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Gambling with State Budgets: Legalized Sports Betting and Lost Lottery Revenue

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Abstract

Legislators often justify legalizing controversial markets, such as sports betting, by citing the potential for new tax revenue to fund popular public programs. However, new revenue from sports betting may cannibalize existing revenue from state-run lotteries, undermining a key rationale for legalization. We study the staggered state-by-state legalization of sports betting following 2018 to examine these substitution effects. Using a difference-in-differences framework applied to state lottery data, we estimate the causal impact of legalization on lottery revenues. We find that sports betting and lotteries are substitutes, with legalization leading to a persistent 10–13% decline in lottery revenue. Because the state captures a much smaller share of each dollar spent on sports betting than on lottery purchases, we estimate a negative—though imprecise—effect on combined state revenue from these two sources.

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1 Introduction

Governments generate substantial revenue from goods with negative externalities — such as alcohol, tobacco, marijuana, and gambling — either through taxation or, in the case of lotteries, through direct operation as the residual claimant after prizes and administrative expenses. This revenue potential is politically appealing and frequently invoked by legislators to justify legalizing or expanding access to such activities, often with promises of dedicated funding for popular programs like education. However, the introduction of a new revenue-generating activity may cannibalize spending on existing ones, producing smaller gains than anticipated. This shortfall can undermine the fiscal justification for legalizing an activity with significant social costs.

The recent wave of sports gambling legalization across the United States provides a policy-relevant setting to study these substitution dynamics. Following the 2018 Supreme Court decision in *Murphy v. National Collegiate Athletic Association*, which invalidated the federal prohibition on sports wagering, individual states gained the authority to legalize and regulate sports betting. The ruling triggered a staggered, state-by-state rollout of legal sports betting markets, and wagering volumes grew rapidly: Americans legally bet $149.9 billion on sports in 2024, up from $121.1 billion a year earlier (American Gaming Association, 2025). Through the first half of 2026, thirty-nine states and the District of Columbia have legalized betting on sports. While lobbyists and state legislators often hail this development as a source of significant new tax revenue, an important question is whether these dollars represent new spending or are siphoned from existing state revenue sources. The stakes are considerable: in fiscal year 2024, state lotteries generated $29.7 billion in net revenue after prizes and administrative costs (U.S. Census Bureau, 2026a), more than ten times the roughly $2.8 billion in state tax revenue collected from sports betting that year (U.S. Census Bureau, 2026b). Because states capture far more of each consumer dollar through lottery operations than through sports betting taxes, even modest substitution away from the lottery could outweigh the new sports-betting revenue. In fact, some state officials have already expressed con-

cern that legal sports betting will draw dollars away from state lotteries, reducing a key source of dedicated public funding.[1]

In this paper, we estimate the causal impact of sports betting legalization on net state lottery revenue and combined government revenue from lottery and sports betting. We exploit the staggered, state-by-state adoption of legal sports betting following the 2018 *Murphy* ruling, combining legalization dates with administrative lottery revenue data spanning 2012 to 2023. Using difference-in-differences regressions, we compare lottery revenue trends in states before and after legalization to contemporaneous trends in states that had not yet legalized, isolating the effect of sports betting on existing government revenue streams.

We find that sports betting and lottery are substitutes. Following legalization, net state lottery revenues decline by 10 to 13 percent — an effect that persists for years after initial legalization. Because the state captures a greater share of consumer spending through lottery operations than through sports gambling taxes, the decline in lottery revenue offsets the gains from newly legalized sports gambling. We further show that our results are robust to jackknife specifications that drop individual states and to recently developed estimators designed to address bias that can arise in staggered difference-in-differences settings.

Literature review

We contribute to three strands of the literature. First, our work engages with the public economics literature on externalities and optimal taxation. Setting tax rates in an environment with negative externalities is complicated: on the one hand, policymakers can use taxes to try to discourage an activity—this is the traditional theoretical and public health basis for "sin taxes" on products such as cigarettes (e.g., Pigou, 1920; Sandmo, 1975). On the other hand, a key argument in favor of legalization is that the goods may be taxed and raise revenue for the state, often in dedicated areas

[1]Notably, the State Auditor of Nebraska has been quoted as saying "If I were a betting man, I'd lay odds that the increasing popularity of such online activities, some of which occur outside of the State of Nebraska's authority, will result in ever more gambling dollars being siphoned away from the Lottery and its intended beneficiary funds." https://auditors.nebraska.gov/APA_Reports/2025/SA161-10202025-Nebraska_Lottery_Press_Release.pdf

(for example, education and health) that have broad political support. Both potential benefits of sin taxes can be undermined by consumer substitution. Faced with localized tax increases, consumers will seek out lower-taxed alternatives, eroding the tax base and complicating welfare calculations. The most prominent examples come from cigarette taxation, where differential tax rates between jurisdictions lead to significant cross-border shopping and smuggling, thereby reducing both expected public health gains and fiscal revenues (for example, Lovenheim, 2008). Studies on soda taxes have found similar patterns, with consumers traveling to neighboring localities to avoid the tax, demonstrating a key channel through which projected revenue gains may fail to materialize (for example, Allcott et al., 2019). Our study applies this same fiscal leakage framework to the legalization of sports gambling.

Second, our paper contributes to a literature that applies these public finance principles to the economics of gambling. Research consistently finds evidence of substitution between competing gambling products, with early work focusing on lottery markets. Substitution patterns emerge across both physical (Forrest et al., 2004) and online lottery products (Trousdale and Dunn, 2014). Grote and Matheson (2006) find that large jackpots in multi-state lotteries (such as Powerball) suppress in-state lottery sales, though the net effect of multi-state lottery participation on state revenues remains positive. State lottery revenues are also sensitive to competition from bordering states: Stover (1990) finds that neighboring state lotteries are substitutes, and Knight and Schiff (2012) find that this effect is especially pronounced for small states with large border populations. Beyond other lottery products, state lotteries also face competition from casinos (for example, Siegel and Anders, 2001; Elliott and Navin, 2002; Walker and Jackson, 2008; Cummings et al., 2017). We find that state lotteries are similarly sensitive to sports betting legalization, a category of spending that has grown dramatically in recent years.

Finally, we contribute to a growing literature studying the effects of the post-2018 sports gambling wave.[2] Baker et al. (2024) use a staggered difference-in-differences strategy on transaction-

[2]See Matheson (2021) for additional background on the economics of sports gambling.

level data and find that online sports betting does not reduce overall consumption or other gambling-related spending. Instead, it is associated with a reduction in saving and increases in credit card spending and overdrafting. Hollenbeck et al. (2024) find that sports betting legalization is associated with declining credit scores through the accumulation of excessive debt, an effect that is larger where online betting is available. Beyond fiscal impacts, legalization is also associated with a range of adverse health and social outcomes, including increased alcohol consumption among young men (Dasgupta and Ghimire, 2025), deteriorating mental health — particularly among men aged 30–34 (Couture et al., 2024) — and increased intimate-partner violence (Matsuzawa and Arnesen, 2024).

The initial evidence on substitution between sports betting and other gambling products is mixed. Nedved and Ferreira Neto (2024) find no short-run substitution between sports betting and casino slot and table-game revenue in Pennsylvania, and Nedved et al. (2026) similarly find no significant short-run substitution between sports betting and lottery across an eighteen-state sample. In contrast, Humphreys (2021) finds substitution between sports betting legalization and video lottery terminal spending, and Matheson et al. (2024) finds that legalization in New York caused a modest decline in lottery sales. Can and Nichols (2024), using difference-in-differences, event study, and regression discontinuity designs, find that both sports betting and casino tax revenue decline in Missouri following sports betting legalization in neighboring Illinois. These conflicting results may reflect differences in geographic scope, time horizon, or the specific gambling products examined.

We help resolve this ambiguity by leveraging uniform administrative data on state lottery revenues from the Annual Survey of State and Local Government Finances across a near-national sample over more than a decade. This scope allows us to estimate substitution effects with greater precision, across a wider range of states, and over a long enough horizon to assess whether effects persist. Consistent with Nedved et al. (2026), we find little evidence of immediate short-run substitution in the first years of operation. However, after that we see significant declines in lottery

revenue. These results suggest that promised fiscal gains from sports betting legalization largely fail to materialize once lottery cannibalization is accounted for, undermining what is often the central justification for legalizing an activity that may carry real social costs.

This paper proceeds as follows. Section 2 describes data sources. Section 3 outlines the empirical strategy and presents the main results, while Section 4 presents key robustness checks including event-study results using several modern estimators that are robust to staggered treatment timing. Section 5 concludes.

2 Data and Background

This section describes the timeline of sports betting legalization and the data we use to estimate the effects of sports betting on lottery revenue.

2.1 A Brief Timeline of Sports Betting Legalization

In May of 2018, the Supreme Court of the United States agreed with the plaintiff, the state of New Jersey, that the Professional and Amateur Sports Protection Act (PASPA) was unconstitutional.[3] Previously, this piece of legislation had, among other things, prohibited the placement of wagers on single-game sports outcomes outside the state of Nevada. After the Supreme Court struck down PASPA, Delaware became the first state outside Nevada to legalize single-game sports betting, beginning operations in June 2018.[4] New Jersey followed two months later, launching online single-game sports betting in August 2018.[5] Five additional states began offering sports betting before the end of 2018 and, as of mid-2026, thirty-nine states and the District of Columbia offered some form of online sports betting.

[3] https://www.businessinsider.com/supreme-court-sports-betting-decision-what-it-means-2018-5

[4] https://www.si.com/extra-mustard/2018/06/05/delaware-governor-john-carney-makes-first-legal-sports-bet-phillies-cubs

[5] https://www.legalsportsreport.com/sports-betting-states/new-jersey/

Figure 1 illustrates the geographic variation in sports betting legalization across our sample period. Our analysis spans 2012 through 2023, the most recent year for which all states have reported lottery revenue. As the figure shows, early adopters, late adopters, and never adopters are geographically dispersed, providing identifying variation across regions. We exclude states that did not operate a state lottery for the entirety of our sample (Alabama, Alaska, Hawaii, Mississippi, Utah, and Wyoming) and states that offered sports gambling prior to 2012 (Nevada and Delaware).[6] Our final sample consists of 504 state-year observations across 42 states.

2.2 Data

Our main outcome is net lottery revenue, drawn from the Annual Survey of State and Local Government Finances collected by the U.S. Census Bureau. Reported at the state level, these data track total lottery revenue, prizes paid, and administrative costs for each fiscal year.[7] Because our primary interest is in lottery revenue available for state use, we define net lottery revenue as total lottery revenue minus prizes and administrative expenses.[8] To account for substantial cross-state heterogeneity in lottery spending, our baseline specification uses the natural log of net lottery revenue as the dependent variable. Finally, to account for changes over time in the population eligible to gamble, we use annual estimates of the population age 18 and older from the U.S. Bureau of Economic Analysis.

We track sports betting revenue from LegalSportsReport (LSR), a website that covers legislative battles to legalize sports gambling across the US. LSR tracks sports gambling totals from state gaming commissions and other sources. We use their data as of April 2024, which covers the time period from when states legalized sports gaming up until the end of 2023.

Across states, consistently available metrics in the sports betting data are handle (the amount

[6] Under a grandfathered exemption in PASPA, Delaware offered parlay betting on National Football League games prior to 2018. This sports betting was branded as a "Sports Lottery", and was operated by the Delaware State Lottery.

[7] Fiscal years begin in July of the previous year and end in June of the numerated year. For example, the 2023 fiscal year begins in July of 2022 and ends in June of 2023.

[8] Results are similar when using lottery revenue net of prizes only.

consumers spend), revenue (handle - prizes paid out), and the state taxes paid by operators. Taxes are typically paid as a fraction of revenue and vary widely in the US, from a high of 51 percent in New York, New Hampshire, and Rhode Island to a low of 6.75 percent in Nevada.

Since taxes are paid on revenue after consumer prizes and promotional credits are paid out, the effective tax rate as a function of consumer spend also depends on promotional activities and competitive pressures across gambling operators. When a state first legalizes gambling, it is common for operators to heavily discount their product to consumers by offering odds boosts and "free bets." Moreover, different bet types have different profit margins for operators, and betting preferences differ across states and times of the year. To account for these important sources of variation in tax receipt, we use the actual taxes paid to the state by sports gambling operators, also reported by LSR.

2.3 Descriptive Evidence

Figure 2 shows the evolution of per-capita spending on state lottery and sports betting across time, with lottery spending stratified by states that do versus do not offer legal sports betting by the end of 2023. The sports betting adopting states have consistently higher levels of per-capita spending on lottery throughout the period. However, prior to the initial wave of legal sports betting in 2018, per-capita lottery spending trended very similarly in both sets of states. Following the initial legalization in 2018, the trends diverge and the gap in spending shrinks, revealing a relative decrease in lottery revenue among legalization states. The gap shrinks more prominently after 2020, as legal sports betting began in additional states. This spending pattern provides suggestive evidence that there may be some degree of substitution between sports betting and lottery.

3 Empirical strategy and results

3.1 Methodology

We estimate a difference-in-differences model to measure the effect of operational sports gambling on our key outcomes:

$$Y_{st} = \alpha + \beta \cdot D_{st} + \gamma \cdot X_{st} + \delta_s + \lambda_t + \varepsilon_{st} \tag{1}$$

where Y_{st} is the outcome for state s in year t. Our key treatment variable, D_{st}, equals the share of months in year t during which sports gambling was operational in state s. Because some states began operating sports gambling partway through a fiscal year, we do not treat each state-year as either fully treated or fully untreated; instead, D_{st} measures partial-year exposure on a continuous scale. By construction, $D_{st} = 0$ in years before sports gambling became operational in a state and $D_{st} = 1$ in years after, while in the first operational year D_{st} equals the fraction of the year during which sports gambling was operational. For example, if a state began operations at the start of the fourth month, nine of the twelve months would be treated, so $D_{st} = 0.75$. This specification avoids attributing a full year of exposure to states that began operating only partway through a year, and it allows β to be interpreted as the effect of a full year of operational sports gambling.[9] We also control for both state (δ_s) and year (λ_t) fixed effects. In some models, we additionally control for time-varying, state-level characteristics (X_{st}). We cluster standard errors at the state level.

To explore dynamic treatment patterns and examine pre-period trends, we estimate event-study versions of Equation 1:

$$Y_{st} = \alpha + \sum_{k=-K, k\neq -1}^{L} \beta_k \cdot \mathbb{1}(t - E_s = k) + \gamma \cdot X_{st} + \delta_s + \lambda_t + \varepsilon_{st} \tag{2}$$

where E_s denotes the first year in which sports gambling was operational in state s, and $\mathbb{1}(t -$

[9] Results are similar, though slightly attenuated, if we instead define treatment as a binary indicator equal to one in any state-year in which sports gambling was operational for any portion of the year.

$E_s = k)$ is an indicator equal to 1 when year t falls exactly k years from that operational onset, and 0 otherwise. Because relative time must be measured in whole years, we treat a state's first operational year as event year $k = 0$ whenever sports gambling was operational during any part of it; this coding choice likely attenuates the estimated effect at $k = 0$, since several states were operational for only part of their first year. We omit the indicator for $k = -1$, so all coefficients are measured relative to the year immediately preceding operation. The coefficients β_k for $k < -1$ test for differential pre-trends, while those for $k \geq 0$ capture the dynamic effects of sports gambling operations. All other variables are defined as in Equation 1.

Our identification relies on the standard parallel trends assumption: in the absence of sports betting legalization, lottery revenues in states that legalized would have followed the same trends as those that did not. This assumption is not directly testable, but we assess its plausibility by examining pre-period trends in the event study estimates from Equation 2. Even with flat pre-trends, a potential concern is that some contemporaneous policy change, coinciding with legalization but independent of sports betting, could explain part of our results. For instance, if states that legalized sports betting simultaneously altered their lottery regulations, this could confound our estimates. We address this concern through a leave-one-out analysis in Section 4, which assesses the sensitivity of our results to the inclusion of any individual state. We also estimate models with a vector of state-specific, time-varying controls for other gambling modalities that were legalized in some states during this period (e.g., internet lottery).

Our primary estimation approach is a standard two-way fixed effects (TWFE) model. TWFE estimates can be biased, however, when comparisons between early- and later-treated units carry sufficient weight and treatment effects are heterogeneous across units or over time (Goodman-Bacon, 2021; De Chaisemartin and D'Haultfœuille, 2020). To assess whether this bias affects our results, we implement several alternative estimators that restrict comparisons to clean treatment-control pairs, replacing Equation 2 with estimators robust to this form of heterogeneity. We discuss these robustness checks in Section 4.

3.2 Results

Table 1 presents our difference-in-differences estimates of the effect of sports betting legalization on net lottery revenue. All specifications include state and year fixed effects. The baseline estimate in column 1 implies that the presence of a legal sports betting market reduces net lottery revenue by approximately 13%. To account for any shifts in the population of eligible bettors within a state, in column 2 we control for the natural log of the population 18 or older. Estimates shrink slightly, and suggest a 10% reduction in net lottery revenue.

To address other changes with the legal gaming environment that occurred during this time period, in column 3, we include indicators for the presence of other forms of newly legalized online gambling. The first measure, "Legalized iLottery", indicates whether a state offers digital versions of traditional lottery games. By offering another platform for purchasing lottery tickets beyond the conventional brick and mortar stores, state lotteries hoped to increase lottery sales. As expected, the coefficient on iLottery is positive, though relatively small and statistically insignificant. Another set of states have legalized iGaming, conventional casino games offered over the internet. iGaming potentially creates yet another substitute for lottery participants, and could further cannibalize lottery sales. The inclusion of both controls leave results largely unchanged. After accounting for the state gambling landscape and the eligible gambling population within the state, an active legal sports betting market is associated with a 10% reduction in net lottery revenue, statistically significant at the 5% level.

While adoption of sports gambling led to a decline in state lottery revenue, it also generated a new source of state revenue–sports gambling taxes. In columns 4-6, we explore the impact of an active legal sports betting market on the combined state revenue from both the lottery and sports betting. The key dependent variable in columns 4 through 6 is the natural log of the sum of net lottery revenue and state tax revenue from sports gambling. On average, legalization of sports gambling causes a reduction of 5–8% in total revenue from these sources, though statistical significance is not robust across specifications. While we cannot rule out zero net effect, the

boundary of the 95% confidence interval allows us to rule out increases in joint revenue larger than a modest 3.4%.

Figure 3 traces how $100 wagered on the lottery or on sports betting is allocated, clarifying why even modest substitution between the two could meaningfully reduce state revenue. Of every $100 spent on the lottery, roughly $65 is returned to participants as prizes, leaving the state as the residual claimant on the remaining $35. About $4.50 of this covers administrative costs, while the remaining $30 flows directly to the state. The structure of sports betting is quite different. Over $91 of every $100 wagered is returned to bettors as winnings, leaving less than $9 as the operator's net revenue — commonly referred to as the "take." States then tax this take at rates ranging from 6.75% to 51%. The result is that states collect just $0.50 to $4.50 per $100 wagered on sports betting ($1.59 on average in our sample), compared with more than $30 per $100 wagered on the lottery. This stark difference in fiscal yield means that substitution from the lottery to sports betting is not revenue-neutral — a dollar-for-dollar shift in consumer spending implies a substantial loss in state revenue.

3.3 Event study results

Figure 4 traces the dynamic effects of legal sports betting on our two key outcomes, presenting estimates from Equation 2. We plot coefficients from eight years prior to the operation of legal sports betting through five years after, omitting the year immediately preceding legal sports betting being available as the baseline. Both panels show results from the fully specified model, which includes state and year fixed effects, the log of the adult population, and indicators for iLottery and iGaming legalization.[10]

Panel (a) of Figure 4 presents the estimated dynamic effects of legal sports betting operation on net lottery revenue. Pre-treatment trends are reassuringly flat in the years leading up to operation, supporting the parallel trends assumption. Following operation, net lottery revenue declines

[10]Results excluding the additional controls are quite similar and are available upon request.

markedly and the effect grows over time, consistent with the gradual expansion of sports betting volume in the years after a market opens. Because sports betting legalization is a recent phenomenon, relatively few states contribute observations to the later post-treatment periods, resulting in wider standard errors for those estimates.[11] Nevertheless, the pattern suggests that the 10% average decline we estimate in our baseline specifications likely understates the long-run impact of legalization.

Panel (b) of Figure 4 presents the estimated dynamic effects of legal sports betting operation on combined net lottery and sports betting tax revenue. Pre-treatment trends are again flat, consistent with the parallel trends assumption. Following operation, combined revenue is approximately flat for the first three years, suggesting that sports betting largely displaces rather than supplements existing state gambling revenue. The point estimates turn increasingly negative in later post-treatment years, and while we typically cannot rule out zero effects, the trajectory is consistent with a growing net fiscal loss — reinforcing the conclusion that legal sports betting operation does not meaningfully expand the state's overall gambling revenue base.

4 Robustness

To address concerns around differences-in-differences with staggered treatment adoption, Figure A1 presents event-study estimates using several alternative estimators. The alternative estimators differ mainly in how they construct valid comparisons under staggered adoption. Callaway and Sant'Anna estimate group-time treatment effects and then aggregate them across cohorts and event times (Callaway and Sant'Anna, 2021). The Borusyak, Jaravel, and Spiess imputation estimator estimates untreated potential outcomes and uses them to impute counterfactual outcomes for treated observations (Borusyak et al., 2024). Local-projections DID estimates dynamic effects through

[11] The five-year post-treatment coefficient is identified by a single treated state (New Jersey), whereas the four-year post-treatment coefficient is identified by seven treated states: Arkansas, New Jersey, New Mexico, New York, Pennsylvania, Rhode Island, and West Virginia.

horizon-specific DID regressions (Dube et al., 2025), while stacked DID forms cohort-specific event-study samples so that treated cohorts are compared to appropriate untreated or not-yet-treated units within a common event-time window (Wing et al., 2024). Across these approaches, the estimates are slightly less precise, but broadly similar to the primary specification, suggesting lost lottery revenue is not offset by increases in sports gambling tax revenue.

Given our point estimates are the average across states that vary in population, tax structure, and political leanings, it is possible that only a few outlier states' outcomes drive our overall results. To assess the influence of outliers, we perform a jackknife estimation in which we re-run the difference-in-difference estimates in Equation 1 dropping one state at a time from our analysis sample. Figure A2 shows the point estimates and 95% confidence intervals associated with each dropped state. The blue line shows the full sample point estimate with the blue shading showing the 95% confidence interval. Across the leave-one-out runs, the results are largely unchanged and remain significant at the 5% level.

One potential concern about our analysis is that the precise dates on which sports betting became available vary in ways that are difficult to pin down. Legalization dates and operational start dates often differ, and the first day of operation may vary further between online and in-person wagering. In constructing our treatment dates, we sought to identify the earliest date on which sports betting was available to state residents through any platform. To assess the sensitivity of our findings to alternative dating conventions, Table A.1 reports results using the treatment dates defined in Baker et al. (2024). Across all specifications, the estimated impacts fall within one percentage point of our baseline estimates.

5 Conclusion

This paper shows that legal sports gambling operation has important fiscal consequences beyond the revenue directly collected from sports betting taxes. Using the staggered rollout of legal sports

gambling across states, we find that net lottery revenue falls after operation. This decline is robust across alternative specifications, controls for related online gambling policies and population, and a range of estimators designed for staggered treatment adoption. The result suggests that sports betting substitutes for lottery purchases.

This substitution is fiscally important because sports-betting tax receipts do not clearly offset the lottery losses. When we combine net lottery revenue with sports-betting tax revenue, the estimates are generally null in the short run and arguably negative within five years. Thus, sports gambling appears to have neutral to negative consequences for state public revenue in the medium term. These findings run counter to a common policy argument for legalization. While legal sports betting may have other benefits, including consumer access to regulated markets and the displacement of illegal betting, the evidence does not support the view that legalization reliably expands state revenue in the short to medium run.

More broadly, the results highlight the importance of accounting for substitution across government revenue sources. Policies that create new taxable markets can still reduce public revenue when they draw spending away from existing, higher-yield sources. For states considering sports gambling legalization or revisions to gambling tax policy, the relevant fiscal question is not how much revenue sports betting generates in isolation, but whether total public revenue increases after accounting for cannibalization of lottery products and other gambling markets.

Declaration of generative AI and AI-assisted technologies in the manuscript preparation process: During the preparation of this work the authors used Claude AI to provide coding support and minor editorial suggestions. After using this tool, the authors reviewed and edited the content as needed, and we take full responsibility for the content of the published article.

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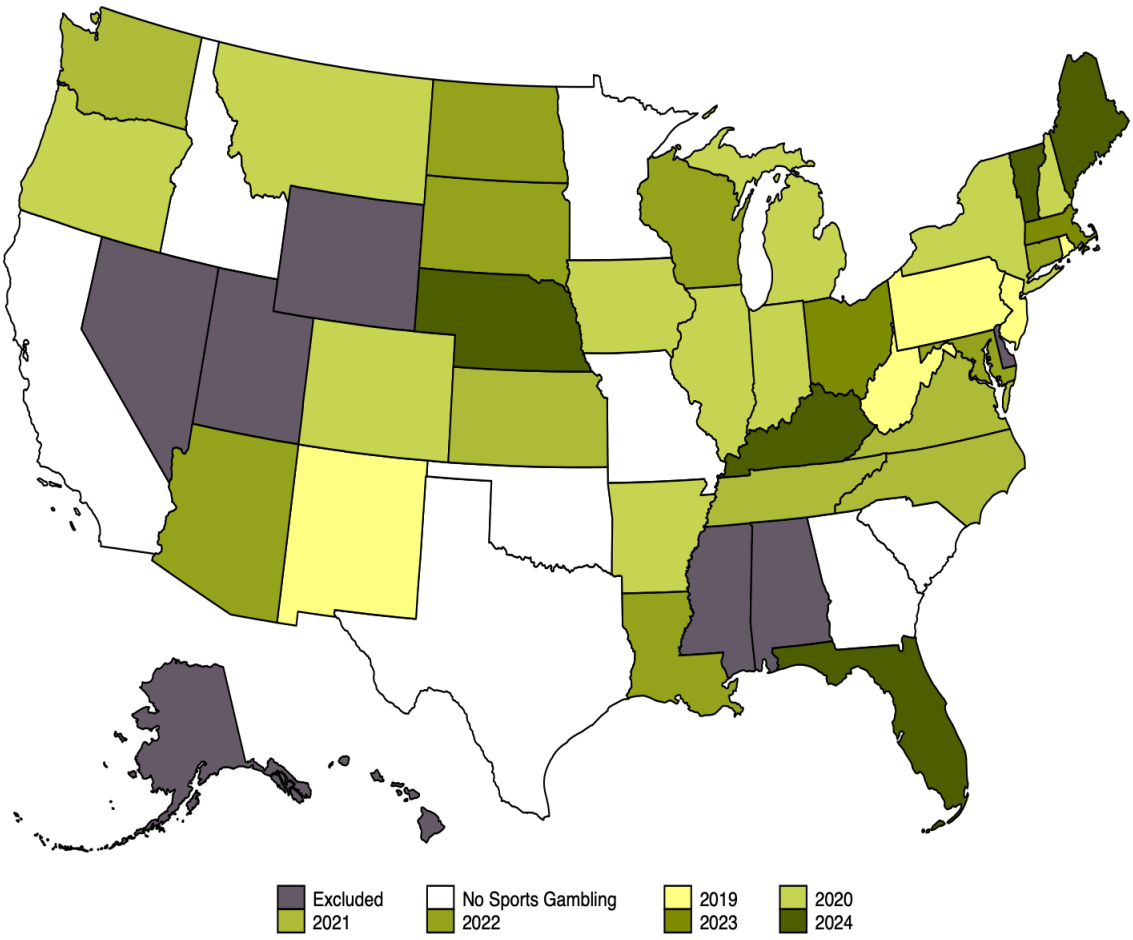
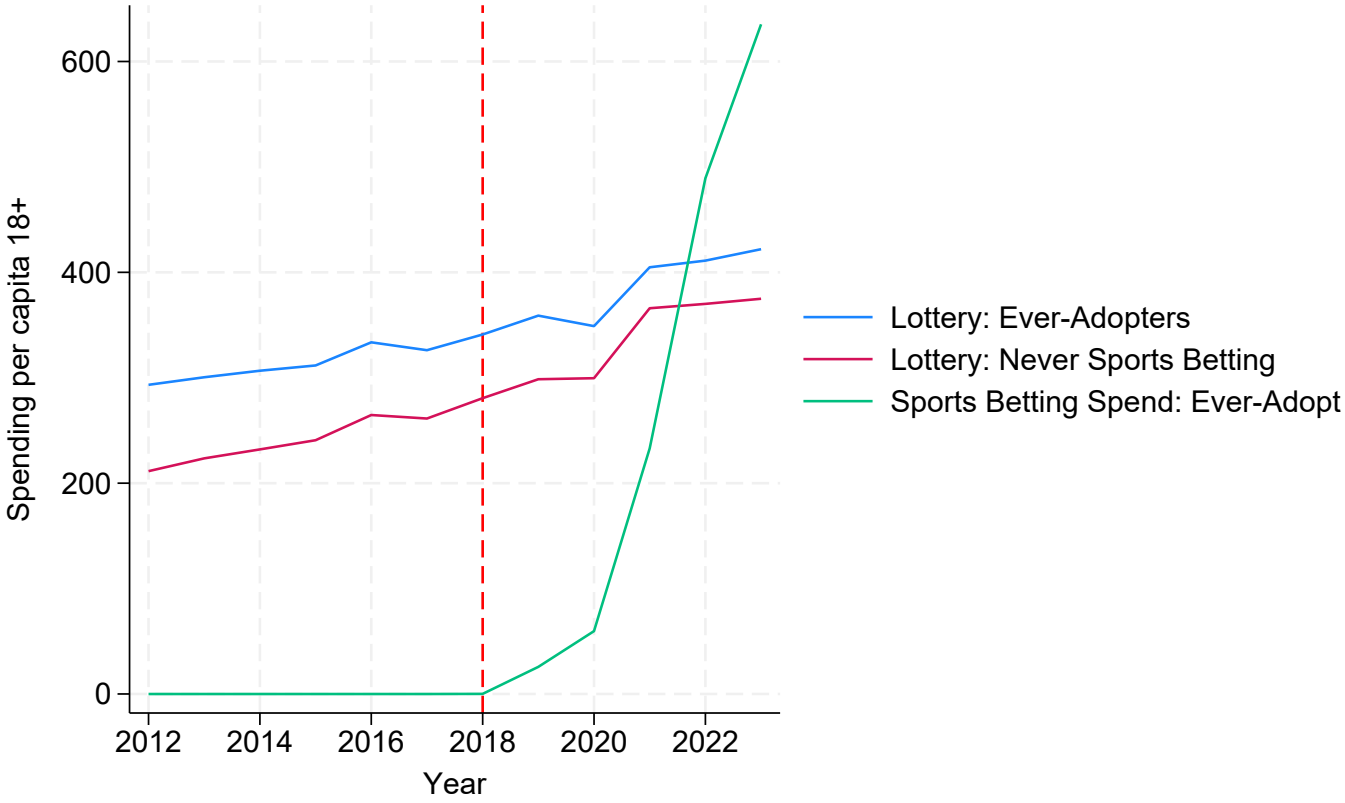
Wing, C., Freedman, S. M., and Hollingsworth, A. (2024). Stacked difference-in-differences. Working Paper 32054, National Bureau of Economic Research.

Figure 1: Timing of Sports Betting Operation



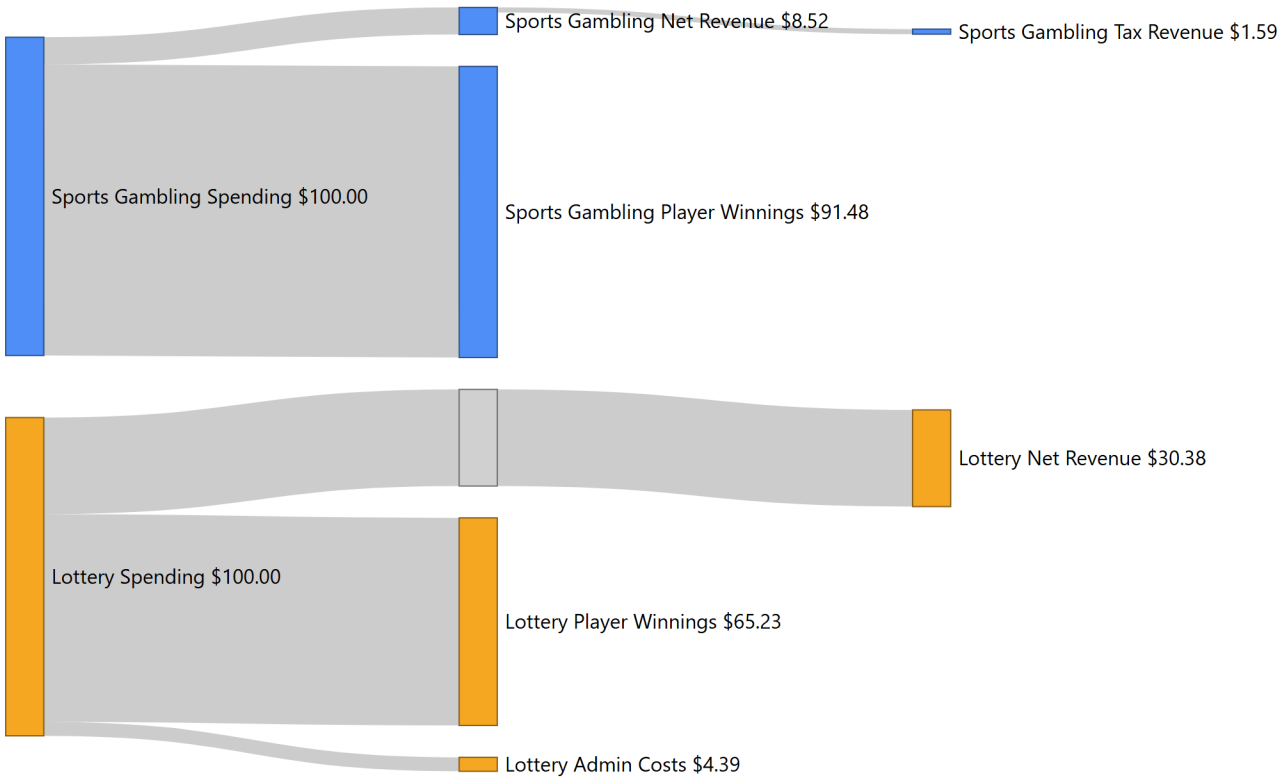
Notes: Excluded states either did not operate a state lottery for the entirety of our sample (Alabama, Alaska, Hawaii, Mississippi, Utah, and Wyoming) or offered sports gambling prior to 2012 (Nevada and Delaware). Delaware offered parlay betting on National Football League games under a grandfathered exemption to PASPA. Because our lottery revenue data end in 2023, the latest adopters — Florida, Kentucky, Maine, Nebraska, and Vermont — legalized sports gambling after our sample period closes and are therefore included in the never-treated group.

Figure 2: Per-Capita Gambling Spending by Sports Betting Operation Status



Notes: Figure presents average annual spending per capita 18+. Never sports betting states consist of states that had not legalized by the end of 2023: CA, FL, GA, ID, KY, ME, MN, MO, NE, OK, SC, TX, and VT.

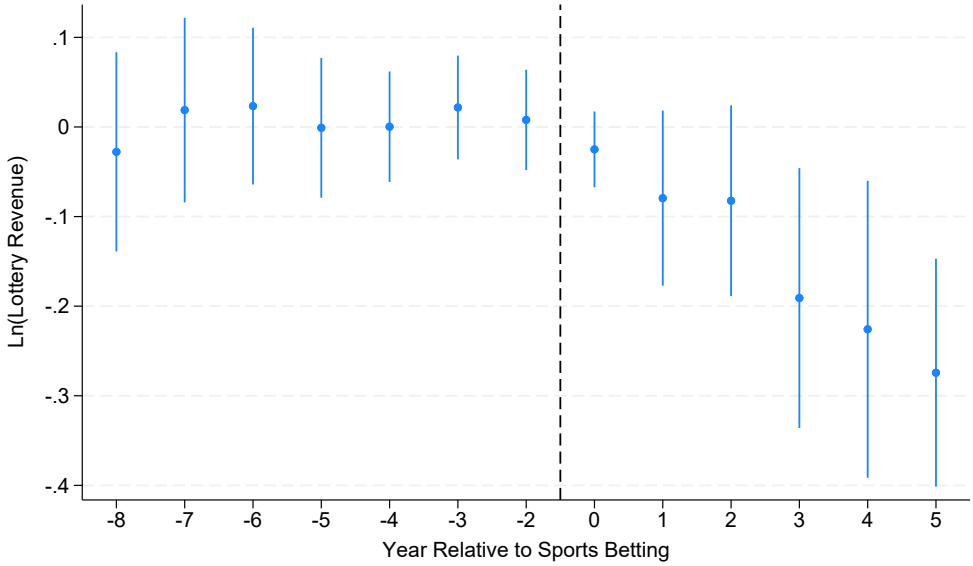
Figure 3: Flow of Funds Comparison between Sports and Lottery Spending



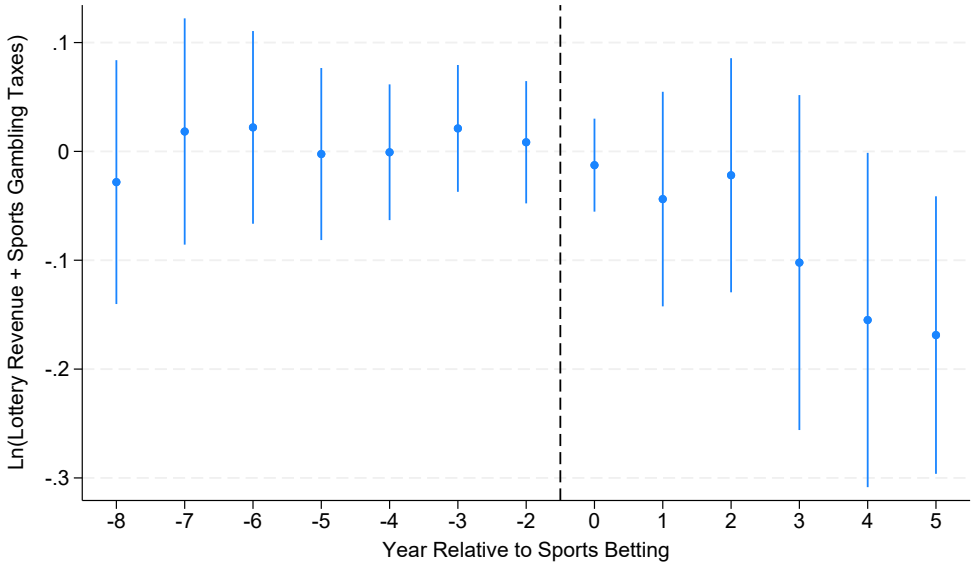
Notes: Figure shows the average flow of funds for states in our sample following a hypothetical consumer spend of $100 on either sports gambling or lottery.

Figure 4: Event-Study Impacts of Sports Gambling Activation

(a) Outcome of Ln(Net Lottery Revenue)



(b) Outcome of Ln(Net Lottery Revenue + Sports Betting Tax Revenue)



Notes: This figure shows our coefficient estimates from the event-study described in equation 2. Panel (a) uses a dependent variable of the natural log of state lottery net revenue, defined as ticket sales less prizes and administrative expenses. Panel (b) uses the natural log of (net lottery revenue + sports betting tax revenue). Both panels include state and year fixed effects, and controls for the logged population over 18 and whether the state had legalized online lottery and gaming operations.

Table 1: Regression Results for Lottery and Combined Revenues

VARIABLES	(1)	(2)	(3)	(4)	(5)	(6)
	Ln(Net Lottery Rev)			Ln(Combined Rev)		
Active Legal Sports Betting	-0.131***	-0.100**	-0.100**	-0.0846*	-0.0551	-0.0552
	(0.0419)	(0.0432)	(0.0449)	(0.0431)	(0.0439)	(0.0455)
Legalized iLottery			0.0266			0.0420
			(0.0629)			(0.0677)
Legalized iGaming			-0.0264			-0.0378
			(0.0712)			(0.0715)
ln(population 18+)		1.592***	1.563***		1.562***	1.523***
		(0.507)	(0.474)		(0.528)	(0.487)
State FE	Yes	Yes	Yes	Yes	Yes	Yes
Year FE	Yes	Yes	Yes	Yes	Yes	Yes
Observations	504	504	504	504	504	504
R-squared	0.993	0.993	0.993	0.993	0.993	0.993
Dep Var Mean	12.48	12.48	12.48	12.49	12.49	12.49

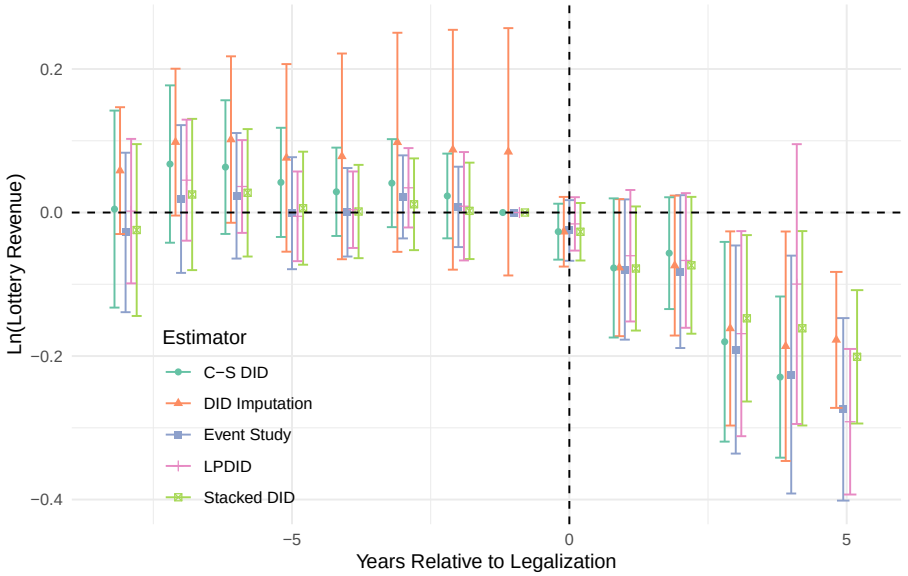
Notes: Dependent variable in columns (1)–(3) is the natural log of state lottery net revenue, defined as ticket sales less prizes and administrative expenses. Columns (4)–(6) use the natural log of (net lottery revenue + sports betting tax revenue). Sample consists of the states with legalized state lotteries prior to 2012, excluding Delaware and Nevada which allowed sports gambling prior to PASPA. Standard errors are clustered at the state level.

*** p<0.01, ** p<0.05, * p<0.1.

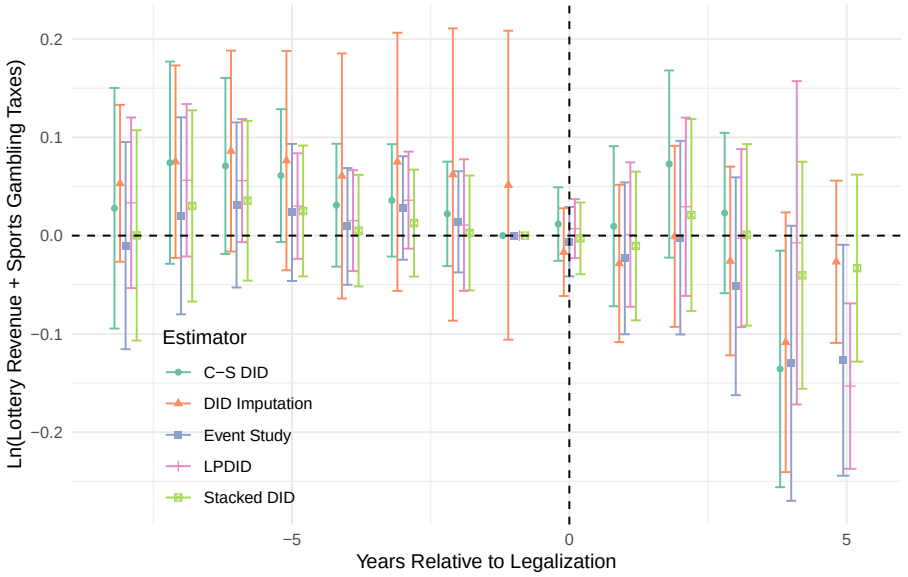
Online Appendix: Not for Publication

Figure A1: Event Study with Robust Methods

(a) Outcome of Ln(Net Lottery Revenue)

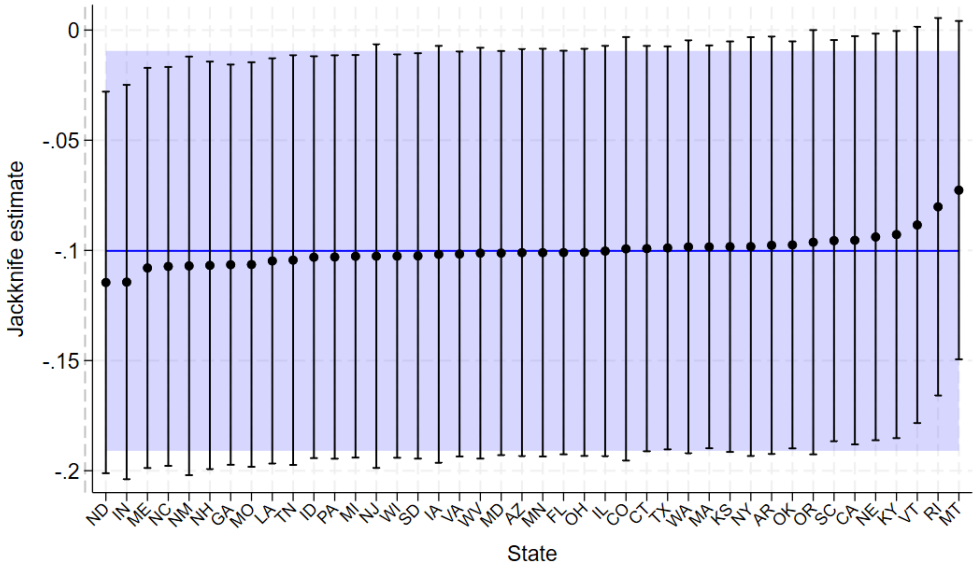


(b) Outcome of Ln(Net Lottery Revenue + Sports Betting Tax Revenue)



Notes: This figure shows event-study coefficients for a battery of methods described in section 4. Panel (a) uses a dependent variable of the natural log of state lottery net revenue, defined as ticket sales less prizes and administrative expenses. Panel (b) uses the natural log of (net lottery revenue + sports betting tax revenue). Both panels include state and year fixed effects, and controls for the logged population over 18 and whether the state had legalized online lottery and gaming operations.

Figure A2: Jackknife estimates of the effect of sports gambling activation on Ln(Lottery Revenue)



Notes: This figure shows jackknife estimates of equation 1 when dropping one state at a time from the analysis sample. The y-axis shows the point estimate and 95% confidence interval when dropping the associated state shown on the x-axis. The blue line and shaded area shows the full sample point estimate and 95% confidence interval also shown in the column (3) of Table 1. All specifications further control for the logged population over 18 and whether the state had legalized online lottery and gaming operations.

Table A.1: Robustness to Baker et al. Treatment Timing

VARIABLES	(1)	(2)	(3)	(4)	(5)	(6)
	Ln(Net Lottery Rev)			Ln(Combined Rev)		
Legal Sports Betting	-0.131***	-0.102**	-0.102**	-0.0845*	-0.0560	-0.0566
(Baker et al.)	(0.0420)	(0.0435)	(0.0446)	(0.0430)	(0.0439)	(0.0449)
Legalized iLottery			0.0282			0.0429
			(0.0621)			(0.0669)
Legalized iGaming			-0.0259			-0.0373
			(0.0713)			(0.0715)
ln(population 18+)		1.601***	1.573***		1.566***	1.528***
		(0.511)	(0.478)		(0.530)	(0.490)
State FE	Yes	Yes	Yes	Yes	Yes	Yes
Year FE	Yes	Yes	Yes	Yes	Yes	Yes
Observations	504	504	504	504	504	504
R-squared	0.993	0.993	0.993	0.993	0.993	0.993
Dep Var Mean	12.48	12.48	12.48	12.49	12.49	12.49

Notes: Replicates analysis from Table 1 using the timing of legalization according to Baker et al. (2024). Dependent variable in columns (1)–(3) is the natural log of state lottery net revenue, defined as ticket sales less prizes and administrative expenses. Columns (4)–(6) use the natural log of (net lottery revenue + sports betting tax revenue). Sample consists of the states with legalized state lotteries prior to 2012, excluding Delaware and Nevada which allowed sports gambling prior to PASPA. Standard errors are clustered at the state level.
*** p<0.01, ** p<0.05, * p<0.1.