Gambling Away Stability: Sports Betting's Impact on Vulnerable Households*

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October 23, 2024

Abstract

We estimate the causal effect of online sports betting on households' investment, spending, and debt management decisions using household transaction data and a staggered difference-in-differences framework. Following legalization, sports betting spreads quickly, with both the number of participants and frequency of bets increasing over time. This increase does not displace other gambling or consumption but significantly reduces savings, as risky bets crowd out positive expected value investments. These effects concentrate among financially constrained households, as credit card debt increases, available credit decreases, and overdraft frequency rises. Our findings highlight the potential adverse effects of online sports betting on vulnerable households.

KEYWORDS: Sports Betting, Gambling, Household Finance, Stock Market Participation
JEL CLASSIFICATION: D14, G11, G18, G51

*We thank Darren Aiello, Aaron Brown, Evan Calford, Karl Diether, Matthew Gustafson, Junchao Liao, Erik Mayer, Ryan Pratt, Tyler Shumway, and seminar and conference participants at Brigham Young University and the 2024 Wasatch Finance Conference for helpful feedback.

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1 Introduction

> "*It's very predictable that there are vulnerable people who wouldn't have gotten into trouble except that sports betting came along.*" — Rachel Volberg[1]

In 2018, the United States Supreme Court overturned a Federal ban on sports betting, leading states to rapidly introduce legislation to legalize in-person and online sports betting for consumers. The growth of these markets was swift, generating over $120 billion in total bets and $11 billion in revenues in 2023.[2] This rapid expansion of the sports betting market raises important questions about its broader economic and social impacts. Despite being marketed as a form of entertainment, the industry's profitability suggests that the typical bettor faces negative expected returns. Moreover, evidence from other gambling contexts indicates that bookmakers exploit bettors' cognitive biases and lack of skill, making betting a detrimental financial activity for most households (Levitt, 2004).[3]

The key question underlying our research is whether the financial impact of online sports betting extends beyond marginal entertainment expenditure — that is, whether sports betting displaces more productive financial behaviors, such as saving and investing, and whether it exacerbates financial strain, particularly among vulnerable households. If sports betting simply substitutes for other discretionary spending, its effects on household financial health may be neutral. However, there could be long-term financial impacts if sports betting crowds out personal savings or induces households to increase leverage to continue betting. Answers to these questions offer important insights into household savings behavior and also inform relevant policy decisions regarding the scope and shape of sports betting access.

[1] https://www.ft.com/content/2e1a235a-8a46-47f3-b040-5ca21a04ebf4.

[2] https://www.espn.com/espn/betting/story/_/id/39563784/sports-betting-industry-posts-record-11b-2023-revenue.

[3] Sports betting sites often take action to cut off or limit bets from bettors who are winning too often. See https://www.wsj.com/business/media/sports-betting-companies-limit-winners-f06ea822.

To estimate the causal impact of legalized sports betting on household financial decisions, we use financial transaction data spanning a large population of U.S. consumers that provides a comprehensive picture of purchases, after-tax investments, and transfers to online betting sites. We then utilize variation induced by state-specific legalization dates for online sports betting, where the precise timing of legalization is generally driven by idiosyncratic differences in judicial and legislative sessions and schedules. Our study covers all 26 online sports betting legalizations in the United States between August 2018 (the first legal bet outside Nevada) and September 2023 (the end of our sample period).

We show that bettors are more likely to be pre-existing gamblers — e.g., four times more likely to have played the lotto — and betting is highly persistent, with the average bettor steadily increasing transfer amounts over time. Importantly, this betting activity crowds out financial investments, leading to a reduction in net deposits to brokerage accounts, including robo-advisors that are primarily used for long-term savings.[4] This substitution is particularly pronounced among financially constrained households. Additionally, consumption in complementary entertainment-related categories rises, likely reflecting spillovers from increased sports betting. Combined, the increase in betting and associated consumption leads to heightened financial instability as households run-up credit card balances and more frequently overdraw their bank accounts. The use of debt to fund betting mirrors other financial mistakes such as using high-interest loans to fund low-yield investments (Gross and Souleles, 2002). Overall, our results suggest that access to online sports betting comes at the expense of equity market attachment and exacerbates financial difficulties faced by

[4]This tendency is consistent with evidence in Cookson (2018) that households readily substitute between positive and negative expected value bets.

constrained households.

To isolate these impacts, we use transaction-level data from a large financial aggregator containing 230,171 households (and approximately 4.9 million household-quarter observations) and employ a two-way fixed effects (TWFE) difference-in-differences (DiD) approach.[5] We find that sports betting deposits are initially near-zero, but spike immediately upon legalization, producing an unconditional state-wide increase in average household betting deposits by about $25 per quarter. Conditional on ever placing a bet after a state legalizes online sports betting, households deposit on average $180 per quarter. While bets come from all along the income distribution, financially constrained households deposit larger fractions of their income. We also find deposits continue to increase throughout the post-legalization period on both intensive and extensive margins. On the intensive margin, betting is persistent, with about two-thirds of bettors making multiple deposits to online sports betting apps and increasing those deposit amounts over time. The increase in amounts deposited over time is often substantial, likely reflecting not only learning curves, advertising yields, and social norms, but also in some cases addiction and increased tolerance for losses.

We then examine whether betting affects households' investing decisions by constructing a measure of net deposits to (after-tax) stock brokerages each quarter. We show that treated and control households invest similarly during the period leading up to legalization. After legalization, treated households experience a relative reduction in net investments of about 14%. The results are robust to an alternative identification strategy that instruments for betting based on the transaction history of users using two-stage least squares (2SLS). This

[5]Our estimates are robust to using alternative estimation methods to account for econometric issues associated with staggered DiD estimated using TWFE, e.g. Borusyak, Jaravel, and Spiess (2024).

approach allows us to isolate within state-quarter variation. Based on evidence showing men comprise roughly 75% of sports betting activity, we instrument for betting activity with the predicted gender of the household account holder. We show that the causal effect of $1 of online sports deposits is a reduction in net investment of just under $1.

In contrast with the sizable effects on equity investments, we find that increases in sports betting do not coincide with decreases in participation in lotteries or other online gambling outlets like poker sites. Cryptocurrency exchanges see a small decline in deposits, but of a much smaller magnitude than either the sports bets themselves or the declines in investments. We also test whether our effects are driven by changes in net deposits to 'gamified' brokerages like Robinhood. While net deposits to such brokerages decline, they explain only a minority of the total effect observed on investments. Overall, these results suggest that most of the displacement driven by increases in sports betting falls on positive expected value "investments" rather than other types of negative expected value "bets."

We next examine heterogeneity in the substitution patterns across consumers with differing levels of financial constraints, finding significantly larger substitution effects among more financially constrained households. This result is consistent with Kumar (2009) who shows that lower income individuals invest more in lottery-like stocks, and with Dorn, Dorn, and Sengmueller (2015) who show that the sensitivity of lottery demand to jackpot size is higher for lower income individuals.[6]

We then turn to the effects of sports betting on other aspects of households' saving and financial planning decisions. Financially constrained households increase their credit card

[6]To provide external validity for our results, we use a separate sample of households from the IRS based on all tax filers in the U.S. Constructing a state-by-year panel and estimating a TWFE DiD estimator, we find sports betting legalization significantly reduces household stock market participation among constrained households.

balances by about $368 relative to less constrained households, an 8% increase in credit card debt relative to the sample mean. Additionally, we find that more constrained households exhaust more of their credit availability, reduce their credit card payments, and increase account overdrafts. Combined, these results suggest that sports betting exacerbates the financial constraints of households already operating with less flexibility.

Finally, we show that sports betting increases households' expenditures on complementary goods such as cable, restaurants, and other entertainment. Overall, these results suggest that sports betting leads constrained households to use would-be savings and debt to reduce investments and increase spending on complements to gambling, likely leading to a lasting deterioration in their longer-term financial health.

Our paper contributes to the literature studying the relation between households' investing and gambling activities. Several prior papers provide evidence that individual investors view trading in the stock market as a fun gambling activity (Statman, 2002; Dorn and Sengmueller, 2009; Grinblatt and Keloharju, 2009; Kumar, 2009; Kumar, Page, and Spalt, 2011; Chen, Kumar, and Zhang, 2021; Kormanyos, Hanspal, and Hackethal, 2023). Gao and Lin (2015) and Dorn et al. (2015) document a negative relation between lottery jackpot sizes and investor trading activity, suggesting that investors substitute between stock market trading and alternative gambling opportunities. We provide evidence that sports betting affects not just gambling-like trading, but also savings-motivated investing. We also show that the effects are concentrated in financially constrained households with the highest marginal benefit of maintaining savings allocations.[7]

[7]In a concurrent working paper, Hollenbeck, Larsen, and Proserpio (2024), use credit bureau data to study the effect of legalized sports betting on households' credit quality, debt loads, and likelihood of bankruptcy and delinquency. Like us, they find negative effects on credit health, particularly among lower income households.

Our paper also contributes to the literature on the determinants of stock market participation. Kaustia and Torstila (2011) examine the political characteristics that affect stock market participation. Using the randomized assignment of lottery prizes across Swedish residents, Briggs, Cesarini, Lindqvist, and Östling (2021) provide evidence that cash windfall gains significantly increase stock market participation. Barnea, Cronqvist, and Siegel (2010), Grinblatt, Keloharju, and Linnainmaa (2011), and Gan, Lu, Lu, Niu, and Zhou (2023) provide evidence that genetic differences in risk preferences, IQ, and physical features affect stock market participation. We contribute to this literature by showing that environmental factors unrelated to income or political affiliations shift individuals' investing decisions.

The spillover effects of legalized sports betting on savings decisions and household balance sheets have potentially important policy implications. Several states are still considering whether and how to legalize sports betting, and our study takes an important step toward quantifying some of the costs of sports betting directly relevant to those decisions. In particular, our evidence suggests states can expect that some of the tax revenue they earn from sports betting is offset by lost tax revenue on investment income and the public costs of managing overextended borrowers. More broadly, increased sports betting activity could undermine government efforts to increase long term financial well-being. Our evidence suggests a more nuanced approach to sports betting access that can potentially curb impulse betting could yield more efficient outcomes, especially for households with the most binding budget constraints. Because sports betting is addictive, these issues are unlikely to self correct.

2 History of Online Sports Betting

Widespread online sports betting in the U.S. began in 2018 when New Jersey became the first state outside Nevada to accept a legal online sports wager. Prior to this, single game sports betting was prohibited outside Nevada by the Professional and Amateur Sports Protection Act (PASPA) of 1992. In March 2009, New Jersey filed a federal lawsuit challenging PASPA, despite facing strong opposition from professional sports leagues and the NCAA. Nearly ten years later, in May 2018, the Supreme Court struck down PASPA, allowing states to pursue their own legalization of sports betting.

On June 5, 2018, Delaware became the first state to take advantage of the PASPA repeal and began accepting single game sports wagers, though only in the form of in-person bets placed at legal betting establishments. On August 6, 2018, DraftKings's online sports book accepted the first single game sports wager outside of Nevada. Since then, many states have legalized either in-person or online sports betting. Figure 1 shows that, as of the third quarter of 2023, single game online sports betting is legal and operational in 25 states plus the District of Columbia.[8] This rapid legalization of sports betting has led to an explosion in betting, with the total wagered amount rising from an average of $1.1 billion per month in 2019 to $14 billion in January 2024.[9]

Appendix Table A.2 shows the launch dates of online betting in each state. The legalization of online betting is staggered across time, with relatively equal numbers of states launching online betting each year from 2019 to 2023. The reasons behind states' decisions to legalize online sports betting vary. While fiscal motives tied to increasing government

[8] At the timing of writing, five additional states have launched online sports betting since the end of our sample in Q3 2023. See Appendix Table A.2.

[9] https://www.sportsbookreview.com/news/us-betting-revenue-tracker/.

budgets might play a role, other drivers include changing local attitudes and competitive pressures from neighboring states (Green, 2022; Petrotta, 2023). Supporting this idea, we show in Appendix Table A.5 that trends in local private- and government-sector economic growth do not predict legalization, indicating that the timing of legalization is not driven by economic trends that simultaneously affect household spending and investment decisions.

Concurrent with the legalization of online sports betting, many states also legalized in-person betting at approved sports books. Conditional on legalizing sports betting, it is most common for states to allow both online and in-person betting. However, a few states only allow betting on the physical premises of approved vendors (e.g., racetracks or casinos), whether in-person or online (see orange-shaded states in Figure 1). Because our transaction-level data (described in Section 3) cannot distinguish between in-person transactions at casinos for sports betting purposes and other types of casino transactions, we focus our analysis on online sports betting (the blue-shaded states in Figure 1).

An important detail is the nature of how online sports books enforce legality across state borders. All existing laws govern the location at which the bet is placed, not the state of residence of the bettor. Betting platforms strictly enforce these rules using geo-location technology that makes the platforms inaccessible on devices not located within state borders. These rules of course do not prohibit a prospective bettor from driving across state lines to place bets, and in practice they do. However these effects are negligible in our data and we additionally control for this potential noise by eliminating consumers located in non-legalized counties bordering legalized states.

3 Data

In this section, we introduce our main transaction-level data (Section 3.1), describe how we use these data to calculate measures of betting and investment (Section 3.2), and summarize the characteristics of bettors and non-bettors in our sample (Section 3.3).

3.1 Transaction Level Data

The primary data source we use to study individuals' consumption and investment decisions over time is a proprietary dataset of U.S. consumer transactions from an undisclosed U.S. data aggregation and analytics platform. The data provider contracts with financial institutions — including major banks, credit card firms, and FinTech firms — to aggregate financial information across a user's financial accounts. Because the data provider contracts with financial institutions, rather than with consumers, the data is both more comprehensive and free from selection issues that may arise when consumers have to opt in to provide their data. The full database includes over 60 million American users and includes billions of transactions from 2010 to September 2023. We are able to track users over time and observe their transactions through bank accounts and credit cards, which allows us to observe household income, spending, and post-tax investment. However, we do not observe demographic characteristics such as gender, race, or age.

Although the data do not constitute a random subset of U.S. consumers, Aiello, Baker, Balyuk, Di Maggio, Johnson, and Kotter (2023a) and Aiello, Baker, Balyuk, Di Maggio, Johnson, and Kotter (2023b) demonstrate that the sample is broadly representative of the general population in terms of geography, spending patterns, and income (excluding low-income unbanked consumers). One concern with these data is that we might not observe a

complete set of a household's financial accounts for all users, which could bias our measures of household income, spending, and investment. The data provider ranks the quality of the transaction data based on completeness and account tenure. We focus on a sub-sample of 230,802 users drawn randomly from the top 10% of the sample based on this measure.

3.2 Identifying Sports Betting and Other Transactions

We identify online sports betting activity by searching for deposits to (and withdrawals from) online sports betting platforms. These deposits can come from a household's bank account (i.e., transfer from a checking or savings account) or from a credit card. The data provider employs advanced analytical tools to determine the names of the primary and secondary merchants from transaction descriptions. For most transactions, we have access to the full transaction description, enabling us to identify additional sports betting transactions not captured by the merchant name.

We leverage this information to identify deposit and withdrawal transactions involving online sports betting platforms.[10] To identify sports betting transactions, we start with an exhaustive list of online betting platforms from Action Network.[11] To avoid false positives (e.g., due to some restaurants or cities sharing the name of a platform), we focus on platforms with at least 1,000 transactions in our data. This leaves us with the following 11 platforms, in descending order of transaction volume: FanDuel, DraftKings, Betrivers, BetMGM, Barstool Sportsbook, Betfair Casino, Playsugarhouse, Pointsbet, Kings, Bet365, and Unibet. Approximately 70% of the transactions we observe involve DraftKings or FanDuel.

[10] One limitation of this approach is that the algorithm may not detect transfers to sports betting platforms that use intermediaries, such as PayPal. While we can identify some of these transactions from the full transaction description, in cases where we cannot, the primary merchant name is often uninformative.

[11] https://www.actionnetwork.com/legal-online-sports-betting/sportsbooks-by-state.

Our results are qualitatively similar if we focus exclusively on these two venues.

To study households' post-tax equity market investment decisions, we identify transfers to and from equity brokerage accounts, again using the merchant and description information. We further separate these transactions into transfers with traditional brokerages — e.g., Charles Schwab, E*Trade, Vanguard, and Fidelity — and transfers with FinTech brokerages such as Robinhood. We search for crypto investments in an analogous way using the list of crypto brokerages in Aiello et al. (2023a).

Finally, using transaction descriptions we identify other risk-taking behavior, such as money spent on online poker and lottery tickets. Because lottery tickets purchased at registers that sell other products (e.g., a grocery store), and most in-person tickets in general, are not identifiable in our data, we only identify a small subset of lottery spending.

We collapse these transaction-level data to the household-quarter level by summing total income, investment, and betting/gambling expenses each quarter, which serves as the main dataset we use in our regression analysis.[12] For this panel, we impute the zip code of the household's residence based on the physical location of merchants that frequently appear in the user's transactions in a given calendar year.[13]

For roughly 15% of our sample, we observe up to four snapshots of credit card information. These snapshots include the balance on the credit card and the available credit to spend. By combining credit card transaction data with these snapshots, we impute (forward and backward) the quarterly credit card balance and available credit. We then sum up these numbers across all of the household's credit cards to obtain a quarterly measure of the

[12]We estimate all of our two-way fixed effect regression results at the household-by-month level and the results are nearly identical.

[13]We limit these transactions to Grocery, Restaurant, Gasoline, General Merchandise, Home Improvement, and Pharmacy transactions.

household's total credit card debt and total available credit.

Finally, we measure financial constraints in two ways. First, we calculate a measure of the quarterly flow of savings by subtracting total spending from total income. In each quarter, we sum the savings flow over the prior four quarters. We then define a household as "low savings" if the four-quarter flow of savings is below the sample median. Our second measure of constraints is an indicator equal to one if the household has at least one overdraft during the previous four quarters.

3.3 Characteristics of Bettors

About 7.7% of the households in our sample place online sports bets during our sample period, who we label as "bettors."[14] In Table 1, we highlight that bettors and non-bettors have similar incomes, after-tax equity investment, and credit card debt burdens, though non-bettors have slightly higher of each. However, there are noticeable differences when it comes to risky financial behavior. Bettors are more than twice as likely as non-bettors to have invested in crypto or overdrawn their bank account, and four times more likely to have played online poker or purchased lottery tickets. Bettors are also more likely to have received child tax credits during the post-COVID stimulus (25% vs. 14%), suggesting that a relatively large fraction of the bettors in our sample have dependent children.

Table 2 highlights differences across bettors. On average, bettors deposit about $102 per quarter to a sports betting app, or roughly $2,300 over our sample period. However, most of this betting comes from a small set of high-intensity bettors. The top tercile of

[14] A similar fraction of the population reported using online gambling services in a Pew Research survey in July 2022. The survey showed that 6% of Americans had gambled using online platforms in the prior 12 months. https://www.pewresearch.org/short-reads/2022/09/14/as-more-states-legalize-the-practice-19-of-u-s-adults-say-they-have-bet-money-on-sports-in-the-past-year/

bettors (based on total betting deposits) deposits an average of $299 per quarter, or 1.7% of their income, while the bottom tercile of bettors only deposits an average of $1.39 per quarter. Despite these large differences in betting behavior, high- and low-intensity bettors look broadly similar in terms of income, investment, and family status, though low-intensity bettors have somewhat lower income and investment on average.

Figure 2 plots the evolution of betting deposits to income over time. Unsurprisingly, betting activity increases over time as online sports betting becomes legal in more states but also more popular and socially acceptable. However, the increase relative to income is most pronounced for households in the bottom tercile of the income distribution. As low income households allocate a growing portion of their income to betting, it is important to understand what ramifications this has for the financial health of these households.

We also document that the upward trend in bets comes from a relatively wide swath of the population. Figure 3a shows that, conditional on betting at least once in our sample, about 70% of bettors subsequently deposit money in sports betting sites at least two more times, with almost 40% of bettors doing so over ten times. Only a fifth of first time bettors do not subsequently deposit additional funds to a betting site.

Figure 3b examines the evolution of follow-on deposits over time. The probability of a follow-on sports betting deposit hovers around 0.5–0.6 across individuals following an initial deposit. This consistently high probability of follow-on deposits yields a steadily increasing amount of money deposited to sports betting sites. Figure 3c displays the path of quarterly deposits relative to the size of a bettor's first deposit. After 12 quarters following legalization, bettors deposit around eight times their initial quarterly deposit. Together, the results in Figure 3 indicate that while the growth of sports betting following legalization likely has large

extensive margin effects — expanding as more of the population engages over time — it also has meaningful intensive margin effects. The overwhelming majority of bettors not only continue betting, but significantly increase the amount of money they deposit to online sports apps after their initial deposit.

To begin to explore the potential consequences of sports betting on household finances, Table 3 compares individuals with high and low savings status (above or below median savings flows), further partitioned by whether they are bettors or non-bettors. Bettors with below median savings allocate close to twice their quarterly income to betting compared with bettors with above median savings (0.85% vs. 0.49%). Bettors with below median savings also have lower incomes and investments and higher instances of overdrafts and debt burdens.

Focusing only on the below median savings households, Table 3 reveals that bettors and non-bettors have similar quarterly incomes, credit card debt burdens, and investments. However, low savings bettors are more than twice as likely to overdraw their bank accounts as low savings non-bettors. They also have lower available credit. Combined, the patterns in Table 3 point in the direction that the impacts of sports betting on household financial health may disproportionately affect constrained households.

4 Staggered State-Level Legalization of Sports Betting

We study the effect of online sports betting on household finances using the staggered passage of sports betting legalizations between 2018 and 2023. We compile a description of past and ongoing sports betting legislation in each state from the American Gaming Association, and supplement this information with additional internet searches for each

state.[15] Using these data, we define the launch date of online betting as the first date it is possible to place an online bet in a state. Appendix Table A.2 shows the launch dates of online betting for each state. Because we observe deposits to online betting sites at the daily level in our transaction data, we are able to verify that we correctly identify launch dates in each state.

Using our household-by-quarter panel of household inflows, spending, and investment, we estimate a two-way fixed effects (TWFE) difference-in-differences regression. Recent literature shows that in the presence of a staggered treatment with heterogeneous effects, TWFE regressions can result in biased estimates. To address this concern, we also estimate all results using the imputation DiD method of Borusyak et al. (2024) and find qualitatively and quantitatively similar results (see Appendix Tables A.6–A.19). In our main tables, we report estimates of the following TWFE specification:

$$y_{it} = \beta \, Treat_s \times Post_t + \chi_{it} + \gamma_i + \delta_t + \alpha_s + \epsilon_{it}, \tag{1}$$

where y_{it} measures household i's spending or investment decisions — e.g., betting deposits or net dollar transfers to equity brokerages — during year-quarter t. *Treat* is an indicator variable equal to one if the household lives in a state s that legalizes online sports betting sometime during our sample period.[16] *Post* is equal to one if year-quarter t occurs after online sports betting goes live in the state. We include up to four years before and after legalization for treated states (then we drop treated states from the sample and do not re-use them as controls), and include all quarters for states that never legalize sports betting. χ_{it} represents

[15] https://www.americangaming.org/research/state-gaming-map-mobile/.

[16] As Figure 1 shows, at the end of our sample in September 2023, 25 states had not legalized online sports betting. We include Mississippi, Montana, and Washington in that list of never treated states; these states allow online betting, but only when physically on the premises of an approved retail location.

a set of time-varying household-level control variables, including household income and the amount of stimulus funds received during year-quarter t. γ_i, δ_t, and α_s represent household, year-quarter, and state fixed effects.

The inclusion of household fixed effects controls for household-specific characteristics that might generally influence betting activity or other spending and investing decisions such as education, financial sophistication, and socioeconomic background. This approach isolates the impact of legalization by examining the variation in a household's spending decisions between periods when they have legal access to online sports betting and periods when they do not. We double cluster standard errors at the individual and state-by-year-quarter level.

Equation 1 identifies the causal effect of sports betting on household finances, contingent on the outcome variables satisfying the parallel trends assumption. The identifying assumption is that pre-legalization trends in outcomes for households in states that are about to legalize sports betting are similar to the trends for households in states that have not yet legalized sports betting. Accessing online betting sites from illegal jurisdictions is virtually impossible given the resources devoted to identifying this behavior, so this assumption is likely trivially satisfied for money spent on online sports betting; households are likely to spend very little money betting absent legalization.[17] The largest exception is for households living in states where online betting is illegal, but close to the borders of states where online betting is legal. These households might choose to drive over the border to place legal bets on their phones. To address this possibility, we drop from the sample households living in counties where it is illegal to bet on sports but that border states where online sports betting

[17]In addition to AML and KYC compliance measures, most books adhere to strict geo-location and age verification, and will lock or ban accounts attempting to skirt rules using virtual private networks (VPNs).

is legal.[18]

Even if the parallel trends assumption is satisfied for betting, to identify the broader effect of sports betting on household finances our experiment requires parallel trends in other household spending and investment decisions. For these other outcomes, such as investment, it is not clear ex ante that household behavior evolves similarly in treated and control states in the period before legalization. We examine these trends and provide evidence supporting the validity of the parallel trends assumption in Section 5.

While the overall effect of sports betting is interesting, the summary statistics in Section 3.3 suggest that any negative effects of betting on household finances are likely concentrated in constrained households. To test this hypothesis, we augment the difference-in-differences estimator described in Equation 1 to include an interaction term with various indicators for constrained households. Specifically, we estimate:

$$y_{it} = \beta_1 Treat_s \times Post_t \times Constrained_{it} + \beta_2 Treat_s \times Post_t + \chi_{it} + \gamma_i + \delta_t + \alpha_s + \epsilon_{it}, \tag{2}$$

where *Constrained* is an indicator variable equal to one if the household is constrained in year-quarter t.[19] We use two proxies for *Constrained*, described in Section 3.2: an indicator for below median savings flows and an indicator for any overdrafts, both measured over the prior four quarters. The identifying assumption under which β_1 estimates the causal effect of sports betting on the relative behavior of constrained households is that the pre-legalization trends of the constrained and unconstrained households in states exposed to the regulatory intervention are similar, and that without the regulatory intervention, the relative behavior of these constrained and unconstrained households in these states would be expected to be

[18] Results are robust to keeping these households in the sample.

[19] The other interactions of *Constrained* with *Treat* and *Post* are absorbed by the fixed effects.

the same before and after the intervention. We further provide evidence supporting this assumption in Section 5.

Our final regression sample includes about 4.9 million household-quarters. Table 4 describes the distribution of the variables we use in our regression analysis. Our main outcome variables *Sports Bets*, *Net Invest*, *Net Robinhood*, and *Net Robo Advisor* represent dollar amounts spent per household per quarter.

5 Results

5.1 Legalization increases betting

To analyze the impact of sports betting on household betting activity, we estimate Equation 1 using our household-by-quarter panel of household transactions. This difference-in-differences estimation leverages variation in the timing of legalization across different states to isolate the causal effect of legalization. As shown in Column (1) of Table 5, the legalization of online sports betting increases average quarterly betting expenditures by $24.91. While this amount might seem small, it represents the overall effect averaged across both bettors and non-bettors. Conditional on living in a treated state post-legalization, the probability of being a bettor is 13.9%. This adoption rate suggests that for households that begin betting following legalization, betting expenses increase by about $179 per quarter.[20]

Further illustrating this increase in online sports betting, Figure 4 depicts the dynamics of betting activity in event time around legalization. To account for the staggered nature of legalization and potentially heterogeneous treatment effects, we estimate the event time trends using the approach of Borusyak et al. (2024). Because there is negligible betting activ-

[20]Table A.3 in the appendix shows similar results when measuring betting activity using net deposits to online betting platforms, rather than gross deposits.

ity in the quarters preceding legalization, there is no difference in betting across households in treated and control states during the pre-period. Immediately following legalization, there is a marked relative increase in betting activity among households in treated states. This increase continues to rise over time, eventually stabilizing at approximately $60 per quarter after three years. This pattern indicates not only an immediate uptake of legalized betting, but also a sustained growth in betting activity, likely driven by a combination of marketing, growing social acceptance, learning and peer spillovers, and addictions that compel habitual losers to continue betting.

To better understand the magnitude of the increase in betting activity over time, we re-estimate the effect of legalization on betting activity using an augmented version of Equation 1 that interacts our treatment indicator with a post-treatment linear time trend. The results, reported in Appendix Table A.20, are consistent with the trends in Figure 4. Following the legalization of online sports betting, the average household's betting expenditures initially increase by about $4.60 per quarter, growing to approximately $73 per quarter after four years. Throughout our remaining analysis, we consistently find that the effects of sports betting on household finances increase over the post-legalization period, suggesting that any knock-on effects of sports betting are unlikely to revert.[21]

We also note that a common strategy to increase adoption among consumers is for sports books to offer bonuses (free bets, deposit matching, etc.) in the early days of rolling out their product to a state. While these bonuses may take several forms, they each effectively increase the amount of betting capital available to customers. All else equal, they reduce the amount of deposits required for customers to reach their desired level of betting. Because of

[21] See Appendix Tables A.21 through A.25.

this strategy, our betting results can be thought of as betting capital in excess of this "free money".

We next explore the extent to which the increase in betting varies for constrained households. The results from estimating Equation 2, reported in Columns (2) and (3) of Table 5, show that low-savings households increase their spending on betting by about half the amount that high savings households do. In contrast, households that have overdrawn their bank accounts in the past year spend more than three times as much as households without recent overdrafts. Importantly though, Columns (4) and (5) show that legalization increases the fraction of income spent on betting for both low-savings households and households with recent overdrafts, compared with less constrained households. The economic magnitude is large. The ratio of their income that low-savings households spend on betting is about 32% larger than how much high savings households spend. Similarly, households with overdrafts spend more than twice the proportion of their income on betting compared with households with no overdrafts. The propensity of financially constrained households to increase their betting activity relative to their income suggests that the legalization of sports betting may exacerbate existing financial strains for these households.

5.2 Betting reduces investment

There are many ways that sports betting might affect investment behavior. First, households may simply substitute between different aspects of their consumption bundle and leave their marginal rate of substitution between current and future consumption fixed (i.e., no effect on investment rates). Second, the excitement and potential quick returns from sports gambling could lead to more active engagement in financial markets, particularly in high-

risk, high-reward investment options (i.e., an increase on investment rates). Finally, bettors might view the expected returns to betting as higher than the returns to investing, or simply value the enjoyment of sports betting more than they value the expected future utility gained from saving, and thus, sports betting might displace financial investments. Consistent with prior evidence showing that gamblers make risky choices in other parts of their lives, sports bettors might also increase other gambling activity that crowds out savings, particularly for constrained households.[22]

Sports betting might also affect different types of investments in different ways. For example, households might employ mental accounting, viewing a proportion of their income as available for "gambling" and a separate proportion reserved for safer "investments." In this case, sports betting will substitute for investment in lottery-like positions such as meme stocks or options, but have little effect on more traditional savings-motivated investments.[23] This type of behavior is consistent with the evidence in Dorn et al. (2015) showing that while increased lottery play displaces risky retail investment, it does not affect trading likely associated with longer-term savings motives. Similarly, Cookson (2018) shows that households substitute between prize-linked savings accounts and gambling, further suggesting that some households have a fixed appetite for gambling risk.

We explore these possibilities by estimating the effect of sports betting on net investment flows. Net investment in a quarter is a household's deposits into after-tax retail investment

[22] An extensive literature shows that those that gamble are more likely to engage in other risky behaviors (see, e.g., Proimos, DuRant, Pierce, and Goodman, 1998; Huang, Jacobs, Derevensky, Gupta, and Paskus, 2007; Chen, Podolski, Rhee, and Veeraraghavan, 2014; Dowling, Suomi, Jackson, Lavis, Patford, Cockman, Thomas, Bellringer, Koziol-Mclain, Battersby et al., 2016; Zhai, Duenas, Wampler, and Potenza, 2020).

[23] Prior research suggests investors view trading in lottery-like stocks as another way to gamble (Kumar, 2009; Jadlow and Mowen, 2010; Kumar et al., 2011; Markiewicz and Weber, 2013; Chen et al., 2021; Kormanyos et al., 2023).

brokerages minus their withdrawals from these accounts. Table 6 indicates that the legalization of sports betting decreases net investments. The estimate in Column (1) implies that net investment falls $53 per quarter, or by about 14% relative to the mean. Figure 5 explores this effect over time, estimated following Borusyak et al. (2024).[24] In the quarters before legalization, average net investment flows are similar for households who live in states that will legalize betting relative to households who live in states that will not legalize betting, consistent with the parallel trends assumption.

These figures further show that it takes some time for any effect on investment to manifest. In the two to three years after betting becomes legal, there is a noticeable drop in net investment relative to states where betting is not yet legal. This result suggests that it takes a sustained period of betting before households adjust their investments, which is also consistent with Figure 2 and Figure 4 showing that the amount of betting grows over time. Further, as discussed in Section 5.1, we also estimate the effect of sports betting on net investment while allowing for a post-legalization trend. The results, reported in Appendix Table A.21, show that net investment falls by an additional $9 per quarter each quarter since legalization (or a decrease of more than $144 by four years after legalization), suggesting that these negative expected value substitutions are not self-correcting.

One way to interpret our analysis thus far is to say that the first stage effect of legalizing sports betting is to increase the amount of bets, and the second stage effect is to decrease net investments. We next formally estimate a two stage least squares (2SLS) regression using the degree to which a household's spending is male-centric as an instrument. Based

[24]We omit states that never legalize online sports betting during our sample period from this event-time figure. Appendix Figure A.1 plots event time coefficients estimated using both Callaway and Sant'Anna (2021) and Sun and Abraham (2021), which are alternative approaches to dealing with the problems inherent in staggered difference-in-differences estimation.

on survey evidence, sports betting, as with many risky activities, skews heavily male. The exclusion restriction requires that households with high male-spending do not differentially change their investment behavior around the legalization of sports betting for any non-sports betting reasons. To tighten this exclusion restriction, we include both state by quarter and high male-spending by quarter fixed effects. Thus, any violation of the exclusion restriction requires male-centric households to change their investment behavior after the legalization of sports betting relative to non-male-centric households in the same state and also relative to male-centric households nationwide for reasons that are unrelated to the legalization of betting — a narrow concern.

Because we do not have demographic information in our data, we build on work in Kim (2024) to classify the percentage of male shoppers at merchants in our data. We match retailers in our data to the industry definitions in Kim (2024) and define a male merchant as any retailer where more than 60% of spending comes from male customers. We next calculate the transaction weighted average household exposure to male merchants and define *Top Male* as an indicator equal to one for households that are in the top quartile of exposure to male merchants. Using this measure of male spending, we estimate the following first stage regression:

$$Bets_{it} \times Post_t \times Treat_s = \beta\, TopMale_i \times Post_t \times Treat_s + \chi_{it} + \gamma_i + \delta_{st} + \alpha_{mt} + \epsilon_{it}, \tag{3}$$

where *Top Male* interacted with the post period in treated states is an instrument for a household's betting deposits in the post-legalization period. We include household (i), state by quarter (st), and top male by quarter (mt) fixed effects. The instrument significantly predicts betting in the post period with a KP F-statistic of 42.

The second stage regression is defined as:

$$y_{it} = \beta\, Bets_{it} \times \widehat{Post_t} \times Treat_s + \chi_{it} + \gamma_i + \delta_{st} + \alpha_{mt} + \epsilon_{it}, \tag{4}$$

where we instrument for betting deposits in the post period using Equation 3. β represents the effect of betting \$1 on the dollar amount of net investments. This 2SLS specification allows us to control for within-state time trends. Consequently, any concerns that the difference-in-differences estimates might be biased by differing time trends across treated and control states are alleviated in this setting.

We report estimates using this 2SLS framework in columns (2) and (3) of Table 6. Column (2) shows the reduced form estimate; the coefficient implies that online sports betting reduces net investment by \$41 per quarter, similar to the difference-in-differences estimate in column (1). The 2SLS estimate, reported in column (3), indicates that \$1 of online sports betting reduces net investments by \$0.99. This result suggests that for the average household, sports betting entirely crowds out investment through equity brokerages.

We next examine heterogeneity in investment substitution across financially constrained households. On one hand, because households who are financially constrained cannot afford to save much, it is possible that the substitution effects are less pronounced among these households. On the other hand, financially constrained households have fewer non-essential expenditures to cut and they bet a higher fraction of their income. As a result, savings displacement might be higher among these households. To explore this question, we return to the difference-in-differences framework specified in Equation 2.

Table 7 shows that the effects of online sports betting on investment are concentrated among constrained households. For instance, Column (2) shows that low savings households

cut net investment by about 41% relative to the sample mean, or about 3 times more than the overall sample average. Consistent with this evidence, untabulated 2SLS estimates show that $1 of sports betting causes low-savings households to cut net investments by $3.07. These constrained households, already in relatively bad financial shape, are more likely to divert funds from their investment portfolios to betting activity.

To determine whether the decline in equity investments stems from a simple substitution between "gambling-like" investment and sports betting, as predicted by Dorn et al. (2015) and Gao and Lin (2015), or from the displacement of savings-motivated investment, we separately examine net investments flowing into Robinhood. These brokerages, which attract a younger and less financially sophisticated clientele, played significant roles in the meme-stock investing craze beginning with Gamestop in 2021. If online sports betting primarily substitutes for lottery-like financial investing and trading, we expect a disproportionately large decline in investments at these brokerages.

In Column (4) of Table 7, we show that online sports betting significantly reduces net investments to Robinhood, with a drop exceeding 30% relative to the average investment in these brokerages. However, the dollar effect for Robinhood investments is an order of magnitude smaller than the overall dollar effect, indicating that the majority of affected dollars come from more traditional brokerages. Thus, the decline in net investments is not primarily driven by brokerages most often used by retail investors to gamble in the stock market. Similar to our overall estimate, households with low savings disproportionately cut deposits to Robinhood (column (5)); however, frequent overdrafters do not disproportionately cut these investments (column (6)).

To test whether sports betting displaces savings, we measure net investments into Robo

Advisor brokerages, including Acorns, Betterment, and Wealthfront. These platforms allocate client investments into a diversified portfolio built from low-cost index funds, making them most suitable for long-term savings. Column (7) of Table 7 reports that online sports betting reduces net deposits to Robo Advisors by about 22% relative to the mean.[25] Moreover, constrained households reduce deposits to Robo Advisors by about twice as much as the full sample (columns (8) and (9)). Combined, the evidence in Table 7 shows that the decline in investments is not merely a reshuffling between one gambling activity (high-turnover retail trading) and another (sports betting). While some reshuffling occurs, online sports betting appears to substantially displace savings-motivated investing, with effects largest for constrained households.

While our data have been shown to be representative of the broader population, our household-level analysis comprises only a slice of total U.S. households. In Appendix Table A.4, we re-run our experiment at the state-year level using tax filing information for the entire U.S. tax-paying population. We measure stock market participation with an indicator for whether the household reports capital gains or losses that year and measure financial constraints using an indicator variable for whether the household reports income in one of the bottom four AGI buckets (i.e., $< \$50{,}000$). We find no effect on average stock market participation, but a significant relative reduction among financially constrained households. While this approach loses much of the granularity of our household-level analysis, it suggests that our findings generalize to alternative measures and to the broader population.

[25]The results in Columns (2) and (3) of Appendix Table A.21 show that, like the overall dollar effect, the declines in deposits to FinTech brokerages and savings brokerages also grow over time.

5.3 Effects of betting on constrained households' balance sheets

We next examine a broader measure of household financial well-being: credit card balances and available credit. Column (1) of Table 8 shows that following the legalization of sports betting, low-savings households increase credit card balances by about $368 relative to high savings households, an increase of about 8% relative to the mean. We find a similar magnitude in Column (2), though not statistically significant, for households with recent overdrafts. Alongside the increase in credit card balances, there is a concomitant reduction in available credit (Column (3)). In untabulated results, we also find that legalization significantly increases the probability that low savings households max out their credit cards. The propensity to incur higher credit card balances post-legalization suggests that sports betting induces some bettors to overextend themselves via high-cost borrowing.

While we can only measure credit card balances for a subsample of households, we can measure quarterly credit card payments for our entire sample. In Columns (5) and (6) of Table 8, we show that constrained households reduce the amount of money they pay on their credit card bills. Low savings households reduce their quarterly total credit card payments by about $550 following legalization. When combined with the evidence that these households increase overall credit card debt, this reduction in payments suggests that increased access to sports betting exacerbates financial constraints of already constrained households. The reduction in quarterly payments could be a strategy to manage immediate cash flow needs, but it results in higher interest accrual and pushes constrained households further into debt.

As an alternative measure of household balance sheet health, we measure the number of times that the household overdraws their bank account over the subsequent 4 quarters.

Because the number of overdrafts in a quarter is a sparsely populated count variable, we estimate this regression using Poisson pseudo-maximum likelihood (Correia, Guimarães, and Zylkin, 2020). The results, shown in Columns (7) and (8) of Table 8, show that sports betting increases the number of times households overdraw their accounts in the future, particularly for constrained households. This increase in overdraft occurrences signals acute financial distress but also reflects a broader pattern of financial instability.

Together, these results highlight several implications of sports betting on household financial health. The increase in credit card balances and reduction in available credit among low-savings households underscore the potential for online sports betting to aggravate financial stress. The reduced payments towards credit card bills, coupled with rising debt levels, indicate that these households do not merely reallocate funds but instead become more indebted. The increase in overdrafts further underscores the financial vulnerability of constrained households, suggesting that the financial risks of sports betting are disproportionately borne by those least able to afford them.

5.4 Impact of sports betting on other risk-taking

To what extent does sports betting spill over into other forms of risk taking? In Table 9, we examine three types of risky transactions we can identify in our data: lottery play, online poker play, and investment in crypto currencies. We find that sports betting has a positive spillover effect on lottery play, particularly for those that frequently overdraw their accounts (Columns (1) and (2)). Households with recent overdrafts increase their lotto play by about 9% of a standard deviation. In contrast, sports betting does not appear to influence participation in online poker. The estimated effects are small and statistically insignificant

(see Columns (3) and (4)). The divergence in these gambling outcomes reveals that online sports betting does not uniformly affect all forms of online gambling.

The observed increase in lottery play among frequent overdraft households raises concerns about the amplification of financial risk-taking behaviors. These households further jeopardize their financial stability by engaging in additional forms of gambling. The lack of spillover into online poker underscores the complex interactions and unique appeals of different gambling behaviors, indicating that policy responses and regulatory frameworks should consider the unique characteristics of different gambling activities.

In Columns (5) and (6), we find a reduction in cryptocurrency investment following the legalization of sports betting, particularly among low savings households. This decrease is consistent with a reallocation of financial resources from high-risk investment opportunities, like cryptocurrencies, to sports betting, which parallels evidence in Dorn et al. (2015) and Gao and Lin (2015) showing that households substitute between "gambling-like" financial market trading and lottery play. Although the dollar decrease in crypto investments is much smaller than the dollar decrease in equity investments shown in Table 7, the effect on low savings households is a 59% decrease relative to the mean.

5.5 Effects on consumption patterns

Our evidence shows that sports betting increases betting activity, which, in turn, reduces investment rates. For financially constrained households, this behavior also increases debt burdens. An important remaining question is how sports betting affects overall household consumption. At the aggregate level, we find no evidence that sports betting alters total household spending. However, it does significantly shift the composition of spending. In

addition to the amounts spent on betting itself, households increase their expenditures on food and entertainment categories that likely complement the experience of watching and betting on live sports, while cutting back on spending in other non-betting categories.[26]

These shifts in spending are even more pronounced among financially constrained households. As shown in Table 10, sports betting leads these households to significantly increase their spending on cable, dining, and entertainment. These spending patterns highlight a lifestyle shift where sports betting inspires broader entertainment-related consumption. While such changes might seem benign on the surface, our earlier results indicate that constrained households are likely funding this increased leisure spending through higher credit card debt and reduced long-term investments. For households already vulnerable to financial strain, this behavior further worsens their financial stability.

6 Conclusion

The legalization of sports betting has far-reaching consequences for household financial health. It increases credit card balances, reduces available credit, increases lottery play, and decreases net investments in financial markets. These effects are particularly pronounced among financially constrained households. Our findings suggest that while online sports betting may offer states a new source of revenue, it also exposes local residents — especially those already facing financial difficulties — to significant financial risks.

Although more work is needed to understand the entertainment value of online sports betting for consumers, our findings provide valuable insight into the costs associated with the current legal framework. These costs highlight benefits to a more nuanced approach to sports

[26] See 2SLS estimates in Appendix Table A.26.

betting regulation — one that balances the economic and entertainment benefits against the increased financial vulnerability faced by households with less flexibility and greater chance of developing problematic gambling habits. Our evidence suggests that the online nature of sports betting plays a critical role in driving these negative financial outcomes. As a result, introducing additional frictions, such as requiring bettors to physically visit specific locations to place online bets, could help deter less informed or impulsive betting behavior and mitigate some of the adverse effects.

Other regulatory efforts could further reduce the financial harms associated with sports betting while preserving access for households that enjoy betting on sports. For example, enhancing price transparency and fostering competition for complex bets that are difficult for consumers to value accurately may help curb the most problematic forms of gambling (Calford, 2024). As the industry evolves, a deeper understanding of its financial impacts can help shape policies that protect vulnerable households while allowing responsible participation in this growing market.

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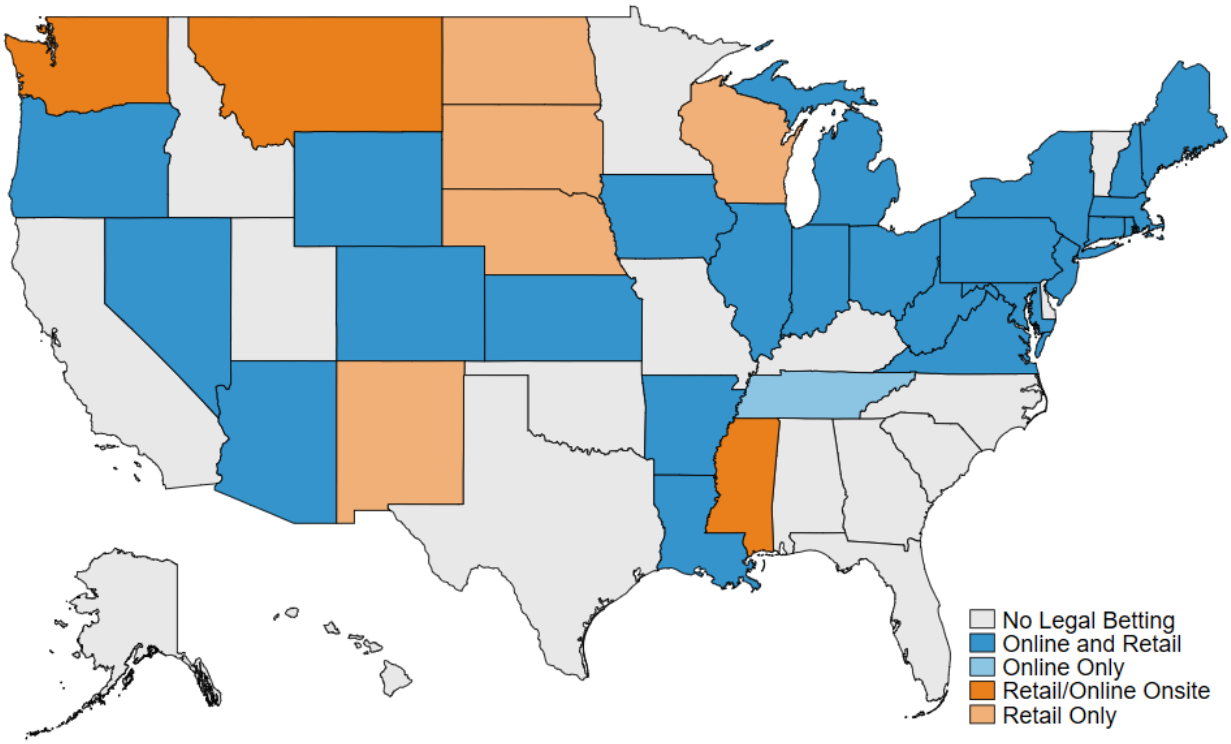


Figure 1. Legal Status of Sports Betting Across States. This figure shows the legal status of online sports betting in each of the 50 states plus the District of Columbia as of the third quarter of 2023. *Online and Retail* indicates states that allow betting both through online apps and at approved retail locations. *Online Only* indicates that betting is only legal through through online apps such as DraftKings and FanDuel. *Retail/Online Onsite* indicates that states allow online betting only when done in person at retail locations; in-person betting is also legal. *Retail Only* indicates that betting is only legal in-person at approved sports books.

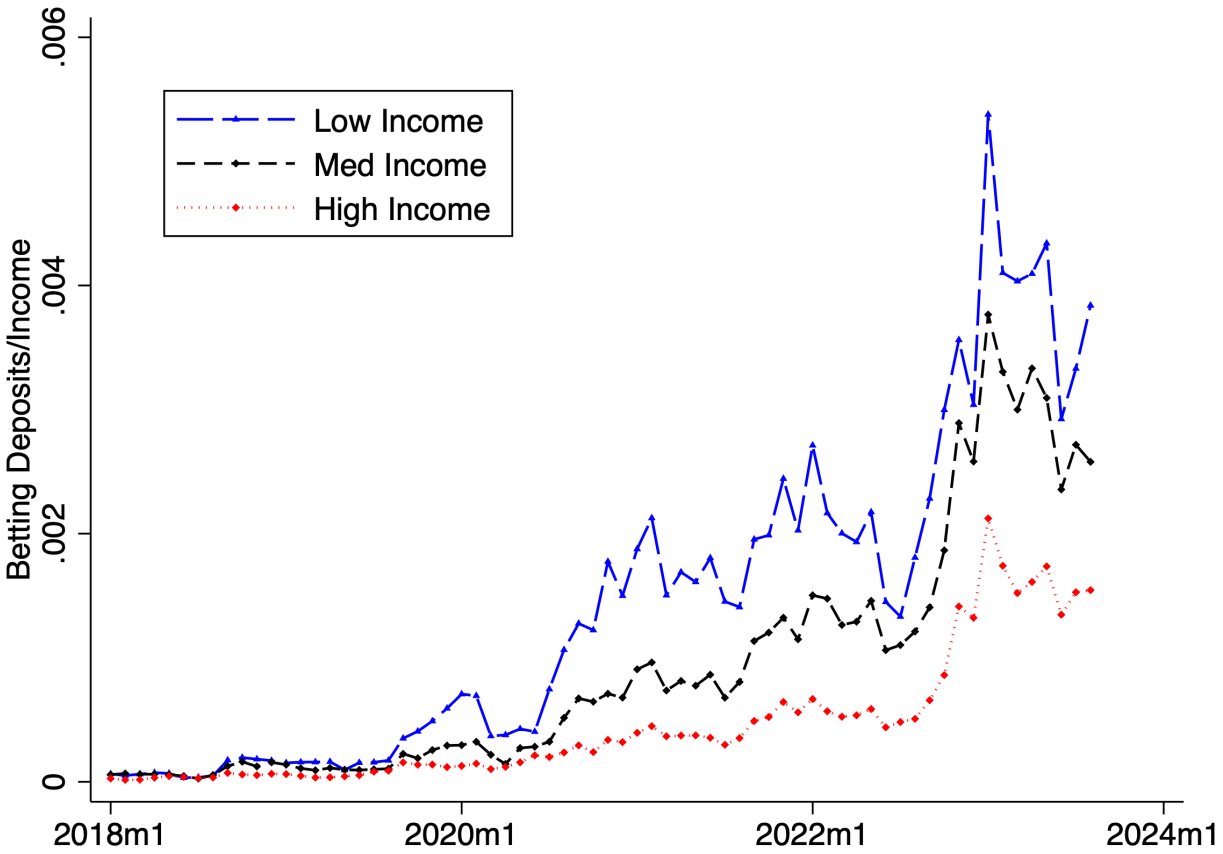


Figure 2. Trends in Betting as a Fraction of Income. This figure shows the evolution of exposure to sports betting over the last decade. We split the sample into income terciles based on the household's average income over the entire sample. We then calculate betting deposits to income in each month as the total sum of betting deposits divided by the total sum of income within each income tercile.

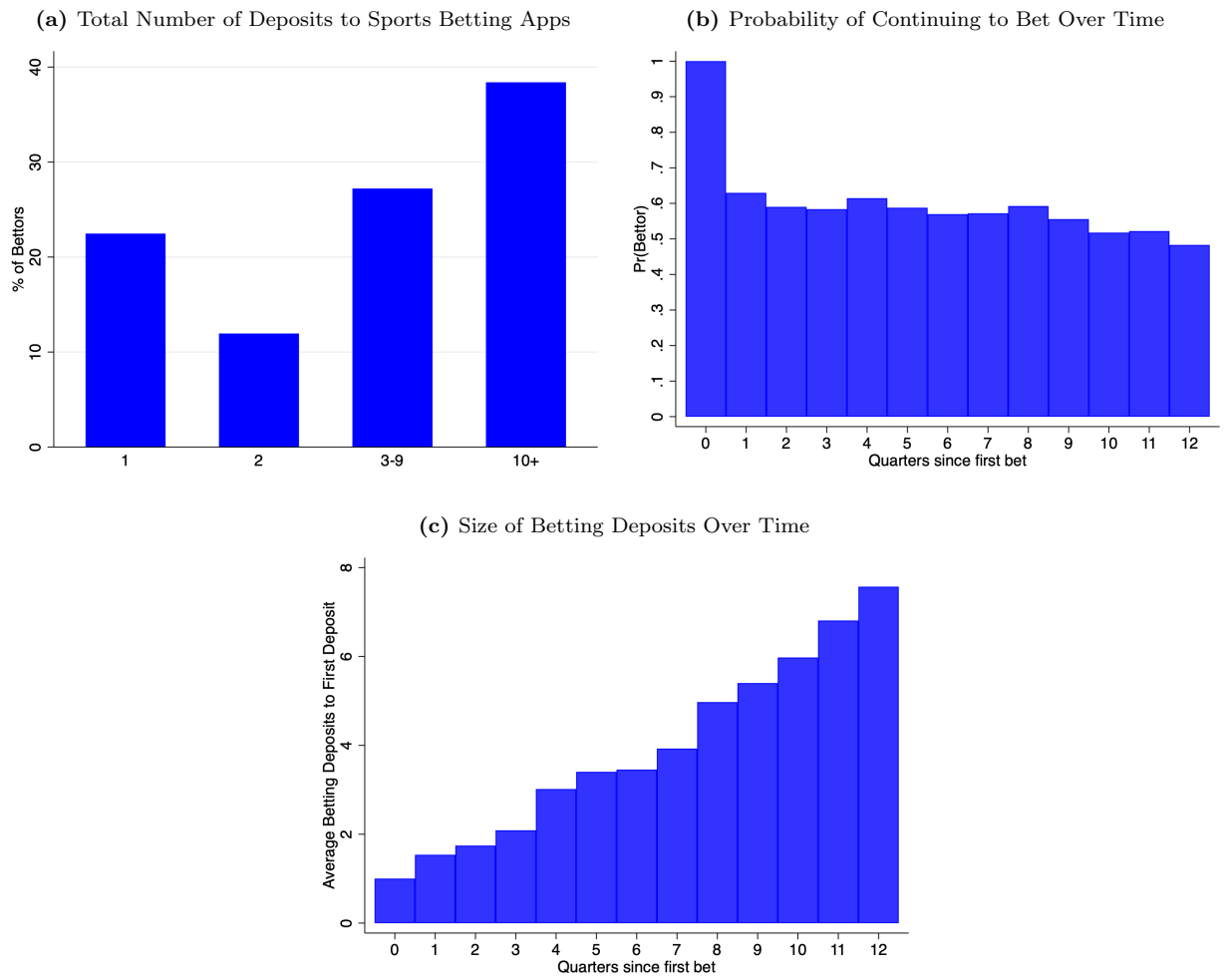


Figure 3. Trends in Betting Behavior. This figure describes the evolution of betting behavior for households that make at least one deposit to online sports betting apps such as DraftKing or FanDuel while living in states with legal online sports betting during the first 12 quarters following legalization. Panel (a) shows the distribution of a household's total number deposits to online sports betting apps. Panel (b) shows the persistence of household-level online sports betting behavior over time. The first quarter that a household deposits money to an online sports betting app is defined as $t = 0$; we then track up to 12 quarters following this quarter. In each of these quarters following the first bet, a household is defined as a bettor if they make at least one deposit to a sports betting app in the rolling forward 4 quarters. The figure graphs the average probability of being a bettor in each event-quarter across this sample. Panel (c) shows the average size of household-level online sports betting deposits over time. The first quarter that a household deposits money to an online sports betting app is defined as $t = 0$; we then track up to 12 quarters following this quarter. In each of the quarters following the first bet, we divide the household's total quarterly deposits to sports betting apps by the amount the household deposited in their first betting quarter (i.e. deposits at $t = 0$). The figure graphs the average betting deposits to first deposit in each event-quarter across this sample.

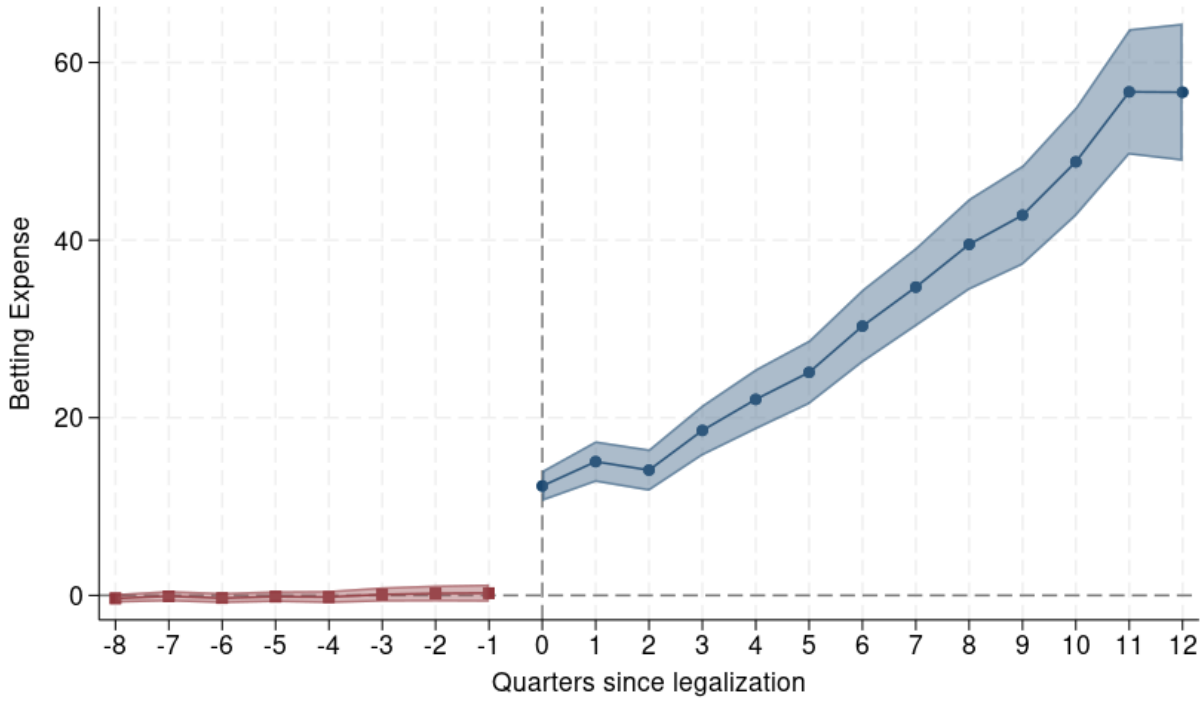


Figure 4. Parallel Trends in Betting around Sports Betting Legalization. This figure presents event-time coefficients of the effect of the legalization of sports betting on sports bets (e.g., deposits to sports betting apps). The x-axis indicates quarters surrounding the legalization of sports betting, where $t = 0$ represents the quarter during which online betting was first possible. The y-axis shows the average causal effect of legalization on quarterly sports betting deposits. We estimate the difference-in-difference event-time coefficients following Borusyak et al. (2024) to account for the staggered rollout of the legalization of state betting. The shaded region represents the 95% confidence interval.

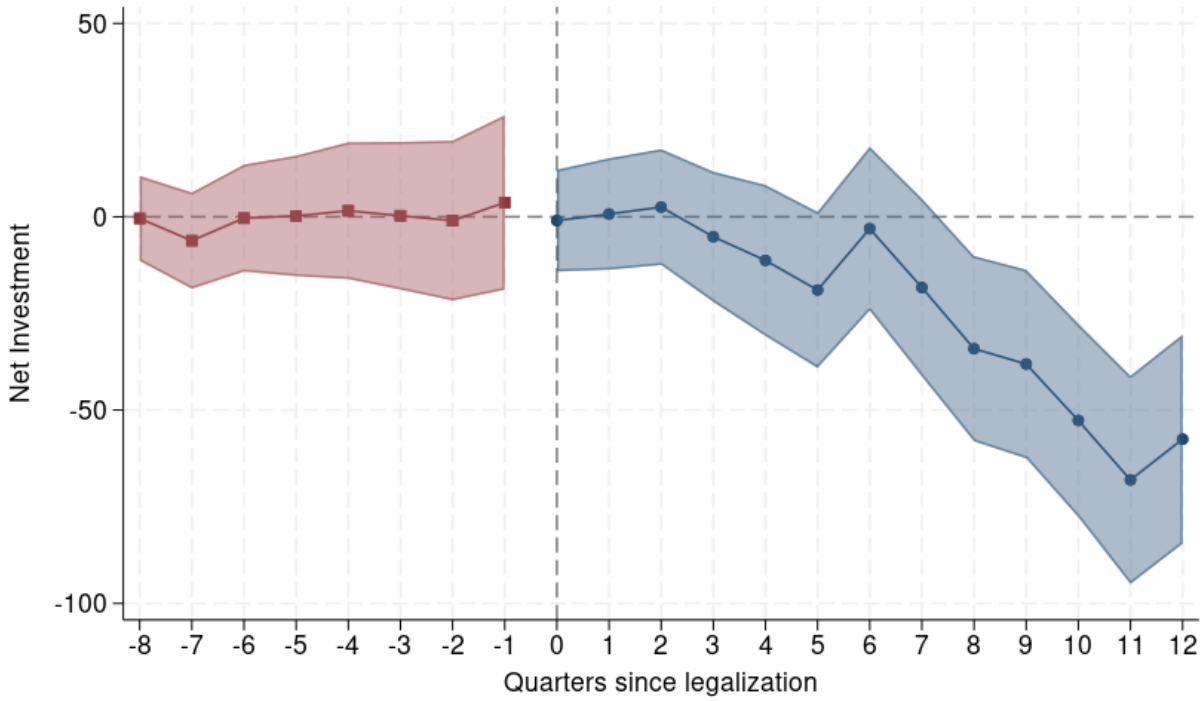


Figure 5. Parallel Trends in Net Investment around Sports Betting Legalization. This figure presents event-time coefficients of the effect of the legalization of sports betting on net investment (e.g., deposits less withdrawals at equity brokerages). The x-axis indicates quarters surrounding the legalization of sports betting, where $t = 0$ represents the quarter during which online betting was first possible. The y-axis shows the average causal effect of legalization on quarterly net investment. We estimate the difference-in-difference event-time coefficients following Borusyak et al. (2024) to account for the staggered rollout of the legalization of state betting. The shaded region represents the 95% confidence interval.

Table 1

Bettor vs. Non-Bettor Characteristics

This table presents summary statistics for bettors and non-bettors. Bettors are defined as a household that deposits any amount of money to an online sports betting app at some point during our sample. Variable definitions are found in Appendix Table A.1. We aggregate the underlying data to the household level and then report means and standard deviations (in parenthesis) for each indicated subsample.

	Bettor Status		
	Non-bettor	Bettor	Overall
Pr(Ever Bet)	0	1	0.0765
	(0)	(0)	(0.266)
Avg. Quarterly Income	20,107	19,388	20,052
	(15,033)	(15,192)	(15,046)
Pr(Ever Invest)	0.497	0.576	0.503
	(0.5)	(0.494)	(0.5)
Avg. Quarterly Investment	413	356	408
	(1,726)	(1,459)	(1,707)
Pr(Ever Play Poker)	0.0052	0.0242	0.00666
	(0.0719)	(0.154)	(0.0813)
Pr(Ever Play Lotto)	0.0343	0.131	0.0417
	(0.182)	(0.337)	(0.2)
Pr(Ever Buy Crypto)	0.131	0.284	0.143
	(0.338)	(0.451)	(0.35)
Pr(Below Median Savings)	0.47	0.494	0.472
	(0.345)	(0.338)	(0.345)
Pr(Ever Overdraw)	0.177	0.414	0.195
	(0.382)	(0.493)	(0.396)
CC Debt to Income	0.237	0.22	0.236
	(0.369)	(0.31)	(0.366)
Available Credit to Income	0.696	0.554	0.688
	(0.906)	(0.764)	(0.899)
Received Child Tax Credit (%)	14.0	25.4	14.9
	(34.7)	(43.5)	(35.6)
Observations	230,171		

Table 2

Bettor Characteristics by Betting Intensity

This table presents summary statistics for the subsample of bettors, defined as a household that deposits any amount of money to an online sports betting app at some point during our sample. Variable definitions are found in Appendix Table A.1. Betttors are split into terciles of betting intensity based the total amount they deposit to sports betting apps. We aggregate the underlying data to the household level and then report means and standard deviations (in parenthesis) for each indicated subsample.

	Total Betting Deposits			
	1st Terc	2nd Terc	3rd Terc	Total
Total Betting Deposits	25.8	162	6,816	2,302
	(14.6)	(80.3)	(17,494)	(10,514)
Avg. Quarterly Betting Deposits	1.39	8.53	299	102
	(1.5)	(8.75)	(760)	(457)
Avg. Bets to Income (%)	0.0841	0.185	1.74	0.662
	(1.25)	(.919)	(3.37)	(2.26)
Avg. Quarterly Income	18,477	20,023	19,689	19,388
	(14,028)	(15,642)	(15,833)	(15,192)
Avg. Quarterly Investment	302	394	374	356
	(1,293)	(1,595)	(1,476)	(1,459)
Pr(Below Median Savings)	0.514	0.479	0.487	0.494
	(0.341)	(0.337)	(0.336)	(0.338)
Pr(Ever Overdraw)	0.377	0.398	0.469	0.414
	(0.485)	(0.489)	(0.499)	(0.493)
CC Debt to Income	0.209	0.224	0.228	0.22
	(0.281)	(0.323)	(0.326)	(0.31)
Available Credit to Income	0.501	0.583	0.581	0.554
	(0.66)	(0.827)	(0.795)	(0.764)
Received Child Tax Credit (%)	27.1	26.7	22.2	25.4
	(44.4)	(44.2)	(41.6)	(43.5)
Observations	17,614			

Table 3

Household Characteristics by Savings Status

This table presents summary statistics for bettors and non-bettors split by savings status. Below (above) median savings households are defined as those households who have more (less) than 50% of their quarterly observations in a low savings status. Low savings status is assigned to a household-quarter when the household's rolling 4-quarter net savings flow (e.g., income less spending) is below the sample median. Bettors are defined as a household that deposits any amount of money to an online sports betting app at some point during our sample. Variable definitions are found in Appendix Table A.1. We aggregate the underlying data to the household level and then report means and standard deviations (in parenthesis) for each indicated subsample.

	Below Median Savings			Above Median Savings		
	Bettor	Non-Bettor	Total	Bettor	Non-Bettor	Total
Total Betting Deposits	2,119	0	173	2,476	0	179
	(9,187)	(0)	(2,688)	(11,633)	(0)	(3,192)
Avg. Quarterly Betting Deposits	91.2	0	7.44	112	0	8.06
	(379)	(0)	(111)	(521)	(0)	(143)
Avg. Bets to Income (%)	0.848	0	0.0693	0.485	0	0.0351
	(2.64)	(0)	(0.791)	(1.8)	(0)	(0.501)
Avg. Quarterly Income	12,397	12,961	12,915	26,026	26,055	26,053
	(9,932)	(10,508)	(10,463)	(16,304)	(15,630)	(15,679)
Avg. Quarterly Investment	87.2	85.1	85.3	612	685	680
	(778)	(1,013)	(995)	(1,855)	(2,107)	(2,090)
Pr(Ever Overdraw)	0.466	0.215	0.236	0.365	0.145	0.161
	(0.499)	(0.411)	(0.424)	(0.482)	(0.352)	(0.367)
CC Debt to Income	0.308	0.356	0.353	0.168	0.163	0.163
	(0.408)	(0.483)	(0.479)	(0.217)	(0.247)	(0.245)
Available Credit to Income	0.686	0.883	0.873	0.474	0.578	0.572
	(1.01)	(1.21)	(1.2)	(.554)	(.615)	(.612)
Received Child Tax Credit (%)	19.8	11.5	12.2	30.7	16.1	17.2
	(39.8)	(32)	(32.7)	(46.1)	(36.8)	(37.7)
Observations	8,579	96,554	105,133	9,035	116,003	125,038

Table 4

Summary Statistics

This table presents summary statistics for our regression sample. Variable definitions are found in Appendix Table A.1. The underlying data is a household quarterly panel made up of 230,171 households from the fourth quarter of 2012 to the third quarter of 2023.

	Obs.	Mean	Std. Dev.	Q25	Q50	Q75
Sports Bets	4,902,383	8.27	235.37	0	0	0
Bets to Income	4,827,919	0.001	0.012	0	0	0
Net Invest	4,902,383	387.80	3,013	0	0	0
Net Robinhood	4,902,383	12.04	385	0	0	0
Net Robo Advisor	4,902,383	8.04	247	0	0	0
CC Debt	651,395	4,592	6,849	319	2,062	6,504
Available Credit	610,646	14,116	13,634	3,605	11,494	20,532
CC Payments	4,902,383	3,147	5,746	0	750	3,450
No. Future Overdrafts	4,674,045	0.53	3.40	0	0	0
Lotto	4,902,383	0.94	31.30	0	0	0
Poker	4,902,383	0.10	10.19	0	0	0
Crypto	4,902,383	36.20	685	0	0	0
Restaurants	4,902,383	1,134	1,106	336	813	1,568
Cable/Telecom	4,902,383	606	574	106	478	927
Entertain/Travel	4,902,383	884	1,253	138	423	1,058
Other Non-bet Spending	4,902,383	13,000	12,308	4,831	9,488	16,969
Low Savings	4,902,383	0.48	0.50	0	0	1
Overdraft	4,902,383	0.10	0.29	0	0	0
Quarterly Income	4,902,383	20,070	18,061	7,997	14,972	26,411
Stimulus Payments	4,902,383	111	629	0	0	0

Table 5

Legalization leads to increased betting

This table reports estimates of the effect of the legalization of sports betting on betting behavior. The underlying data are a quarterly household-level panel. We use a two-way fixed effects difference-in-differences (TWFE) regression to estimate the effect of legalizing sports betting. *Post* × *Treat* is an indicator equal to one for quarters following the launch of online sports betting in states that legalize betting. *Low Savings* is an indicator for household-quarters where the total savings flow over the prior 4 quarters is less than the sample median. *Overdraft* is an indicator for household-quarters where there is at least one overdraft over the prior 4 quarters. Columns (1)–(3) estimate the effect of legalization on quarterly deposits to sports betting apps, while columns (4) and (5) show the effect on quarterly deposits to sports betting apps divided by quarterly income. The regressions include controls for quarterly income and the amount received from stimulus payments in the quarter in addition to household, state, and year-quarter fixed effects. Variable definitions are found in Appendix Table A.1. Reported t-statistics in parentheses are heteroskedasticity-robust and clustered at the household and state by year-quarter levels. ***, **, and * indicate statistical significance at the 1%, 5%, and 10% levels, respectively.

	(1) Sports Bets	(2) Sports Bets	(3) Sports Bets	(4) Bets to Income	(5) Bets to Income
Post × Treat	24.91*** (10.01)	32.23*** (10.79)	18.42*** (9.08)	0.00121*** (10.92)	0.00106*** (10.88)
Post × Treat × Low Savings		-16.43*** (-7.73)		0.000383*** (4.27)	
Post × Treat × Overdraft			60.39*** (7.45)		0.00295*** (8.59)
Low Savings		0.769* (1.72)		-0.000126*** (-5.53)	
Overdraft			-9.243*** (-4.94)		-0.000481*** (-6.04)
Controls	Yes	Yes	Yes	Yes	Yes
Household FE	Yes	Yes	Yes	Yes	Yes
State FE	Yes	Yes	Yes	Yes	Yes
Year-quarter FE	Yes	Yes	Yes	Yes	Yes
Observations	4,902,383	4,902,383	4,902,383	4,827,688	4,827,688
Adjusted R^2	0.273	0.273	0.273	0.231	0.232

Table 6

Betting Causes Households to Invest Less

This table reports estimates of the effect of the legalization of sports betting on investment (i.e., investment deposits less withdrawals). Column (1) reports the results from a two-way fixed effects difference-in-differences (TWFE) regression, where *Post* × *Treat* is an indicator variable equal to one for quarters following the launch of online sports betting in states that legalize betting. Columns (2) and (3) show estimates from reduced form and 2SLS regressions. *Top Male* is an indicator variable equal to one for households in the top quartile of transactions at male-focused retailers. The sample is limited to households for whom we can identify the gender composition of their total spending. We use *Top Male* × *Post* × *Treat* as an instrument for deposits to sports betting apps post-legalization (i.e., *Bets* × *Post* × *Treat*). The regressions include controls for quarterly income and the amount received from stimulus payments in the quarter. The difference-in-differences regressions include household, state, and year-quarter FEs. The reduced form and 2SLS regressions include household, state by year-quarter, and top male by year-quarter fixed effects. Variable definitions are found in Appendix Table A.1. Reported *t*-statistics in parentheses are heteroskedasticity-robust and clustered at the household and state by year-quarter levels. ***, **, and * indicate statistical significance at the 1%, 5%, and 10% levels, respectively.

	Diff-in-Diff (1) Net Invest	Reduced Form (2) Net Invest	2SLS (3) Net Invest
Post × Treat	-53.05*** (-4.41)		
Top Male × Post × Treat		-41.21** (-2.17)	
Bets × Post × Treat			-0.986** (-2.08)
Controls	Yes	Yes	Yes
Household FE	Yes	Yes	Yes
State FE	Yes	No	No
Year-quarter FE	Yes	No	No
State by Quarter FE	No	Yes	Yes
Top Male by Quarter FE	No	Yes	Yes
Observations	4,902,383	3,231,790	3,231,790
Adjusted R^2	0.245	0.242	0.003
KP F Stat			42.12

Table 7

The Effects are Concentrated in Constrained Households

This table shows how the estimates of the effect of the legalization of sports betting on investment vary by the extent to which households are constrained. The underlying data are a quarterly household-level panel. We use a two-way fixed effects difference-in-differences (TWFE) regression to estimate the effect of legalizing sports betting. *Post* × *Treat* is an indicator equal to one for quarters following the launch of online sports betting in states that legalize betting. *Low Savings* is an indicator for household-quarters where the total savings flow over the prior 4 quarters is less than the sample median. *Overdraft* is an indicator for household-quarters where there is at least one overdraft over the prior 4 quarters. The dependent variable in columns (1)–(3) is net investment (e.g., investment deposits less withdrawals), the dependent variable in columns (4)–(6) is the subset of net investments deposits to Robinhood, and the dependent variable in columns (7)–(9) is the subset of investment deposits made to Robo Advisors brokerages. The regressions include controls for quarterly income and the amount received from stimulus payments in the quarter in addition to household, state, and year-quarter fixed effects. Variable definitions are found in Appendix Table A.1. Reported *t*-statistics in parentheses are heteroskedasticity-robust and clustered at the household and state by year-quarter levels. ***, **, and * indicate statistical significance at the 1%, 5%, and 10% levels, respectively.

	Net Invest			Net Robinhood			Net Robo Advisor		
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
Post × Treat	-53.05***	27.62**	-38.15***	-4.034***	-0.157	-4.282***	-1.781***	-0.387	-1.409**
	(-4.41)	(2.01)	(-3.15)	(-3.44)	(-0.10)	(-3.54)	(-2.64)	(-0.47)	(-2.04)
Post × Treat × Low Savings		-185.4***			-9.047***			-3.062***	
		(-11.43)			(-4.88)			(-4.22)	
Post × Treat × Overdraft			-137.4***			2.169			-3.516***
			(-9.29)			(0.87)			(-3.92)
Low Savings		-86.52***			-7.265***			1.746***	
		(-16.00)			(-10.04)			(3.61)	
Overdraft			42.46***			-3.158**			-0.648
			(5.53)			(-2.57)			(-0.85)
Controls	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Household FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
State FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Year-quarter FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Observations	4,902,383	4,902,383	4,902,383	4,902,383	4,902,383	4,902,383	4,902,383	4,902,383	4,902,383
Adjusted R^2	0.245	0.245	0.245	0.077	0.078	0.078	0.253	0.253	0.253

Table 8

Betting Leads Low Savings Households to Lever Up

This table reports estimates of the effect of the legalization of sports betting on household debt. The underlying data are a quarterly household-level panel. We use a two-way fixed effects difference-in-differences (TWFE) regression to estimate the effect of legalizing sports betting. *Post* × *Treat* is an indicator equal to one for quarters following the launch of online sports betting in states that legalize betting. *Low Savings* is an indicator for household-quarters where the total savings flow over the prior 4 quarters is less than the sample median. *Overdraft* is an indicator for household-quarters where there is at least one overdraft over the prior 4 quarters. The dependent variable in columns (1) and (2) is total credit card debt. The dependent variable in columns (3) and (4) is the amount of credit households have available across all credit cards. The dependent variable in columns (5) and (6) is the total amount that the household pays on their credit card bill over the quarter. The dependent variable in columns (7) and (8) is the number of times the household will overdraw their bank accounts in the following 4 quarters. Columns (1)–(6) are estimated using OLS regressions, while columns (7) and (8) are estimated using Poisson pseudo-maximum likelihood regressions as described in Correia et al. (2020). The regressions include controls for quarterly income and the amount received from stimulus payments in the quarter in addition to household, state, and year-quarter fixed effects. Variable definitions are found in Appendix Table A.1. Reported t-statistics in parentheses are heteroskedasticity-robust and clustered at the household and state by year-quarter levels. ***, **, and * indicate statistical significance at the 1%, 5%, and 10% levels, respectively.

	(1) CC Debt	(2) CC Debt	(3) Available Credit	(4) Available Credit	(5) CC Payments	(6) CC Payments	(7) Future Overdrafts	(8) Future Overdrafts
Post × Treat	-107.1**	24.19	48.38	-64.62	334.9***	-2.501	0.0694**	-0.0326
	(-2.02)	(0.47)	(0.59)	(-0.84)	(9.66)	(-0.11)	(2.48)	(-0.66)
Post × Treat × Low Savings	368.4***		-316.3***		-889.9***		0.0612***	
	(5.63)		(-3.47)		(-14.15)		(2.62)	
Post × Treat × Overdraft		328.0		-289.0		-381.6***		0.164***
		(1.28)		(-0.73)		(-10.25)		(2.86)
Low Savings	769.7***		-533.1***		-879.1***		-0.0173	
	(32.37)		(-15.95)		(-57.70)		(-1.53)	
Overdraft		216.0*		-247.4		-4.975		0.505***
		(1.84)		(-1.42)		(-0.32)		(23.43)
Controls	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Household FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
State FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Year-quarter FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Observations	641,694	641,694	600,923	600,923	4,902,383	4,902,383	916,677	916,677
Adjusted R^2	0.677	0.675	0.862	0.862	0.677	0.672		

Table 9

The Effects of Sports Betting on Other Risk Taking

This table reports estimates of the effect of the legalization of sports betting on other forms of risk-taking. The underlying data are a quarterly household-level panel. We use a two-way fixed effects difference-in-differences (TWFE) regression to estimate the effect of legalizing sports betting. *Post* × *Treat* is an indicator equal to one for quarters following the launch of online sports betting in states that legalize betting. *Low Savings* is an indicator for household-quarters where the total savings flow over the prior 4 quarters is less than the sample median. *Overdraft* is an indicator for household-quarters where there is at least one overdraft over the prior 4 quarters. The dependent variable in columns (1) and (2) is total lottery spending. The dependent variable in columns (3) and (4) is total spending on online poker. The dependent variable in columns (5) and (6) is the amount that the household deposits to crypto brokerages (e.g., Coinbase). The regressions include controls for quarterly income and the amount received from stimulus payments in the quarter in addition to household, state, and year-quarter fixed effects. Variable definitions are found in Appendix Table A.1. Reported t-statistics in parentheses are heteroskedasticity-robust and clustered at the household and state by year-quarter levels. ***, **, and * indicate statistical significance at the 1%, 5%, and 10% levels, respectively.

	(1) Lotto	(2) Lotto	(3) Poker	(4) Poker	(5) Crypto	(6) Crypto
Post × Treat	1.138***	0.874***	0.0447	0.0298	-4.747	-12.15***
	(4.93)	(4.23)	(0.82)	(0.85)	(-1.39)	(-3.60)
Post × Treat × Low Savings	-0.132		-0.0125		-16.57***	
	(-0.70)		(-0.24)		(-5.13)	
Post × Treat × Overdraft		1.881***		0.0875		-2.547
		(3.43)		(0.66)		(-0.74)
Low Savings	0.230***		-0.00293		18.02***	
	(3.81)		(-0.16)		(11.65)	
Overdraft		-0.178		-0.0116		5.690***
		(-1.00)		(-0.31)		(3.01)
Controls	Yes	Yes	Yes	Yes	Yes	Yes
Household FE	Yes	Yes	Yes	Yes	Yes	Yes
State FE	Yes	Yes	Yes	Yes	Yes	Yes
Year-quarter FE	Yes	Yes	Yes	Yes	Yes	Yes
Observations	4,902,383	4,902,383	4,902,383	4,902,383	4,902,383	4,902,383
Adjusted R^2	0.350	0.350	0.243	0.243	0.142	0.142

Table 10

The Effects of Sports Betting on Consumption

This table reports estimates of the effect of the legalization of sports betting on other consumption. The underlying data are a quarterly household-level panel. We use a two-way fixed effects difference-in-differences (TWFE) regression to estimate the effect of legalizing sports betting. *Post* × *Treat* is an indicator equal to one for quarters following the launch of online sports betting in states that legalize betting. *Low Savings* is an indicator for household-quarters where the total savings flow over the prior 4 quarters is less than the sample median. *Overdraft* is an indicator for household-quarters where there is at least one overdraft over the prior 4 quarters. The dependent variable in columns (1) and (2) is total spending on restaurants. The dependent variable in columns (3) and (4) is total spending on cable and telecommunication. The dependent variable in columns (5) and (6) is total spending on entertainment and travel. The regressions include controls for quarterly income and the amount received from stimulus payments in the quarter in addition to household, state, and year-quarter fixed effects. Variable definitions are found in Appendix Table A.1. Reported t-statistics in parentheses are heteroskedasticity-robust and clustered at the household and state by year-quarter levels. ***, **, and * indicate statistical significance at the 1%, 5%, and 10% levels, respectively.

	(1) Restaurants	(2) Restaurants	(3) Cable/ Telecom	(4) Cable/ Telecom	(5) Entertain/ Travel	(6) Entertain/ Travel
Post × Treat	27.48***	61.79***	31.89***	40.34***	62.12***	73.87***
	(2.96)	(6.52)	(6.61)	(8.15)	(5.55)	(6.81)
Post × Treat × Low Savings	100.1***		25.16***		47.93***	
	(14.51)		(10.47)		(6.62)	
Post × Treat × Overdraft		84.88***		26.63***		71.89***
		(8.05)		(5.56)		(6.75)
Low Savings	47.90***		-1.666		93.26***	
	(19.31)		(-1.57)		(31.97)	
Overdraft		-24.52***		17.17***		-9.402**
		(-5.59)		(8.63)		(-2.29)
Controls	Yes	Yes	Yes	Yes	Yes	Yes
Household FE	Yes	Yes	Yes	Yes	Yes	Yes
State FE	Yes	Yes	Yes	Yes	Yes	Yes
Year-quarter FE	Yes	Yes	Yes	Yes	Yes	Yes
Observations	4,902,383	4,902,383	4,902,383	4,902,383	4,902,383	4,902,383
Adjusted R^2	0.601	0.600	0.665	0.665	0.457	0.456

Internet Appendix

Table A.1
Definition of Variables

This table provides definitions for the variables used in our analysis. Unless otherwise noted, the source for all variables is Yodlee transaction data and the variables are constructed based on the authors' calculations.

Variable	Definition
Dependent Variables	
Sports Bets	Total quarterly household deposits to online sports betting apps such as DraftKings or FanDuel.
Bets to Income	Total quarterly household deposits to online sports betting apps divided by quarterly income.
Net Invest	Total quarterly household deposits to post-tax brokerage accounts less withdrawals from these accounts.
Net Robinhood	Total quarterly household deposits to Robinhood less withdrawals from these accounts.
Net Robo Advisor	Total quarterly household deposits to Robo Advisor brokerage accounts (Acorns, Betterment, and Wealthfront) less withdrawals from these accounts.
CC Debt	Total credit card balance as of the end of the quarter, summed across all of the household's credit cards. Balances are extrapolated based on observable credit card flows from two point in time snapshots of credit card balances.
Available Credit	Total dollars of available credit as of the end of the quarter, summed across all of the household's credit cards. Available credit is extrapolated based on observable credit card flows from two point in time snapshots of credit card balances.
CC Payments	Total quarterly household payments to credit card companies.
Future Overdrafts	Number of times that the household will overdraw any of their bank accounts in the next 4 quarters.
Lotto	Total quarterly household spending on lottery tickets.
Poker	Total quarterly household spending on online poker games.
Crypto	Total quarterly household deposits to crypto brokerages (e.g., Coinbase, Gemini, etc.).
Restaurants	Total quarterly household spending on transactions categorized by data provider as restaurants.
Cable/Telecom	Total quarterly household spending on transactions categorized by data provider as cable or telecommunications.
Entertain/Travel	Total quarterly household spending on transactions categorized by data provider as entertainment or travel.
Control Variables	
Treat	Indicator variable equal to one if the household currently lives in a state that legalizes online sports betting at some point over our sample (through September 2023). A list of states that legalize online betting is available in Appendix Table A.2.
Post	Indicator variable equal to one for quarters following the launch of online sports betting for households living in a state with legal online sports betting. Legalization dates are available in Appendix Table A.2.
Low Savings	Quarterly indicator variable equal to one if the household's total savings flow over the prior 4 quarters is below the sample median. We calculate savings flows as total income minus total spending.
Overdraft	Quarterly indicator variable equal to one if the household overdrew any of their bank accounts at least one time in the prior 4 quarters.

Variable	Definition
Control Variables Cont.	
Quarterly Income	Total household quarterly income, defined as salary plus other income plus deposits.
Stimulus Payments	Total household quarterly COVID-19 stimulus payments, including any child tax credits received.
Household Characteristics	
Pr(Ever Bet)	Indicator variable equal to one if the household ever deposits money to a sports betting app during our sample period.
Avg. quarterly Income	Average quarterly household income across all quarters that the household appears in our sample period.
Pr(Ever Invest)	Indicator variable equal to one if the household ever deposits money to a post-tax brokerage account during our sample period.
Avg. quarterly Investment	Average quarterly household deposits to post-tax brokerage accounts across all quarters that the household appears in our sample period.
Pr(Ever Play Poker)	Indicator variable equal to one if the household ever spends money on online poker sites during our sample period.
Pr(Ever Play Lotto)	Indicator variable equal to one if the household ever spends money on lottery tickets during our sample period, primarily identified from online lottery ticket purchases.
Pr(Ever Buy Crypto)	Indicator variable equal to one if the household ever deposits money to a crypto brokerage account during our sample period.
Pr(Below Median Savings)	Average percentage of quarters that the household has a lagged 4 quarter savings flow less than the sample median.
Pr(Ever Overdraw)	Indicator variable equal to one if the household ever overdraws their bank accounts during our sample period.
CC Debt to Income	Average end of quarter household credit card balance divided by average quarterly income.
Available Credit to Income	Average end of quarter dollars of available credit across all household credit cards divided by average quarterly income.
Received Child Tax Credit	Indicator variable equal to one if the household recieves any amount of Covid stimulus or child tax credit.
Bettor Characteristics	
Total Betting Deposits	Total household deposits to online sports betting apps over our sample period.
Avg. Quarterly Betting Deposits	Average quarterly deposits to online sports betting apps over our sample period.
Avg. Bets to Income (%)	Quarterly deposits to online sports betting apps over our sample period, divided by quarterly income, averaged at the household level across our sample.

Table A.2

Sports Betting Legalization Dates

This table shows the legal status of sports betting by state. States have legalized sports betting only at retail locations, only through online apps, or through both methods as indicated. Note that Mississippi, Montana, and Washington allow online betting, but only when physically on the premises of a retail location. For our purposes, we consider these states as not allowing online betting. Launch dates represent the first date on which bets could actually be placed. Our experiment is based on the online launch date of sports betting in states for which it is legal to bet through online apps. Our sample includes all states that launch online sports betting prior to September 2023.

State	Online Betting	Retail Betting	Online Launch	Retail Launch
Arizona	YES	YES	9/9/2021	9/9/2021
Arkansas	YES	YES	3/6/2022	7/1/2019
Colorado	YES	YES	5/1/2020	6/17/2020
Connecticut	YES	YES	10/19/2021	9/30/2021
Delaware	YES	YES	12/27/2023	6/5/2018
Florida	YES	YES	11/7/2023	12/7/2023
Illinois	YES	YES	3/5/2022	3/9/2020
Indiana	YES	YES	10/3/2019	9/1/2019
Iowa	YES	YES	8/15/2019	8/15/2019
Kansas	YES	YES	9/1/2022	9/1/2022
Kentucky	YES	YES	9/28/2023	9/7/2023
Louisiana	YES	YES	1/28/2022	10/6/2021
Maine	YES	YES	5/2/2022	5/2/2022
Maryland	YES	YES	11/23/2022	12/9/2021
Massachusetts	YES	YES	3/10/2023	1/31/2023
Michigan	YES	YES	1/22/2021	3/11/2020
Mississippi	NO	YES	—	8/1/2018
Montana	NO	YES	—	3/11/2020
Nebraska	NO	YES	—	6/22/2023
Nevada	YES	YES	1/1/2010	1/1/1949
New Hampshire	YES	YES	12/30/2019	8/12/2020
New Jersey	YES	YES	8/1/2018	6/14/2018
New Mexico	NO	YES	—	10/16/2018
New York	YES	YES	1/8/2022	7/16/2019
North Carolina	YES	YES	3/11/2024	3/18/2021
North Dakota	NO	YES	—	6/23/2021
Ohio	YES	YES	1/1/2023	1/1/2023
Oregon	YES	YES	8/27/2019	8/27/2019
Pennsylvania	YES	YES	5/1/2019	11/15/2018
Rhode Island	YES	YES	9/14/2019	11/26/2018
South Dakota	NO	YES	—	9/9/2021
Tennessee	YES	NO	11/1/2020	—
Vermont	YES	NO	1/11/2024	—
Virginia	YES	YES	1/21/2021	1/21/2021
Washington	NO	YES	—	9/9/2021
District of Columbia	YES	YES	5/28/2020	8/31/2020
West Virginia	YES	YES	12/1/2018	9/1/2018
Wisconsin	NO	YES	—	11/31/2021
Wyoming	YES	YES	9/1/2021	9/1/2021

Table A.3

Legalization Leads to Increased Net Betting

This table reports estimates of the effect of the legalization of sports betting on net betting behavior. The underlying data are a quarterly household-level panel. We use a two-way fixed effects difference-in-differences (TWFE) regression to estimate the effect of legalizing sports betting. *Post* × *Treat* is an indicator equal to one for quarters following the launch of online sports betting in states that legalize betting. *Low Savings* is an indicator for household-quarters where the total savings flow over the prior 4 quarters is less than the sample median. *Overdraft* is an indicator for household-quarters where there is at least one overdraft over the prior 4 quarters. Columns (1)–(3) estimate the effect of legalization on net quarterly deposits to sports betting apps (e.g., deposits less withdrawals), while columns (4) and (5) show the effect on net quarterly deposits to sports betting apps divided by quarterly income. The regressions include controls for quarterly income and the amount received from stimulus payments in the quarter in addition to household, state, and year-quarter fixed effects. Variable definitions are found in Appendix Table A.1. Reported t-statistics in parentheses are heteroskedasticity-robust and clustered at the household and state by year-quarter levels. ***, **, and * indicate statistical significance at the 1%, 5%, and 10% levels, respectively.

	(1) Net Bets	(2) Net Bets	(3) Net Bets	(4) Net Bets to Income	(5) Net Bets to Income
Post × Treat	13.15***	16.67***	9.649***	0.000710***	0.000664***
	(9.72)	(10.45)	(8.77)	(10.34)	(10.94)
Post × Treat × Low Savings		-7.901***		0.000344***	
		(-6.94)		(5.08)	
Post × Treat × Overdraft			32.57***		0.00183***
			(7.57)		(7.82)
Low Savings		0.541**		-0.0000643***	
		(2.12)		(-4.10)	
Overdraft			-4.835***		-0.000297***
			(-4.52)		(-5.26)
Controls	Yes	Yes	Yes	Yes	Yes
Household FE	Yes	Yes	Yes	Yes	Yes
State FE	Yes	Yes	Yes	Yes	Yes
Year-quarter FE	Yes	Yes	Yes	Yes	Yes
Observations	4,902,383	4,902,383	4,902,383	4,827,692	4,827,692
Adjusted R^2	0.254	0.254	0.254	0.182	0.182

Table A.4

Stock Market Participation Rates from IRS Tax Filings

This table reports estimates of the effect of the legalization of sports betting on stock market participation among a broad cross section of U.S. tax filers. The underlying data are a state-by-year panel. We use two-way fixed effects difference-in-differences (TWFE) regressions (Columns (1) and (3)) and imputed difference-in-differences regressions from Borusyak et al. (2024) (Columns (2) and (4)) to estimate the effect of legalizing sports betting. *Post* × *Treat* is an indicator variable equal to one for the years following legalization in states that legalize betting. The sample includes event years (-3,+3) between 2015 and 2021 for states that legalize (excluding year zero) and all years for states that never legalize. *Low Income* is an indicator variable for households in the bottom four IRS's AGI brackets (i.e., AGI≤ $50,000). *Stock Market Participation* is the percentage of tax filers in state s during year t that report capital gains or losses that year. The regressions include state, and year, and income bucket fixed effects. Variables are defined in Appendix Table A.1. Reported t-statistics in parentheses are heteroskedasticity-robust and clustered at the state level. ***, **, and * denote statistical significance at the 1%, 5%, and 10% levels, respectively.

	OLS	DID Imputation	OLS	DID Imputation
	(1) Stock Market Participation	(2) Stock Market Participation	(3) Stock Market Participation	(4) Stock Market Participation
Post x Treat	-0.000		0.010***	0.010***
	(-0.10)		(2.79)	(2.90)
Post x Treat x Low Income		-0.001	-0.034***	-0.034***
		(-0.32)	(-4.39)	(-6.70)
Ln(Number of Filers)	-0.007	-0.010	-0.022***	-0.020***
	(-0.15)	(-0.21)	(-4.54)	(-4.19)
State FE	Yes	Yes	Yes	Yes
Year FE	Yes	Yes	Yes	Yes
AGI Bracket FE	No	No	Yes	Yes
Adj. R-squared	0.984		0.990	
Observations	241	243	2,673	2,673

Table A.5

Predicting Sports Betting Legalization

This table reports estimates from state-by-quarter OLS and hazard model regressions predicting the timing of a state's legalization of sports betting. Quarterly estimates of private and state-government employment, number of establishments, and wages come from the Quarterly Census of Employment and Wages (QCEW). Reported t-statistics in parentheses are heteroskedasticity-robust and clustered at the state level. ***, **, and * denote statistical significance at the 1%, 5%, and 10% levels, respectively.

	(1) Legalization	(2) Legalization	(3) Legalization
Private Employment Growth$_{t-1}$	-5.769	1.602	-0.082
	(-1.32)	(1.55)	(-0.36)
State Employment Growth$_{t-1}$	3.985	-0.991	0.162
	(0.57)	(-0.62)	(0.76)
Private Employment Growth$_{t-4}$	-1.844	0.684	-0.044
	(-0.56)	(0.86)	(-0.22)
State Employment Growth$_{t-4}$	-7.851	1.488	0.138
	(-1.12)	(0.99)	(0.57)
Private Establishment Growth$_{t-4}$	-4.700	1.222	0.058
	(-1.08)	(1.07)	(0.36)
Private Wage Growth$_{t-4}$	1.441	-0.367	0.036
	(0.29)	(-0.35)	(0.11)
State Wage Growth$_{t-4}$	1.768	-0.307	0.158
	(0.60)	(-0.49)	(1.23)
Ln(Lagged Total Private Income)	0.137	-0.027	-0.088
	(0.78)	(-0.69)	(-0.64)
Model	Cox	Log logistic	OLS
State FE	No	No	Yes
Year-Quarter FE	No	No	Yes
Adj. R-squared			0.018
Observations	1,110	1,110	1,110

Table A.6

Imputed Diff-in-Diff Estimates: Betting

This table reports estimates of the effect of the legalization of sports betting on betting behavior. The underlying data are a quarterly household-level panel. We use the imputed difference-in-differences estimator from Borusyak et al. (2024) to estimate the effect of legalizing sports betting. Column (1) shows the overall estimate for the effect of legalization on household deposits to online betting apps (*Post* × *Treat*). Columns (2) and (3) test for heterogeneity in the effect based on how constrained the household is. In Column (2), we measure constrained using *Low Savings*, which is an indicator for household-quarters where the total savings flow over the prior 4 quarters is less than the sample median. In Column (3), we measure constrained using *Overdraft*, which is an indicator for household-quarters where there is at least one overdraft over the prior 4 quarters. We report the difference in the effect for constrained vs unconstrained households, along with the p-value of this difference, at the bottom of the table. The regressions include controls for quarterly income and the amount received from stimulus payments in the quarter in addition to household and year-quarter fixed effects. Variable definitions are found in Appendix Table A.1. Reported Z-statistics in parentheses are heteroskedasticity-robust and clustered at the household level. ***, **, and * indicate statistical significance at the 0.1%, 1%, and 5% levels, respectively.

	(1) Sports Bets	(2) Sports Bets	(3) Sports Bets
Post × Treat	31.62***		
	(24.09)		
Post × Treat × Constrained=0		39.70***	24.07***
		(20.45)	(21.58)
Post × Treat × Constrained=1		21.61***	92.84***
		(18.01)	(14.95)
Controls	Yes	Yes	Yes
Observations	4,886,994	4,886,994	4,886,994
Constrained Measure		Low Savings	Overdraft
Constrained Minus Unconstrained		-18.097	68.773
P-value		0.000	0.000

Table A.7

Imputed Diff-in-Diff Estimates: Bets to Income

This table reports estimates of the effect of the legalization of sports betting on betting behavior. The underlying data are a quarterly household-level panel. We use the imputed difference-in-differences estimator from Borusyak et al. (2024) to estimate the effect of legalizing sports betting. Column (1) shows the overall estimate for the effect of legalization on household deposits to online betting apps divided by quarterly income (*Post* × *Treat*). Columns (2) and (3) test for heterogeneity in the effect based on how constrained the household is. In Column (2), we measure constrained using *Low Savings*, which is an indicator for household-quarters where the total savings flow over the prior 4 quarters is less than the sample median. In Column (3), we measure constrained using *Overdraft*, which is an indicator for household-quarters where there is at least one overdraft over the prior 4 quarters. We report the difference in the effect for constrained vs unconstrained households, along with the p-value of this difference, at the bottom of the table. The regressions include controls for quarterly income and the amount received from stimulus payments in the quarter in addition to household and year-quarter fixed effects. Variable definitions are found in Appendix Table A.1. Reported Z-statistics in parentheses are heteroskedasticity-robust and clustered at the household level. ***, **, and * indicate statistical significance at the 0.1%, 1%, and 5% levels, respectively.

	(1) Bets to Income	(2) Bets to Income	(3) Bets to Income
Post × Treat	0.00168***		
	(29.21)		
Post × Treat × Constrained=0		0.00150***	0.00131***
		(22.76)	(25.80)
Post × Treat × Constrained=1		0.00192***	0.00467***
		(23.42)	(18.59)
Controls	Yes	Yes	Yes
Observations	4,812,151	4,812,151	4,812,151
Constrained Measure		Low Savings	Overdraft
Constrained Minus Unconstrained		0.0004	0.0034
P-value		0.000	0.000

Table A.8

Imputed Diff-in-Diff Estimates: Net Investments

This table reports estimates of the effect of the legalization of sports betting on net investments. The underlying data are a quarterly household-level panel. We use the imputed difference-in-differences estimator from Borusyak et al. (2024) to estimate the effect of legalizing sports betting. Column (1) shows the overall estimate for the effect of legalization on net household deposits to brokerages (*Post* × *Treat*). Columns (2) and (3) test for heterogeneity in the effect based on how constrained the household is. In Column (2), we measure constrained using *Low Savings*, which is an indicator for household-quarters where the total savings flow over the prior 4 quarters is less than the sample median. In Column (3), we measure constrained using *Overdraft*, which is an indicator for household-quarters where there is at least one overdraft over the prior 4 quarters. We report the difference in the effect for constrained vs unconstrained households, along with the p-value of this difference, at the bottom of the table. The regressions include controls for quarterly income and the amount received from stimulus payments in the quarter in addition to household and year-quarter fixed effects. Variable definitions are found in Appendix Table A.1. Reported Z-statistics in parentheses are heteroskedasticity-robust and clustered at the household level. ***, **, and * indicate statistical significance at the 0.1%, 1%, and 5% levels, respectively.

	(1) Net Invest	(2) Net Invest	(3) Net Invest
Post × Treat	-80.29***		
	(-10.45)		
Post × Treat × Constrained=0		42.87***	-64.02***
		(4.28)	(-7.98)
Post × Treat × Constrained=1		-232.9***	-212.2***
		(-31.75)	(-20.26)
Controls	Yes	Yes	Yes
Observations	4,886,994	4,886,994	4,886,994
Constrained Measure		Low Savings	Overdraft
Constrained Minus Unconstrained		-275.743	-148.202
P-value		0.000	0.000

Table A.9

Imputed Diff-in-Diff Estimates: Robinhood Investments

This table reports estimates of the effect of the legalization of sports betting on net investments at Robinhood. The underlying data are a quarterly household-level panel. We use the imputed difference-in-differences estimator from Borusyak et al. (2024) to estimate the effect of legalizing sports betting. Column (1) shows the overall estimate for the effect of legalization on net household deposits to Robinhood (*Post* × *Treat*). Columns (2) and (3) test for heterogeneity in the effect based on how constrained the household is. In Column (2), we measure constrained using *Low Savings*, which is an indicator for household-quarters where the total savings flow over the prior 4 quarters is less than the sample median. In Column (3), we measure constrained using *Overdraft*, which is an indicator for household-quarters where there is at least one overdraft over the prior 4 quarters. We report the difference in the effect for constrained vs unconstrained households, along with the p-value of this difference, at the bottom of the table. The regressions include controls for quarterly income and the amount received from stimulus payments in the quarter in addition to household and year-quarter fixed effects. Variable definitions are found in Appendix Table A.1. Reported Z-statistics in parentheses are heteroskedasticity-robust and clustered at the household level. ***, **, and * indicate statistical significance at the 0.1%, 1%, and 5% levels, respectively.

	(1) Net Robinhood	(2) Net Robinhood	(3) Net Robinhood
Post × Treat	-4.541***		
	(-4.76)		
Post × Treat × Constrained=0		1.767	-4.418***
		(1.33)	(-4.54)
Post × Treat × Constrained=1		-12.36***	-5.532**
		(-15.11)	(-2.60)
Controls	Yes	Yes	Yes
Observations	4,886,994	4,886,994	4,886,994
Constrained Measure		Low Savings	Overdraft
Constrained Minus Unconstrained		-14.123	-1.114
P-value		0.000	0.596

Table A.10

Imputed Diff-in-Diff Estimates: Robo Advisors

This table reports estimates of the effect of the legalization of sports betting on net investments at Robo Advisors. The underlying data are a quarterly household-level panel. We use the imputed difference-in-differences estimator from Borusyak et al. (2024) to estimate the effect of legalizing sports betting. Column (1) shows the overall estimate for the effect of legalization on net household deposits to Robo Advisor brokerages (*Post* × *Treat*). Columns (2) and (3) test for heterogeneity in the effect based on how constrained the household is. In Column (2), we measure constrained using *Low Savings*, which is an indicator for household-quarters where the total savings flow over the prior 4 quarters is less than the sample median. In Column (3), we measure constrained using *Overdraft*, which is an indicator for household-quarters where there is at least one overdraft over the prior 4 quarters. We report the difference in the effect for constrained vs unconstrained households, along with the p-value of this difference, at the bottom of the table. The regressions include controls for quarterly income and the amount received from stimulus payments in the quarter in addition to household and year-quarter fixed effects. Variable definitions are found in Appendix Table A.1. Reported Z-statistics in parentheses are heteroskedasticity-robust and clustered at the household level. ***, **, and * indicate statistical significance at the 0.1%, 1%, and 5% levels, respectively.

	(1) Net Robo Advisor	(2) Net Robo Advisor	(3) Net Robo Advisor
Post × Treat	-1.709*		
	(-2.57)		
Post × Treat × Constrained=0		-0.457	-1.277
		(-0.54)	(-1.86)
Post × Treat × Constrained=1		-3.261***	-5.215***
		(-5.25)	(-5.73)
Controls	Yes	Yes	Yes
Observations	4,886,994	4,886,994	4,886,994
Constrained Measure		Low Savings	Overdraft
Constrained Minus Unconstrained		-2.804	-3.938
P-value		0.000	0.000

Table A.11

Imputed Diff-in-Diff Estimates: Debt

This table reports estimates of the effect of the legalization of sports betting on credit card debt. The underlying data are a quarterly household-level panel. We use the imputed difference-in-differences estimator from Borusyak et al. (2024) to estimate the effect of legalizing sports betting. Column (1) shows the overall estimate for the effect of legalization on quarter-end credit card balance (*Post* × *Treat*). Columns (2) and (3) test for heterogeneity in the effect based on how constrained the household is. In Column (2), we measure constrained using *Low Savings*, which is an indicator for household-quarters where the total savings flow over the prior 4 quarters is less than the sample median. In Column (3), we measure constrained using *Overdraft*, which is an indicator for household-quarters where there is at least one overdraft over the prior 4 quarters. We report the difference in the effect for constrained vs unconstrained households, along with the p-value of this difference, at the bottom of the table. The regressions include controls for quarterly income and the amount received from stimulus payments in the quarter in addition to household and year-quarter fixed effects. Variable definitions are found in Appendix Table A.1. Reported Z-statistics in parentheses are heteroskedasticity-robust and clustered at the household level. ***, **, and * indicate statistical significance at the 0.1%, 1%, and 5% levels, respectively.

	(1) CC Debt	(2) CC Debt	(3) CC Debt
Post × Treat	115.4*		
	(2.37)		
Post × Treat × Constrained=0		-250.1***	104.1*
		(-4.87)	(2.14)
Post × Treat × Constrained=1		723.4***	713.0**
		(10.35)	(2.98)
Controls	Yes	Yes	Yes
Observations	642,363	642,363	642,363
Constrained Measure		Low Savings	Overdraft
Constrained Minus Unconstrained		973.459	608.865
P-value		0.000	0.011

Table A.12

Imputed Diff-in-Diff Estimates: Available Credit

This table reports estimates of the effect of the legalization of sports betting on available credit. The underlying data are a quarterly household-level panel. We use the imputed difference-in-differences estimator from Borusyak et al. (2024) to estimate the effect of legalizing sports betting. Column (1) shows the overall estimate for the effect of legalization on quarter-end available credit (*Post* × *Treat*). Columns (2) and (3) test for heterogeneity in the effect based on how constrained the household is. In Column (2), we measure constrained using *Low Savings*, which is an indicator for household-quarters where the total savings flow over the prior 4 quarters is less than the sample median. In Column (3), we measure constrained using *Overdraft*, which is an indicator for household-quarters where there is at least one overdraft over the prior 4 quarters. We report the difference in the effect for constrained vs unconstrained households, along with the p-value of this difference, at the bottom of the table. The regressions include controls for quarterly income and the amount received from stimulus payments in the quarter in addition to household and year-quarter fixed effects. Variable definitions are found in Appendix Table A.1. Reported Z-statistics in parentheses are heteroskedasticity-robust and clustered at the household level. ***, **, and * indicate statistical significance at the 0.1%, 1%, and 5% levels, respectively.

	(1) Available Credit	(2) Available Credit	(3) Available Credit
Post × Treat	-38.24		
	(-0.50)		
Post × Treat × Constrained=0		226.4**	-26.55
		(2.86)	(-0.35)
Post × Treat × Constrained=1		-478.4***	-641.1
		(-4.24)	(-1.68)
Controls	Yes	Yes	Yes
Observations	601,716	601,716	601,716
Constrained Measure		Low Savings	Overdraft
Constrained Minus Unconstrained		-704.843	-614.557
P-value		0.000	0.107

Table A.13

Imputed Diff-in-Diff Estimates: Credit Card Payments

This table reports estimates of the effect of the legalization of sports betting on credit card payments. The underlying data are a quarterly household-level panel. We use the imputed difference-in-differences estimator from Borusyak et al. (2024) to estimate the effect of legalizing sports betting. Column (1) shows the overall estimate for the effect of legalization on quarterly payments on credit card balances (*Post* × *Treat*). Columns (2) and (3) test for heterogeneity in the effect based on how constrained the household is. In Column (2), we measure constrained using *Low Savings*, which is an indicator for household-quarters where the total savings flow over the prior 4 quarters is less than the sample median. In Column (3), we measure constrained using *Overdraft*, which is an indicator for household-quarters where there is at least one overdraft over the prior 4 quarters. We report the difference in the effect for constrained vs unconstrained households, along with the p-value of this difference, at the bottom of the table. The regressions include controls for quarterly income and the amount received from stimulus payments in the quarter in addition to household and year-quarter fixed effects. Variable definitions are found in Appendix Table A.1. Reported Z-statistics in parentheses are heteroskedasticity-robust and clustered at the household level. ***, **, and * indicate statistical significance at the 0.1%, 1%, and 5% levels, respectively.

	(1) CC Payments	(2) CC Payments	(3) CC Payments
Post × Treat	-140.3***		
	(-10.40)		
Post × Treat × Constrained=0		638.3***	-88.84***
		(36.04)	(-6.32)
Post × Treat × Constrained=1		-1105.0***	-557.9***
		(-95.10)	(-26.60)
Controls	Yes	Yes	Yes
Observations	4,886,994	4,886,994	4,886,994
Constrained Measure		Low Savings	Overdraft
Constrained Minus Unconstrained		-1743.322	-469.059
P-value		0.000	0.000

Table A.14

Imputed Diff-in-Diff Estimates: Lotto

This table reports estimates of the effect of the legalization of sports betting on lottery play. The underlying data are a quarterly household-level panel. We use the imputed difference-in-differences estimator from Borusyak et al. (2024) to estimate the effect of legalizing sports betting. Column (1) shows the overall estimate for the effect of legalization on the lottery ticket purchases (*Post* × *Treat*). Columns (2) and (3) test for heterogeneity in the effect based on how constrained the household is. In Column (2), we measure constrained using *Low Savings*, which is an indicator for household-quarters where the total savings flow over the prior 4 quarters is less than the sample median. In Column (3), we measure constrained using *Overdraft*, which is an indicator for household-quarters where there is at least one overdraft over the prior 4 quarters. We report the difference in the effect for constrained vs unconstrained households, along with the p-value of this difference, at the bottom of the table. The regressions include controls for quarterly income and the amount received from stimulus payments in the quarter in addition to household and year-quarter fixed effects. Variable definitions are found in Appendix Table A.1. Reported Z-statistics in parentheses are heteroskedasticity-robust and clustered at the household level. ***, **, and * indicate statistical significance at the 0.1%, 1%, and 5% levels, respectively.

	(1) Lotto	(2) Lotto	(3) Lotto
Post × Treat	1.209***		
	(8.72)		
Post × Treat × Constrained=0		1.255***	0.959***
		(7.98)	(7.60)
Post × Treat × Constrained=1		1.151***	3.232***
		(6.21)	(5.43)
Controls	Yes	Yes	Yes
Observations	4,886,994	4,886,994	4,886,994
Constrained Measure		Low Savings	Overdraft
Constrained Minus Unconstrained		-0.104	2.273
P-value		0.602	0.000

Table A.15

Imputed Diff-in-Diff Estimates: Poker

This table reports estimates of the effect of the legalization of sports betting on online poker play. The underlying data are a quarterly household-level panel. We use the imputed difference-in-differences estimator from Borusyak et al. (2024) to estimate the effect of legalizing sports betting. Column (1) shows the overall estimate for the effect of legalization on the online poker spending (*Post* × *Treat*). Columns (2) and (3) test for heterogeneity in the effect based on how constrained the household is. In Column (2), we measure constrained using *Low Savings*, which is an indicator for household-quarters where the total savings flow over the prior 4 quarters is less than the sample median. In Column (3), we measure constrained using *Overdraft*, which is an indicator for household-quarters where there is at least one overdraft over the prior 4 quarters. We report the difference in the effect for constrained vs unconstrained households, along with the p-value of this difference, at the bottom of the table. The regressions include controls for quarterly income and the amount received from stimulus payments in the quarter in addition to household and year-quarter fixed effects. Variable definitions are found in Appendix Table A.1. Reported Z-statistics in parentheses are heteroskedasticity-robust and clustered at the household level. ***, **, and * indicate statistical significance at the 0.1%, 1%, and 5% levels, respectively.

	(1) Poker	(2) Poker	(3) Poker
Post × Treat	0.0589		
	(1.33)		
Post × Treat × Constrained=0		0.0800	0.0438
		(1.22)	(1.23)
Post × Treat × Constrained=1		0.0327	0.181
		(0.78)	(1.03)
Controls	Yes	Yes	Yes
Observations	4,886,994	4,886,994	4,886,994
Constrained Measure		Low Savings	Overdraft
Constrained Minus Unconstrained		-0.047	0.137
P-value		0.497	0.398

Table A.16

Imputed Diff-in-Diff Estimates: Crypto

This table reports estimates of the effect of the legalization of sports betting on crypto investments. The underlying data are a quarterly household-level panel. We use the imputed difference-in-differences estimator from Borusyak et al. (2024) to estimate the effect of legalizing sports betting. Column (1) shows the overall estimate for the effect of legalization on deposits to crypto exchanges (*Post* × *Treat*). Columns (2) and (3) test for heterogeneity in the effect based on how constrained the household is. In Column (2), we measure constrained using *Low Savings*, which is an indicator for household-quarters where the total savings flow over the prior 4 quarters is less than the sample median. In Column (3), we measure constrained using *Overdraft*, which is an indicator for household-quarters where there is at least one overdraft over the prior 4 quarters. We report the difference in the effect for constrained vs unconstrained households, along with the p-value of this difference, at the bottom of the table. The regressions include controls for quarterly income and the amount received from stimulus payments in the quarter in addition to household and year-quarter fixed effects. Variable definitions are found in Appendix Table A.1. Reported Z-statistics in parentheses are heteroskedasticity-robust and clustered at the household level. ***, **, and * indicate statistical significance at the 0.1%, 1%, and 5% levels, respectively.

	(1) Crypto	(2) Crypto	(3) Crypto
Post × Treat	-14.21***		
	(-7.12)		
Post × Treat × Constrained=0		-10.40***	-13.88***
		(-4.14)	(-6.66)
Post × Treat × Constrained=1		-18.92***	-16.84***
		(-9.69)	(-5.24)
Controls	Yes	Yes	Yes
Observations	4,886,994	4,886,994	4,886,994
Constrained Measure		Low Savings	Overdraft
Constrained Minus Unconstrained		-8.527	-2.953
P-value		0.000	0.360

Table A.17

Imputed Diff-in-Diff Estimates: Restaurants

This table reports estimates of the effect of the legalization of sports betting on restaurant spending. The underlying data are a quarterly household-level panel. We use the imputed difference-in-differences estimator from Borusyak et al. (2024) to estimate the effect of legalizing sports betting. Column (1) shows the overall estimate for the effect of legalization on quarterly spending at restaurants (*Post* × *Treat*). Columns (2) and (3) test for heterogeneity in the effect based on how constrained the household is. In Column (2), we measure constrained using *Low Savings*, which is an indicator for household-quarters where the total savings flow over the prior 4 quarters is less than the sample median. In Column (3), we measure constrained using *Overdraft*, which is an indicator for household-quarters where there is at least one overdraft over the prior 4 quarters. We report the difference in the effect for constrained vs unconstrained households, along with the p-value of this difference, at the bottom of the table. The regressions include controls for quarterly income and the amount received from stimulus payments in the quarter in addition to household and year-quarter fixed effects. Variable definitions are found in Appendix Table A.1. Reported Z-statistics in parentheses are heteroskedasticity-robust and clustered at the household level. ***, **, and * indicate statistical significance at the 0.1%, 1%, and 5% levels, respectively.

	(1) Restaurants	(2) Restaurants	(3) Restaurants
Post × Treat	100.1***		
	(34.47)		
Post × Treat × Constrained=0		29.03***	88.56***
		(8.33)	(29.66)
Post × Treat × Constrained=1		188.3***	194.1***
		(57.52)	(32.96)
Controls	Yes	Yes	Yes
Observations	4,886,994	4,886,994	4,886,994
Constrained Measure		Low Savings	Overdraft
Constrained Minus Unconstrained		159.224	105.589
P-value		0.000	0.000

Table A.18

Imputed Diff-in-Diff Estimates: Cable

This table reports estimates of the effect of the legalization of sports betting on cable spending. The underlying data are a quarterly household-level panel. We use the imputed difference-in-differences estimator from Borusyak et al. (2024) to estimate the effect of legalizing sports betting. Column (1) shows the overall estimate for the effect of legalization on quarterly spending on cable and telecommunications (*Post* × *Treat*). Columns (2) and (3) test for heterogeneity in the effect based on how constrained the household is. In Column (2), we measure constrained using *Low Savings*, which is an indicator for household-quarters where the total savings flow over the prior 4 quarters is less than the sample median. In Column (3), we measure constrained using *Overdraft*, which is an indicator for household-quarters where there is at least one overdraft over the prior 4 quarters. We report the difference in the effect for constrained vs unconstrained households, along with the p-value of this difference, at the bottom of the table. The regressions include controls for quarterly income and the amount received from stimulus payments in the quarter in addition to household and year-quarter fixed effects. Variable definitions are found in Appendix Table A.1. Reported Z-statistics in parentheses are heteroskedasticity-robust and clustered at the household level. ***, **, and * indicate statistical significance at the 0.1%, 1%, and 5% levels, respectively.

	(1) Cable/Telecom	(2) Cable/Telecom	(3) Cable/Telecom
Post × Treat	60.21***		
	(41.75)		
Post × Treat × Constrained=0		45.86***	54.79***
		(26.73)	(37.45)
Post × Treat × Constrained=1		77.98***	104.1***
		(46.85)	(30.71)
Controls	Yes	Yes	Yes
Observations	4,886,994	4,886,994	4,886,994
Constrained Measure		Low Savings	Overdraft
Constrained Minus Unconstrained		32.121	49.354
P-value		0.000	0.000

Table A.19

Imputed Diff-in-Diff Estimates: Entertainment

This table reports estimates of the effect of the legalization of sports betting on entertainment spending. The underlying data are a quarterly household-level panel. We use the imputed difference-in-differences estimator from Borusyak et al. (2024) to estimate the effect of legalizing sports betting. Column (1) shows the overall estimate for the effect of legalization on quarterly spending on entertainment and travel (*Post* × *Treat*). Columns (2) and (3) test for heterogeneity in the effect based on how constrained the household is. In Column (2), we measure constrained using *Low Savings*, which is an indicator for household-quarters where the total savings flow over the prior 4 quarters is less than the sample median. In Column (3), we measure constrained using *Overdraft*, which is an indicator for household-quarters where there is at least one overdraft over the prior 4 quarters. We report the difference in the effect for constrained vs unconstrained households, along with the p-value of this difference, at the bottom of the table. The regressions include controls for quarterly income and the amount received from stimulus payments in the quarter in addition to household and year-quarter fixed effects. Variable definitions are found in Appendix Table A.1. Reported Z-statistics in parentheses are heteroskedasticity-robust and clustered at the household level. ***, **, and * indicate statistical significance at the 0.1%, 1%, and 5% levels, respectively.

	(1) Entertain/Travel	(2) Entertain/Travel	(3) Entertain/Travel
Post × Treat	101.3***		
	(32.33)		
Post × Treat × Constrained=0		44.87***	91.24***
		(11.86)	(28.40)
Post × Treat × Constrained=1		171.3***	183.3***
		(48.99)	(27.28)
Controls	Yes	Yes	Yes
Observations	4,886,994	4,886,994	4,886,994
Constrained Measure		Low Savings	Overdraft
Constrained Minus Unconstrained		126.435	92.051
P-value		0.000	0.000

Table A.20
Online Betting Linearly Grows Following Legalization

This table reports estimates of the effect of the legalization of sports betting on betting behavior. The underlying data are a quarterly household-level panel. We use a two-way fixed effects difference-in-differences (TWFE) regression to estimate the effect of legalizing sports betting. *# Quarters Post × Treat* indicates the number of quarters that have passed since the legalization of online sports betting; it is defined as zero for all states that have not yet legalized betting. *Low Savings* is an indicator for household-quarters where the total savings flow over the prior 4 quarters is less than the sample median. *Overdraft* is an indicator for household-quarters where there is at least one overdraft over the prior 4 quarters. Columns (1)–(3) estimate the effect of legalization on quarterly deposits to sports betting apps, while columns (4) and (5) show the effect on quarterly deposits to sports betting apps divided by quarterly income. The regressions include controls for quarterly income and the amount received from stimulus payments in the quarter in addition to household, state, and year-quarter fixed effects. Variable definitions are found in Appendix Table A.1. Reported t-statistics in parentheses are heteroskedasticity-robust and clustered at the household and state by year-quarter levels. ***, **, and * indicate statistical significance at the 1%, 5%, and 10% levels, respectively.

	(1) Sports Bets	(2) Sports Bets	(3) Sports Bets	(4) Bets to Income	(5) Bets to Income
# Quarters Post × Treat	4.577***	5.556***	3.586***	0.000191***	0.000168***
	(14.29)	(13.84)	(13.20)	(13.60)	(13.15)
Low Savings × # Quarters Post × Treat		-2.270***		0.0000501***	
		(-7.50)		(3.77)	
Overdraft × # Quarters Post × Treat			9.309***		0.000424***
			(8.94)		(10.70)
Low Savings		0.868*		-0.000109***	
		(1.88)		(-4.95)	
Overdraft			-9.034***		-0.000432***
			(-4.56)		(-5.47)
Controls	Yes	Yes	Yes	Yes	Yes
Household FE	Yes	Yes	Yes	Yes	Yes
State FE	Yes	Yes	Yes	Yes	Yes
Year-quarter FE	Yes	Yes	Yes	Yes	Yes
Observations	4,902,383	4,902,383	4,902,383	4,827,688	4,827,688
Adjusted R^2	0.273	0.274	0.275	0.232	0.233

Table A.21

Effect of Betting on Investments Increases Over Time

This table reports estimates of the effect of the legalization of sports betting on investment. The underlying data are a quarterly household-level panel. We use a two-way fixed effects difference-in-differences (TWFE) regression to estimate the effect of legalizing sports betting. *# Quarters Post × Treat* indicates the number of quarters that have passed since the legalization of online sports betting; it is defined as zero for all states that have not yet legalized betting. The dependent variable in column (1) is net investment (e.g., investment deposits less withdrawals), while the dependent variable in columns (2) and (3) show the subset of investments made in Robinhood and in Robo Advisors. The regressions include controls for quarterly income and the amount received from stimulus payments in the quarter in addition to household, state, and year-quarter fixed effects. Variable definitions are found in Appendix Table A.1. Reported *t*-statistics in parentheses are heteroskedasticity-robust and clustered at the household and state by year-quarter levels. ***, **, and * indicate statistical significance at the 1%, 5%, and 10% levels, respectively.

	(1) Net Invest	(2) Net Robinhood	(3) Net Robo Advisor
# Quarters Post × Treat	-9.115*** (-6.98)	-0.345*** (-2.67)	-0.180** (-2.22)
Controls	Yes	Yes	Yes
Household FE	Yes	Yes	Yes
State FE	Yes	Yes	Yes
Year-quarter FE	Yes	Yes	Yes
Observations	4,902,383	4,902,383	4,902,383
Adjusted R^2	0.245	0.077	0.253

Table A.22

Constrained Households Cut Investments Over Time

This table shows how the estimates of the effect of the legalization of sports betting on investment vary by the extent to which households are constrained. The underlying data are a quarterly household-level panel. We use a two-way fixed effects difference-in-differences (TWFE) regression to estimate the effect of legalizing sports betting. *# Quarters Post × Treat* indicates the number of quarters that have passed since the legalization of online sports betting; it is defined as zero for all states that have not yet legalized betting. *Low Savings* is an indicator for household-quarters where the total savings flow over the prior 4 quarters is less than the sample median. *Overdraft* is an indicator for household-quarters where there is at least one overdraft over the prior 4 quarters. The dependent variable in columns (1) and (2) is net investment (e.g., investment deposits less withdrawals), while the dependent variable in columns (3)–(6) show the subset of investments made to Robinhood and to Robo Advisors. The regressions include controls for quarterly income and the amount received from stimulus payments in the quarter in addition to household, state, and year-quarter fixed effects. Variable definitions are found in Appendix Table A.1. Reported *t*-statistics in parentheses are heteroskedasticity-robust and clustered at the household and state by year-quarter levels. ***, **, and * indicate statistical significance at the 1%, 5%, and 10% levels, respectively.

	(1) Net Invest	(2) Net Invest	(3) Net Robinhood	(4) Net Robinhood	(5) Net Robo Advisor	(6) Net Robo Advisor
# Quarters Post × Treat	-0.960	-7.430***	-0.0242	-0.378***	-0.0263	-0.145*
	(-0.63)	(-5.64)	(-0.14)	(-2.87)	(-0.28)	(-1.74)
Low Savings × # Quarters Post × Treat	-19.79***		-0.813***		-0.344***	
	(-10.81)		(-3.64)		(-4.23)	
Overdraft × # Quarters Post × Treat		-15.48***		0.257		-0.349***
		(-9.01)		(0.75)		(-3.55)
Low Savings	-95.61***		-7.866***		1.622***	
	(-19.30)		(-11.14)		(3.46)	
Overdraft		34.51***		-3.106***		-0.900
		(4.76)		(-2.64)		(-1.21)
Controls	Yes	Yes	Yes	Yes	Yes	Yes
Household FE	Yes	Yes	Yes	Yes	Yes	Yes
State FE	Yes	Yes	Yes	Yes	Yes	Yes
Year-quarter FE	Yes	Yes	Yes	Yes	Yes	Yes
Observations	4,902,383	4,902,383	4,902,383	4,902,383	4,902,383	4,902,383
Adjusted R^2	0.245	0.245	0.078	0.077	0.253	0.253

Table A.23
Low Savings Households Lever Up More Over Time

This table reports estimates of the effect of the legalization of sports betting on household debt. The underlying data are a quarterly household-level panel. We use a two-way fixed effects difference-in-differences (TWFE) regression to estimate the effect of legalizing sports betting. *# Quarters Post × Treat* indicates the number of quarters that have passed since the legalization of online sports betting; it is defined as zero for all states that have not yet legalized betting. *Low Savings* is an indicator for household-quarters where the total savings flow over the prior 4 quarters is less than the sample median. *Overdraft* is an indicator for household-quarters where there is at least one overdraft over the prior 4 quarters. The dependent variable in columns (1) and (2) is total credit card debt. The dependent variable in columns (3) and (4) is the amount of credit households have available across all credit cards. The dependent variable in columns (5) and (6) is the total amount that the household pays on their credit card bill over the quarter. The dependent variable in columns (7) and (8) is the number of times the household will overdraw their bank accounts in the following 4 quarters. Columns (1)–(6) are estimated using OLS regressions, while columns (7) and (8) are estimated using Poisson pseudo-maximum likelihood regressions as described in Correia et al. (2020). The regressions include controls for quarterly income and the amount received from stimulus payments in the quarter in addition to household, state, and year-quarter fixed effects. Variable definitions are found in Appendix Table A.1. Reported *t*-statistics in parentheses are heteroskedasticity-robust and clustered at the household and state by year-quarter levels. ***, **, and * indicate statistical significance at the 1%, 5%, and 10% levels, respectively.

	(1) CC Debt	(2) CC Debt	(3) Available Credit	(4) Available Credit	(5) CC Payments	(6) CC Payments	(7) Future Overdrafts	(8) Future Overdrafts
# Quarters Post × Treat	-10.55	11.56	12.68	-2.764	32.43***	-7.695*	0.00625*	-0.00983**
	(-1.24)	(1.40)	(0.85)	(-0.19)	(6.69)	(-1.89)	(1.79)	(-1.99)
Low Savings × # Quarters Post × Treat	55.43***		-40.32***		-113.7***		0.00791***	
	(5.40)		(-2.63)		(-17.90)		(2.79)	
Overdraft × # Quarters Post × Treat		-27.44		-5.831		-52.42***		0.0277***
		(-0.86)		(-0.11)		(-14.69)		(4.46)
Low Savings	775.7***		-543.4***		-899.6***		-0.0160	
	(33.05)		(-16.35)		(-61.59)		(-1.45)	
Overdraft		274.4**		-276.6		-12.81		0.497***
		(2.39)		(-1.59)		(-0.82)		(22.73)
Controls	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Household FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
State FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Year-quarter FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Observations	641,694	641,694	600,923	600,923	4,902,383	4,902,383	916,677	916,677
Adjusted R^2	0.677	0.675	0.862	0.862	0.677	0.672		

Table A.24
Effects of Betting on Other Risk Taking Over Time

This table reports estimates of the effect of the legalization of sports betting on other forms of risk-taking. The underlying data are a quarterly household-level panel. We use a two-way fixed effects difference-in-differences (TWFE) regression to estimate the effect of legalizing sports betting. *# Quarters Post × Treat* indicates the number of quarters that have passed since the legalization of online sports betting; it is defined as zero for all states that have not yet legalized betting. *Low Savings* is an indicator for household-quarters where the total savings flow over the prior 4 quarters is less than the sample median. *Overdraft* is an indicator for household-quarters where there is at least one overdraft over the prior 4 quarters. The dependent variable in columns (1) and (2) is total lottery spending. The dependent variable in columns (3) and (4) is total spending on online poker. The dependent variable in columns (5) and (6) is the amount that the household deposits to crypto brokerages (e.g., Coinbase). The regressions include controls for quarterly income and the amount received from stimulus payments in the quarter in addition to household, state, and year-quarter fixed effects. Variable definitions are found in Appendix Table A.1. Reported t-statistics in parentheses are heteroskedasticity-robust and clustered at the household and state by year-quarter levels. ***, **, and * indicate statistical significance at the 1%, 5%, and 10% levels, respectively.

	(1) Lotto	(2) Lotto	(3) Poker	(4) Poker	(5) Crypto	(6) Crypto
# Quarters Post × Treat	0.0754***	0.0490**	0.0169*	0.0135*	-1.360***	-2.252***
	(2.64)	(2.03)	(1.67)	(1.91)	(-3.45)	(-5.54)
Low Savings × # Quarters Post × Treat	-0.0163		-0.00558		-2.035***	
	(-0.72)		(-0.73)		(-5.19)	
Overdraft × # Quarters Post × Treat		0.177**		0.00888		-0.346
		(2.57)		(0.41)		(-0.88)
Low Savings	0.224***		0.00260		17.44***	
	(3.84)		(0.14)		(11.72)	
Overdraft		-0.0366		-0.00351		5.297***
		(-0.21)		(-0.09)		(2.77)
Controls	Yes	Yes	Yes	Yes	Yes	Yes
Household FE	Yes	Yes	Yes	Yes	Yes	Yes
State FE	Yes	Yes	Yes	Yes	Yes	Yes
Year-quarter FE	Yes	Yes	Yes	Yes	Yes	Yes
Observations	4,902,383	4,902,383	4,902,383	4,902,383	4,902,383	4,902,383
Adjusted R^2	0.350	0.350	0.243	0.243	0.142	0.142

Table A.25

The Effects of Sports Betting on Consumption Over Time

This table reports estimates of the effect of the legalization of sports betting on other consumption. The underlying data are a quarterly household-level panel. We use a two-way fixed effects difference-in-differences (TWFE) regression to estimate the effect of legalizing sports betting. *# Quarters Post × Treat* indicates the number of quarters that have passed since the legalization of online sports betting; it is defined as zero for all states that have not yet legalized betting. *Low Savings* is an indicator for household-quarters where the total savings flow over the prior 4 quarters is less than the sample median. *Overdraft* is an indicator for household-quarters where there is at least one overdraft over the prior 4 quarters. The dependent variable in columns (1) and (2) is total spending on restaurants. The dependent variable in columns (3) and (4) is total spending on cable and telecommunication. The dependent variable in columns (5) and (6) is total spending on entertainment and travel. The regressions include controls for quarterly income and the amount received from stimulus payments in the quarter in addition to household, state, and year-quarter fixed effects. Variable definitions are found in Appendix Table A.1. Reported t-statistics in parentheses are heteroskedasticity-robust and clustered at the household and state by year-quarter levels. ***, **, and * indicate statistical significance at the 1%, 5%, and 10% levels, respectively.

	(1) Restaurants	(2) Restaurants	(3) Cable/Telecom	(4) Cable/Telecom	(5) Entertain/Travel	(6) Entertain/Travel
# Quarters Post × Treat	8.155***	11.88***	7.064***	7.943***	11.38***	12.18***
	(5.09)	(7.45)	(8.95)	(10.38)	(7.59)	(8.54)
Low Savings × # Quarters Post × Treat	11.58***		2.700***		4.811***	
	(14.75)		(8.32)		(6.14)	
Overdraft × # Quarters Post × Treat		9.784***		3.050***		8.646***
		(8.03)		(4.73)		(7.42)
Low Savings	52.21***		-0.0413		96.50***	
	(22.90)		(-0.04)		(34.44)	
Overdraft		-18.78***		19.66***		-4.781
		(-4.54)		(10.40)		(-1.24)
Controls	Yes	Yes	Yes	Yes	Yes	Yes
Household FE	Yes	Yes	Yes	Yes	Yes	Yes
State FE	Yes	Yes	Yes	Yes	Yes	Yes
Year-quarter FE	Yes	Yes	Yes	Yes	Yes	Yes
Observations	4,902,383	4,902,383	4,902,383	4,902,383	4,902,383	4,902,383
Adjusted R^2	0.601	0.601	0.665	0.665	0.457	0.456

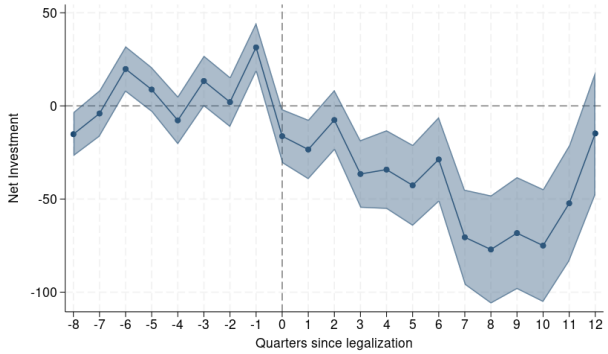
Table A.26

2SLS Estimates of the Effect of Betting on Consumption

This table reports 2SLS estimates of the effect of the legalization of sports betting on investment. The underlying data are a quarterly household-level panel. *Post* × *Treat* is an indicator variable equal to one for quarters following the launch of online sports betting in states that legalize betting. *Top Male* is an indicator variable equal to one for households in the top quartile of transactions at male-focused retailers. The sample is limited to households for whom we can identify the gender composition of at least 60 b.p. of their total spending. We use *Top Male* × *Post* × *Treat* as an instrument for deposits to sports betting apps post-legalization (i.e., *Bets* × *Post* × *Treat*). Column (1) reports the effect of sports betting on total spending, column (2) reports the effect on food and entertainment spending, and column (3) reports the effect on all other non-bet spending (i.e., total spending less betting deposits and food and entertainment expenses). The regressions include controls for quarterly income and the amount received from stimulus payments in the quarter in addition to household, state by year-quarter, and top male by year-quarter fixed effects. Variable definitions are found in Appendix Table A.1. Reported t-statistics in parentheses are heteroskedasticity-robust and clustered at the household and state by year-quarter levels. ***, **, and * indicate statistical significance at the 1%, 5%, and 10% levels, respectively.

	(1) Total Spending	(2) Food & Entertainment	(3) Non-bet Spending Less Food/Entertain
Bets × Post × Treat	-1.410	0.868**	-3.114**
	(-1.01)	(2.07)	(-2.50)
Controls	Yes	Yes	Yes
Household FE	Yes	Yes	Yes
State by Quarter FE	Yes	Yes	Yes
Top Male by Quarter FE	Yes	Yes	Yes
Observations	3,231,790	3,231,790	3,231,790
Adjusted R^2	0.267	0.087	0.244
Weak ID KP F Stat	42.12	42.12	42.12

(a) Callaway and Sant'Anna (2021)



(b) Sun and Abraham (2021)

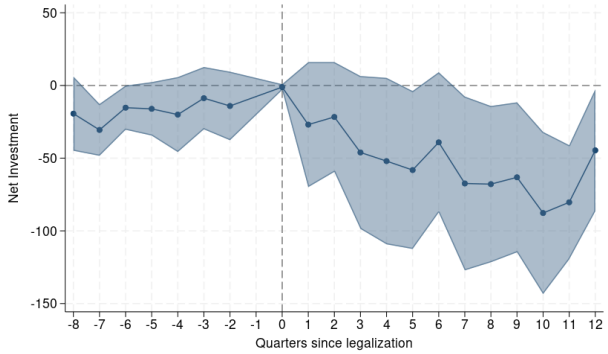


Figure A.1. Parallel Trends in Net Investment around Sports Betting Legalization. This figure presents event-time coefficients of the effect of the legalization of sports betting on net investment (e.g., deposits less withdrawals at equity brokerages). The x-axis indicates quarters surrounding the legalization of sports betting, where $t = 0$ represents the quarter during which online betting was first possible. The y-axis shows the average causal effect of legalization on quarterly net investment. We estimate the difference-in-difference event-time coefficients following Callaway and Sant'Anna (2021) in Panel (a), and following Sun and Abraham (2021) in Panel (b). These methods account for the staggered rollout of the legalization of state betting. The shaded region represents the 95% confidence interval.