overconsumption—not just at a societal level but also from the bettor’s own perspective.

Another critical distortion relevant to online sports betting is the illusion of control—the mistaken belief that one can influence outcomes in games of chance. Originally introduced by Langer 1975, this concept has been applied to gambling behavior in a range of contexts. Recent work shows that early betting success can heighten the illusion of control, leading to increased wager sizes and frequency (Orgaz, Estévez, and Matute 2013). Pathological gamblers were particularly vulnerable to this belief, frequently interpreting personal choice or familiarity as skill rather than randomness. Closely related is the near-miss effect, a phenomenon in which outcomes that are close to winning—though still losses—produce heightened arousal and increased motivation to continue betting. Clark et al. 2009 show that near-misses activate reward-related brain regions similarly to actual wins, even when no monetary gain is realized. These near-miss outcomes contribute to the illusion of control by making players feel that success is “within reach,” encouraging continued play and greater risk-taking.

Finally, the economics of addiction reinforces the idea that sportsbooks are financially dependent on a small subset of high-risk users. As previously noted, *Social and Economic Impacts of Casino Introduction to Massachusetts* 2024 finds that 90% of casino gambling revenue in Massachusetts came from just 9.9% of gamblers. This pattern is consistent with findings from the World Health Organization (*Gambling* 2024), which estimates that people gambling at harmful levels generate approximately 60% of industry losses. Studies in health economics and public policy highlight the regulatory dilemma this creates: governments may be reluctant to enact stronger consumer protections when a significant portion of tax revenue depends on compulsive gambling behavior. Livingstone and Adams 2011, for example, argue that the normalization of gambling in public policy has led to what they call “structural reliance” on addiction-based revenues, undermining efforts at harm minimization.

Government intervention, as discussed in Lipton & Vogel (Lipton and Vogel 2022) and Holmes (Holmes 2023), often fails to correct these distortions adequately. Policymakers face a conflict of interest: while charged with protecting consumers, they also benefit financially from betting tax revenue. This has led to half-measures like banning refer-a-friend bonuses (for example, in Massachusetts) but still allowing other promotions that fuel addiction. Such policy gaps reinforce the idea that current outcomes are suboptimal and call for better-aligned incentives between stakeholders

5 Suggested Approach

5.1 Behavioral Mechanisms & Modelling Approach

We attempt to understand the explosive profitability of online sportsbooks through understanding and modeling bettor behavior. In the long run, the vig, as a form of “house edge”, ensures that sportsbooks are guaranteed to make money so long as bettors keep placing bets - but what are the factors that encourage bettors to consistently make these negative expectancy decisions? We propose that a primary driver is the systematic exploitation of cognitive biases — especially overconfidence due to the *illusion of control*. As explained above, sports betting is unique in that it has an element of skill - however, it is difficult to separate this skill from luck. As such, bettors who have experienced recent wins are more likely to be overconfident because they overestimate their degree of skill. To demonstrate this, we use a simple behavioral model that captures these phenomena through two distinct bettor types—“naifs” and “sophisticates”—and sportsbooks incentives in the form of profit boosts.

5.2 Naifs & Sophisticates

In our model, bettors fall into two categories: *naifs*, who exhibit behavioral biases (but still try to maximize their perceived utility), and *sophisticates*, who behave rationally without biases and maximize their expected utility. We model N_n naif bettors and N_s sophisticate bettors in a setting with a single sportbook over T rounds. At each round t , the sportsbook offers every bettor the same bet with a win probability of p and a vig of ε . The payoffs are thus $1 - p - \varepsilon$ if the bet hits, and $-p - \varepsilon$ if the bet misses. Note the payoff of this bet is:

$$\mathbb{E}[\text{bet}] = p(1 - p - \varepsilon) + (1 - p)(-p - \varepsilon) = -\varepsilon < 0$$

and ordinarily no rational better should take this bet. At each round, every bettor either bets (if they have a non-negative perceived expectancy), or chooses not to bet (if they have negative perceived expectancy).

However, naifs and sophisticates differ in that while the sophisticate perceives the true probability of winning p (Assuming the vig is known, they can back this out from the displayed odds), the naif perceives a distorted probability $\tilde{p}_t$ encoding some amount of noise due to their psychological biases.

We dynamically adjust $\tilde{p}_t$ based on the outcome of the previous round:

$$\tilde{p}_t = \max(0, \min(1, p + w_t)), \quad w_t = \begin{cases} w_{t-1} + |\eta_t| & \text{if win} \\ w_{t-1} - |\eta_t| & \text{if lose} \\ w_{t-1} & \text{if no bet} \end{cases}, \quad \eta_t \sim \mathcal{N}(\mu, \sigma)$$

We have $w_0 \sim \mathcal{N}(0, 1)$ as the initial amount of noise, reflecting the underlying initial beliefs of each bettor with differing beliefs on if they have an edge or not.

This models a behavioral feedback loop where bettors who win become more confident (perhaps irrationally so), and those who lose become more cautious. We note that the model assumes that people react to outcomes in magnitude but not in direction to show that wins always increase confidence and losses always decreases it (we use $|\eta_t|$). When they don't bet, their beliefs are frozen, capturing a lack of new information. A naif's *perceived* expected value of a bet at time t is thus:

$$\mathbb{E}_{\text{naif}}[\text{bet}_t] = \tilde{p}_t \cdot (1 - p - \varepsilon) + (1 - \tilde{p}_t) \cdot (-p - \varepsilon)$$

and we see that it is possible for the above expression to be positive, and thus a naif would choose to bet for sufficiently high w_t .

5.3 Profit Boosting

A commonly used tactic by online sportsbooks to entice bettors is that of *profit boosts*, where a bonus b_t is paid on top of the original payout if the bet hits. Intuitively, this can be used to encourage new bettors to join the platform, or to encourage losing bettors to continue betting. Since this bonus affects the payouts directly, it affects the perceived expectancies of both naifs and sophisticates:

$$\mathbb{E}_{\text{naif}}[\text{bet}_t] = \tilde{p}_t \cdot (1 - p - \varepsilon + b_t) + (1 - \tilde{p}_t) \cdot (-p - \varepsilon)$$

$$\mathbb{E}_{\text{soph}}[\text{bet}_t] = p \cdot (1 - p - \varepsilon + b_t) + (1 - p) \cdot (-p - \varepsilon)$$

and we see that the presence of a boost (i.e. $b_t > 0$) can also cause sophisticates to bet. We experiment with various boost magnitudes and boost timings and assess how they affect bettor behavior and overall profitability of the sportsbook.

5.4 Simulations

We simulate the decisions of bettors over time and track the fraction of naifs and sophisticates that bet each round, as well as the cumulative profits of the sportsbook. Note that the profit of the sportsbook for round t is simply the negative of the sum of all the bettors' payouts for

that round. Parameters are selected such that their relative magnitudes are reasonable in a real world context, such as an approximately $\approx 6\%$ vig. We model a world in which 10% of the population are sophisticates, while the rest are naifs.

Parameter	Symbol	Value
Number of Naifs	N_n	1000
Number of Sophisticates	N_s	150
Maximum Time Steps	T	500
Win Probability	p	0.5
Vigorish	ε	0.03
Mean of η	μ	0
St dev of η	σ	1
Initial Boost	b_0	0.2

Table 1: Simulation parameter settings

To better illustrate the dynamics of odds boosts on betting behavior and outcomes, we developed a Python simulation to implement the model in Section 3. We run simulations across three scenarios:

1. No Odds Boosts
2. Sign-up Odds Boost (Single universal boost at $t = 1$)
3. Dynamic Odds Boosts (Boosts given intermittently based on activity and losses)

By comparing these three scenarios, we demonstrate the optimal sportsbook strategy, as well as a divergence in the betting behavior and bankroll of naif vs. sophisticate bettors.

5.4.1 No Odds Boosts

In our simulation absent odds boosts, no bet is ever advantageous to the bettor — it always has negative expectancy for the bettor due to odds tilted in favor of the book. As such, a sophisticate bettor will never bet under these conditions, as their perceived expectancy reflects the true expectancy of the bet. A naif bettor, on the other hand, may opt to bet if their perceived expectancy is positive due to their initial overconfidence factor w_0 being sufficiently high. However, over time, w_t will decay and hence they eventually no longer bet under this scenario. Because of this, the proportion of bettors betting quickly drops to 0 (Fig 1a), and sportsbook profit plateaus (Fig 1c).

5.4.2 Sign-up Odds Boost

In this simulation, we offer a single odds boost to all bettors at $t = 1$ to represent the sign up bonus offered by sportsbooks to draw in new users. In this simulation, betting in the first period is advantageous to the bettor, while all subsequent bets are unboosted and

thus favor the sportsbook. As such, all naif and sophisticate bettors will bet in the first period. Sophisticate bettors will immediately halt betting in subsequent periods, while naif bettors will continue in a similar fashion to the “no odds boost” scenario, based on their overconfidence factor (Fig 2a). Again, similar to the no odds boost scenario, we see betting activity drop to 0 rather quickly. Notice that while there is higher action of betting on the platform early on, profit still plateaus at a similar level to before due to the losses incurred by the book in offering boosts (Fig 2c), particularly to sophisticates who take advantage of these and leave.

5.4.3 Dynamic Odds Boosts

In this simulation, we again offer a universal boost at $t = 0$ to represent a sign up bonus. However, we also introduce additional boosts to individual bettors who qualify under one of two conditions:

1. Inactivity, as defined by not betting for k consecutive periods.
2. Continued losses, as defined by a streak of k consecutive losing bets in a row.

If a bettor qualifies under one of these criteria, they will be offered another boost at the first time step t in which they qualify.

In this simulation, we see a much more interesting pattern in behavior. Sophisticates continue to bet only when offered boosts, meaning they will bet each time they are given a boost for inactivity, and remain inactive in the periods between. By doing this, their bankroll continues to rise indefinitely (Fig 3b).

Naifs will similarly bet whenever they are given a boost, causing their overconfidence factor w to rise, in turn causing many of them to continue betting beyond when the sophisticate would halt. By the end of our simulation, the proportion of naifs betting is nearly 100% (Fig 3a)! While this increase may seem surprising, it mirrors the dynamics of addiction perpetuated by sportsbooks through continued promotions such as odds boosts. Unlike the sophisticates, because they continue to bet on unboosted odds, naifs’ bankrolls will trend downwards over the horizon of the simulation (Fig 3b).

From this, it is evident that offering boosts to sophisticates is unprofitable to sportsbooks, while offering boosts to naifs is profitable. But because there is always a large proportion of naifs betting, both with and without boosts, the profits sportsbooks make on naifs will exceed those losses incurred by sophisticates. Hence, it is clear that the continued offering of targeted boosts helps maintain action on the platform, enabling sportsbook profits to rise (Fig 3c).

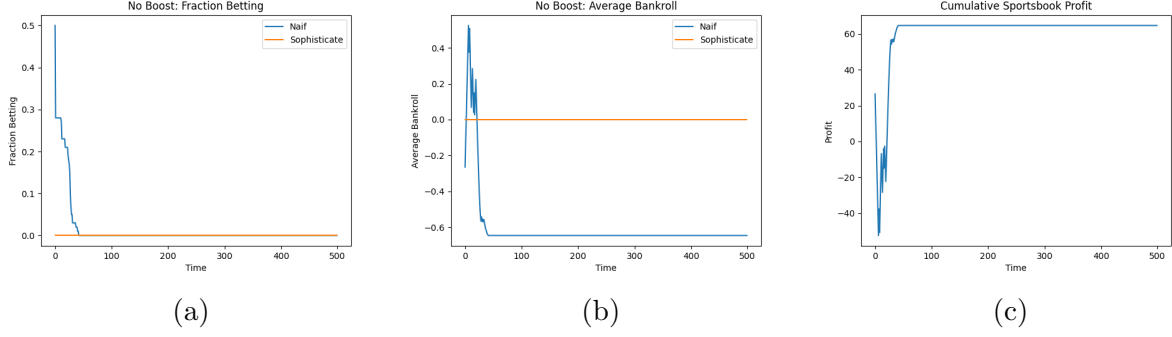


Figure 1: No Boost—bettors behave rationally under negative EV conditions, leading to minimal participation. Those with overconfidence fade.

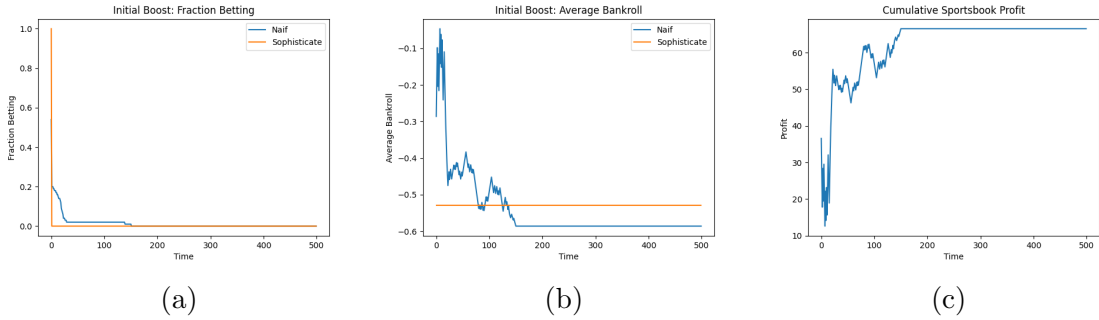


Figure 2: Initial Boost—bettors are drawn in due to temporarily positive EV but drop off as overconfidence fades.

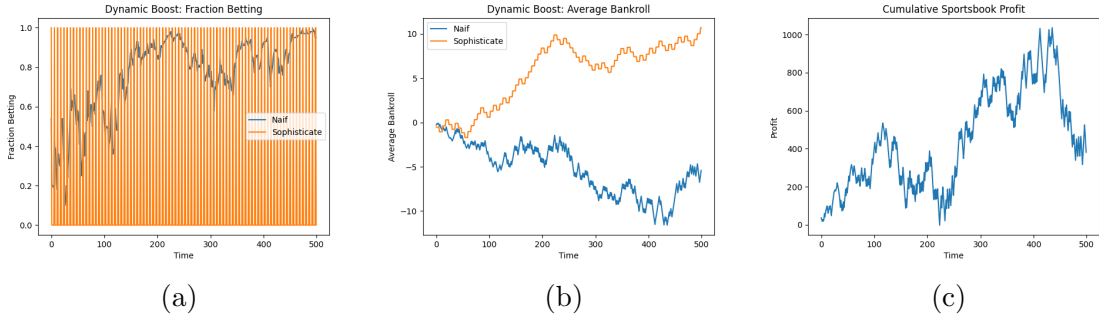


Figure 3: Dynamic Boost—bettors experience addiction cycles and are sustained with well-timed boosts.

6 Policy Applications

Our analysis outlines how the current sports betting market exploits cognitive biases such as overconfidence dynamics, particularly by leveraging aggressive promotional tactics and enticing promotions such as odds boosts. While sportsbooks have reaped immense profits from these mechanisms, the rapid spread of online sports betting has perpetuated real societal harm in the form of financial losses and gambling addiction.

6.1 Required Public Education

As shown in Section 4 and the simulations in Section 5, the distinction between "naif" and "sophisticate" plays a significant role in gambling outcomes. It is evident that the naif population is far more vulnerable to these risks, and combined with predatory marketing tactics, this means they are more susceptible to higher rates of addiction as well as greater financial losses. While most states already require substance abuse education at the high school level, and many colleges mandate educational programming on substance abuse, gambling abuse does not receive the same treatment despite similar addictive patterns and growing prevalence among younger age groups.

Practically, it would be difficult to set paternalistic limits on private sports betting enterprises. With an endless number of strategies available to sportsbooks, banning one would simply incentivize the use of a different one. Instead, we advocate for emphasis on targeted educational programs, especially for those vulnerable to addiction. Particularly, basic education on mathematical concepts such as betting odds (and implied probabilities), expected value, and vigorish, as well as cognitive biases such as chasing losses and the gambler's (hot hand) fallacy should be mandatory for new bettors before they sign up on the platform, and regulators should work together with sportsbooks to identify at-risk bettors who display a consistent streak of poor betting decisions.

7 Conclusion

The rapid expansion of the online sports betting industry has seen sportsbooks exploit cognitive biases, addiction dynamics, and informational asymmetries in order to maximize profit. As our model shows, even seemingly rational consumers are vulnerable to long-term negative expectancy betting due to promotional tactics, cognitive biases, and structural incentives embedded within sportsbooks. Without targeted intervention, the rise of online sports betting will continue to perpetuate societally suboptimal outcomes, due to financial losses and gambling addiction, and the associated negative externalities. Policy solutions must therefore address the behavioral vulnerabilities of bettors, particularly in light of the aggressive strategies of sportsbooks.

The strength of our approach lies in its interdisciplinary synthesis—linking economic structure, behavioral theory, and formal modeling—to explain how targeted promotions can sustain platform profitability while perpetuating user harm. However, several limitations warrant discussion. Our model abstracts bettor behavior into two discrete types—naifs and sophisticates—when, in reality, user rationality likely falls on a spectrum. It treats all bets as homogeneous, omits learning or peer effects, and excludes real-world frictions such as financial constraints, regulation, and algorithmic targeting. These simplifications, while necessary for tractability, limit the precision of real-world predictions. Still, the dynamics we

model closely mirror observed behaviors, offering a compelling baseline for understanding the mechanisms driving sportsbook profit and user loss.

Importantly, the insights from our model may extend beyond sports betting. Similar dynamics are observable in other digital consumer environments where platforms rely on sustained user engagement and behavioral frictions to drive revenue. Examples include daily fantasy sports, mobile games with variable-ratio reward systems, and gamified investing applications that encourage high-frequency or high-risk trades. In each of these domains, distorted perceptions of value and platform-induced incentives can lead to persistent, suboptimal user behavior. Future work may build on our framework to assess these adjacent markets and develop generalizable strategies for harm mitigation.

Nonetheless, sports betting presents a particularly urgent regulatory challenge given its rapid normalization, deep integration into mainstream sports culture, and high visibility among young, financially vulnerable users. Through publicly sponsored gambling education, public regulators can better protect consumers without disrupting the rights of private sportsbooks or the rights of consumers. Such reform would empower bettors to make more informed decisions, and would set up additional roadblocks on the path to gambling addiction, while still preserving the fundamental experience value of sports betting for responsible users. Critically, early action in this relatively new space offers an opportunity to protect future generations of consumers, particularly the young male demographic among which sports betting is most prevalent. By modeling the mechanisms driving sportsbook profit as well as negative societal outcomes, and addressing this with the appropriate intervention, we can proactively protect future consumers, preserving social welfare and mitigating suboptimal societal outcomes.

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