The Economic Effects of Greyhound Racing in West Virginia

This study examines the economic effects of greyhound racing in West Virginia, with careful attention paid to both its direct footprint and its wider economic linkages to local communities, state finances, and associated industries.

February 23, 2026

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Note: The views expressed in this publication are solely those of the author, and do not represent those of funders, associations, any entity of Ball State University, or its governing body.

Executive Summary

This study examines the economic and fiscal effects of greyhound racing in West Virginia, the last U.S. state to maintain live greyhound tracks. Historically, the industry grew rapidly during the 20th century, peaking mid-century before a long-term decline due to animal welfare concerns, changing public tastes, and competition from casinos and lotteries. Unlike other states, West Virginia sustains greyhound racing through statutory subsidies drawn from casino gaming revenues, primarily via transfers from video lottery and racino revenues into purse accounts and the Greyhound Breeding Development Fund. These subsidies, totaling roughly $15 million to $22 million annually, account for 95% to 97% of total purse payments, highlighting that the industry's continued operation is almost entirely dependent on public support rather than market demand.

This study uses both historical economic literature and modern empirical methods, including difference-in-differences (DiD) and event study approaches, to estimate the local economic impact of greyhound racing. Results show modest, transient employment gains of approximately 0.38% in counties hosting racing, peaking two to three years post-adoption before dissipating. Pre-treatment trend analysis indicates that these counties were already on stronger economic trajectories, suggesting the measured effects are temporary bursts rather than sustainable growth. Input-output models confirm that the sector's direct economic impact is roughly $17.5 million, barely exceeding the subsidies provided, with minimal tax revenue generated relative to public spending.

Overall, the evidence indicates that greyhound racing in West Virginia provides limited economic benefit, primarily sustaining a narrow set of low-wage jobs without producing long-term employment, income, or GDP gains. Fiscal analysis reinforces that public subsidies are essential to its survival, meaning the industry functions more as a legacy-supported activity than a viable economic development strategy. Policymakers are thus advised to weigh the opportunity costs of continued support against alternative uses of public funds, as the industry's broader economic contribution remains minimal and increasingly tenuous.

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Introduction

Greyhound racing has undergone a dramatic national contraction over the past several decades, leaving West Virginia as the final stronghold of the industry in the United States. Once promoted as a major tourism attraction and revenue generator, the industry has faced sustained declines in attendance, wagering, and public support. Yet in West Virginia, greyhound racing persists due to a unique institutional structure in which casino gaming revenues directly subsidize greyhound race purses, creating an economic and political environment distinct from that of other states. As policymakers continue to debate whether these subsidies produce meaningful economic benefits or merely sustain an otherwise nonviable industry, a clear and empirically grounded assessment of greyhound racing's economic role is increasingly important.

This study examines the economic effects of greyhound racing in West Virginia, with careful attention paid to both its direct footprint — employment, purse payments, and track operations — and its wider economic linkages to local communities, state finances, and associated industries. The persistence of racing in West Virginia raises fundamental questions about public investment, sectoral decline, and the challenges of evaluating state-supported legacy industries in rural and post-industrial regions.

At a time when many states have transitioned away from greyhound racing, West Virginia's experience offers a rare opportunity to evaluate the economic implications of maintaining an industry that continues largely because of statutory subsidies rather than market demand. By situating greyhound racing within broader debates about economic development, gaming policy, and economic impact measurement, this study contributes to a more nuanced understanding of how legacy industries survive, and what their survival means for the communities that host them.

To perform this study, we offer a brief review of the research on greyhound racing's economic impact. This is followed by an explanation of the two differing methods of measuring economic impacts and their relative strengths and weaknesses. Here we emphasize the importance of using more modern 'causal' estimates of racing impact to fully understand the effect of racing on state and local economies. That is followed by our own causal estimates using two modern methods of analysis. Once we have provided these estimates, we outline the transmission or pathway of economic effects of greyhound racing that we report, and the nuanced fiscal effects of greyhound racing in the state. That is followed by a summary and conclusion. We begin this explanation with a review of the history of greyhound racing.

Greyhound Racing in the United States

At the dawn of the 20th century, greyhound racing in America was a rough-and-ready affair rooted in old "coursing" traditions. Dogs chased live hares — a practice that stirred controversy for its cruelty. That began to change when Owen Patrick Smith invented a mechanical "rabbit" (a moving lure) as a humane alternative to live prey. In 1919, Smith and his associates built what is now widely recognized as the first commercial greyhound racetrack in the U.S., in Emeryville, California — and on May 29, 1920, the track held its first official races.[1]

With that innovation, greyhound racing quickly expanded. By 1930, there were around 67 dog tracks across the country.[2] In 1931, for example, Florida became the first U.S. state to legalize *pari-mutuel* greyhound racing, paving the way for many other states to follow over subsequent decades.[3]

During mid-century and into the 1970s and 1980s, greyhound racing achieved widespread popularity. It was sometimes referred to — perhaps inspirationally — as the "Sport of Queens," aiming to rival horse racing in glamour and public appeal.[4] As more states legalized it, the number of operating tracks swelled. At its peak, the industry was large (more than 70 tracks), drawing bettors, punters, and spectators across the nation.[5]

By the late 20th century and especially the 2000s, greyhound racing began a steep decline. Betting revenue dropped, public sentiment shifted strongly against the practice, and many states began to reconsider, and ultimately ban, live dog racing. Advocacy groups, increased awareness of greyhound welfare issues, and competition from casinos and other forms of gambling hastened the unraveling of the industry.[6]

The decline left just one state still hosting live greyhound racing: West Virginia. In West Virginia, an older horse racing facility known as Wheeling Downs, on what's now the grounds of Wheeling Island Hotel, Casino & Racetrack, was converted to greyhound racing after the passage of a state law in 1975. Greyhound racing officially began there in 1976. A second track, Mardi Gras Casino & Resort (also known historically as Tri-State Greyhound Park), joined it. By the 2020s, these two facilities were essentially the only live-greyhound tracks left in the United States.[7]

Today, as of early 2026, West Virginia stands as the final U.S. location with live, commercial greyhound racing. However, that era may come to an end. A new federal bill has been introduced that would ban greyhound racing nationwide — potentially shuttering the last two active tracks (Knisely, 2025).

1. See *Oakland Tribune*. "Emeryville Arena Being Torn Down; Lumber Used To Build Coursing Park..." February 13, 1920, p18.
   See also Toms, David. "The Electric Hare: Greyhound Racing's Development in Ireland, 1927–58." *Irish Economic and Social History* 40, no. 1 (2013): 69-85.
2. See GREY2K USA Worldwide. "History of Greyhound Racing." Accessed December 10, 2025. https://grey2kusa.org/about/history.php
3. See Encyclopaedia Britannica. "The History of Greyhound Racing in the United States." Saving Earth. Accessed December 10, 2025. https://explore.britannica.com/explore/savingearth/the-history-of-greyhound-racing-in-the-united-states

4. Ibid. • 5. Ibid. • 6. Ibid • 7. Ibid.

Existing Research

Over the past several decades, greyhound racing has become a focal point of debate in both economic and public policy research due to its structural decline, fiscal performance, and relevance to state budgeting. The sources considered here illustrate a multifaceted picture in which greyhound racing's economic contribution has weakened precipitously, fiscal benefits have eroded, and statewide impacts vary substantially depending on prevailing market conditions and policy contexts.

A central academic contribution to understanding the economic dynamics of greyhound racing came from Ray (2001). This work employed econometric analysis using regression models to identify factors influencing greyhound racing handle (the total legal wagers on races, including both live and off-track/intertrack betting). The study investigated data from multiple racing states across the 1990s and applied statistical estimation to variables affecting handle levels. The results showed that higher takeout rates (the percentage of wagers retained by the track) were associated with reduced handle, while a greater number of races and higher purses correlated with increased betting. An important finding of her work was that the presence of casino gambling and horse racing significantly reduced greyhound racing handle, indicating substitution effects among gambling sectors. Other socioeconomic factors, such as lottery availability, also reduced greyhound wagering, suggesting that bettors viewed alternative gambling options as substitutes for greyhound racing. By isolating these determinants through an econometric framework, Ray demonstrated that greyhound racing's decline was linked not just to cultural shifts but to measurable economic competition within the gambling landscape.

Complementing these econometric insights, policy-oriented accounts such as testimony before the 2019 Kansas Legislature provided a broader picture of industry trends and claimed economic effects at the state level. This testimony — *The Economic Impact of the Kansas Greyhound Industry* — outlined an input-output model to project potential economic contributions if live racing were restored in Kansas. The testimony used input-output analysis to estimate multipliers for employment, income, and tax revenue, tracing how direct spending by racetracks (i.e., labor and services) would ripple through supplier industries and consumer spending. These input-output projections suggested that resurgence of live racing could generate net-new total employment on the order of 2,450 to 3,300 jobs statewide and substantial wage income ($98 million to $132 million), including indirect and induced effects through associated industries. Survey data from Kansas greyhound farms supplemented this model, indicating that annual expenditures by greyhound operations constituted a base of economic activity that could expand with restored racing (Kansas Legislature, 2019).

The contrasting methodologies between the econometric analysis (Ray, 2001) and the input-output projections (Kansas Legislature, 2019) highlight important differences in how economic impact is conceptualized. Ray's econometric approach seeks to explain historical patterns of wagering behavior and draws on cross-state data to statistically infer causal relationships among gambling sectors. This method underscores substitution effects and broader competitive dynamics that have depressed greyhound handle. In contrast, input-output modeling assumes that increased industry activity linearly influences other sectors via established spending linkages; such models are sensitive to underlying assumptions about net new activity and often do not account for opportunity costs (i.e., whether dollars spent on racing would instead circulate in other local sectors). Critics of racetrack economic impact reports frequently argue that without isolating net economic gains from spending that merely reallocates existing expenditures (e.g., consumers shifting entertainment spending from one activity to another), input-output figures may overstate benefits.

Simply put, the literature on greyhound racing's economic and fiscal effects reveals a sport in structural decline. Econometric evidence identifies significant substitution away from greyhound betting toward other gambling options; input-output projections offer scenario-based assessments of potential, but not guaranteed, economic activity; and advocacy group analyses emphasize falling tax receipts and weak fiscal outcomes in contemporary contexts. The variation in methodologies and outcomes underscores that while greyhound racing once contributed meaningfully to regional gambling economies, its current economic and fiscal impact is limited and is increasingly scrutinized by policymakers.

Greyhound Racing in West Virginia

Bowen, Deskins, Christiadi and Augustine (2014) examined the economic role of greyhound racing within West Virginia, focusing on its contribution to business activity, employment, and public revenue. While the racing industry as a whole — combining thoroughbred horse and greyhound racing — was estimated to generate more than $300 million in total economic activity, the portion attributable specifically to greyhound racing was relatively modest. Greyhound racing was found to account for roughly $30 million in direct and indirect economic output, a small share of the racing industry's overall footprint in the state.

In terms of employment, the study estimated that greyhound racing supported approximately 1,700 jobs statewide, including positions related to track operations, kennel management, training, and ancillary services. Payroll associated with these jobs totaled a little over $30 million. Although these figures suggest that the industry provides employment opportunities, the study emphasized that job creation and wage support are closely tied to public policy choices rather than market demand. We discuss this at greater length in the fiscal section of this study.

A central finding of the study was the continued decline in live greyhound racing activity. Attendance and on-track wagering have fallen significantly over time as consumers increasingly favor alternative forms of gambling, particularly casino gaming. While simulcast wagering from other states helped stabilize some revenue streams, it has not reversed the long-term downward trend in interest in live greyhound racing.

Perhaps the most important finding highlighted in this work is the critical role of subsidies in sustaining the industry. Grey-

hound racing purses in West Virginia are overwhelmingly funded through transfers from casino video lottery revenue, rather than from betting on live races. In many cases, more than 90 percent of purse funding originates from these subsidies, indicating that the industry would likely be financially unsustainable without continued public support. Moreover, the analysis noted that a substantial share of purse winnings is paid to owners who reside outside West Virginia, resulting in economic leakage and reducing the in-state benefits of these expenditures.

Taken together, the findings suggest that while greyhound racing continues to generate some economic activity and employment, its viability depends heavily on public subsidies amid declining consumer demand. As a result, the Bowen et al. (2019) study informed subsequent policy discussions about whether the economic returns from supporting greyhound racing justify the ongoing allocation of public resources, particularly given competing budget priorities and alternative economic development options.

Among the more important aspects of research on greyhound racing is identifying the appropriate tools for measuring economic effects. While there have been many good faith efforts to measure and report the size of the greyhound racing sector in West Virginia, none of the studies we found deployed a modern suite of statistical tools to estimate the impact.

Assessing Economic Effects

Input-Output Models

Input-output models provide a structured way to trace the flow of spending in one industry as it ripples through the broader economy. However, like all modeling, it relies on assumptions. Those employed in input-output models are simplifying assumptions that often produce upward-biased or overly optimistic impact estimates. There are several limitations that contribute to this.

The first assumption is a nearly perfectly elastic supply of inputs, primarily labor. This assumes that every job created by a proposed firm or industry will result in one new worker materializing into the study area, either through migration or movement from unemployment. This is distinctly important because most studies focus on labor market effects.

The second-most fundamental limitation is the assumption of fixed technical coefficients — that industries use inputs in fixed, unchanging proportions regardless of prices, technological change, or capacity constraints. In reality, firms substitute among inputs, adjust production techniques, and change suppliers, meaning real-world responses diverge from the rigid linkages embedded in I-O tables.

Third, I-O models assume perfectly elastic supply within a region: They treat industries as if they can expand production infinitely to meet new demand without bidding up prices or drawing resources away from other uses. This is related to the infinitely elastic supply of labor assumption, which implies that any additional demand leads to new output rather than crowding out existing activity. This is a very restrictive assumption that inflates multiplier effects. When markets for local land, labor, capital, or managerial talent are tight or when supply chains are constrained, as is common in modern regional economies, the model's projections become especially unrealistic.

Another criticism is the absence of behavioral responses. Consumers, firms, and governments do not react to policy changes or shocks in the mechanical way assumed by I-O models. The models treat spending as an external injection and ignore how taxes, price changes, risk, or policy uncertainty affect actual decision-making. They also typically omit opportunity costs, meaning the model counts the gross value of a project rather than its net value — what the economy gains relative to what must be foregone to undertake it.

I-O-based impact studies are also sensitive to import leakages and regional boundaries. Many analyses rely on outdated or poorly calibrated regional purchase coefficients, which can misstate how much spending truly stays local. When regions are small, or when industries are not locally embedded, multipliers derived from I-O frameworks tend to exaggerate the benefits because they assume more local sourcing than actually occurs.

Finally, because I-O frameworks lack price adjustments, capacity limits, and behavioral mechanisms, they often produce point estimates with an illusion of precision. The absence of uncertainty or sensitivity analysis leads to results that appear authoritative but are rarely robust. For this reason, critics argue that I-O modeling is best suited for descriptive accounting, not for causal inference or precise measurement of economic impacts.

Alternative Approaches

Recent decades have seen the economics profession develop more robust alternatives to input-output modeling. These models typically involve evaluating, *ex post*, the effects of a policy or a change in economic structure, to evaluate the effects on a local economy.

Difference-in-Differences

There are several approaches to evaluating economic effects from historical evidence. These all depend on creating a treatment and control group — people or geographies that are affected by a policy (the treatment group), and those that are not (the control group). Almost all of these models assess units (people or places) over time. So, they make comparisons between groups at every point in time, as well as comparing each group over time. This is a difference-in-difference study.

Staggered difference-in-difference (DiD) designs arise when units adopt a treatment at different points in time. Goodman-Bacon (2021) demonstrated that the Two-Way Fixed Effect DiD estimator in staggered adoption settings is a weighted average of all possible 2×2 DiDs, including comparisons where already-treated units serve as controls for later-treated units. These comparisons bias the estimated effect of a policy or economic change.

Imputation-Based Estimators and Group-Time ATTs

Borusyak, Jaravel, and Spiess (2021) proposed an alternative approach centered on imputation. Their method constructs counterfactual untreated outcomes for treated units using untreated observations and then averages the treatment effects cleanly across cohorts. This estimator naturally accommodates heterogeneous effects across groups and time.

In parallel, Callaway and Sant'Anna (2021) developed a group-time average treatment effect framework. Instead of aggregating all comparisons into a single regression, they estimate causal effects separately for each treatment cohort and time period, using only appropriate control groups (e.g., never-treated units or not-yet-treated units). The cohort-specific effects can then be aggregated with transparent weighting schemes. This approach clarified inferential procedures, allowed flexible covariate adjustment, and made explicit the assumptions behind each comparison.

Event Study

A related contribution from Sun and Abraham (2020) highlighted that event-study coefficients in TWFE models are also contaminated by the same negative-weight issues, leading to misleading dynamic treatment effect patterns. They introduced an estimator that "residualizes" the fixed-effects regression to purge comparisons involving previously treated units, enabling unbiased dynamic effect estimation in staggered designs.

Subsequent literature has refined these ideas further. De Chaisemartin and D'Haultfoeuille (2020, 2022) proposed a family of robust estimators that reweight comparison groups to ensure that only valid control units contribute to each causal contrast. Researchers have also extended staggered DiD methodology to high-dimensional settings, covariate-adjusted designs, and cases with treatment reversal or intermittent treatment.

Collectively, this body of work has transformed the modern use of staggered DiD designs. Whereas the traditional TWFE estimator obscured the underlying comparisons and often delivered biased results, the newer methods—group-time ATTs, imputation-based estimators, and corrected event-study procedures—allow researchers to explicitly handle treatment-timing heterogeneity and heterogeneous effects over time. As a result, staggered DiD analysis now centers on transparent cohort-specific identification and aggregated estimates built from valid comparisons, reflecting a major methodological shift in applied econometrics.

Methodology

Causal Estimate of Greyhound Racing Impact

To estimate the effect of greyhound racing on local employment, we employ a difference-in-differences (DiD) research design using a balanced panel of regional labor market data. The DiD framework compares the changes in employment over time in jurisdictions that host greyhound racing to otherwise similar jurisdictions that do not, examining the period before and after the presence of greyhound racing.

The analysis is conducted using 55 cross-sectional units observed over 54 years, yielding a balanced panel of 2,970 observations. This panel structure allows us to control for persistent regional characteristics as well as macroeconomic trends that affect all regions simultaneously.

The dependent variable is the natural logarithm of total employment. Modeling employment in logarithmic form allows estimated coefficients to be interpreted as approximate percentage changes, which is standard practice in applied labor and regional economics. This transformation also reduces the influence of extreme values and improves the statistical properties of the regression.

The key explanatory variable is an indicator for the presence of greyhound racing. This variable equals 1.0 in periods and locations where greyhound racing operates and zero otherwise. The coefficient on this variable captures the average change in employment associated with greyhound racing, relative to the control group, after accounting for fixed differences across regions and common time trends.

The DiD model includes fixed effects for both cross-sectional units and time periods. Regional fixed effects control for all time-invariant characteristics of each jurisdiction, such as geography, long-run industrial composition, or historical labor market conditions. Time fixed effects account for aggregate shocks that affect all regions equally, including business cycles, national policy changes, or broader economic trends.

Formally, the model estimates the relationship between employment and greyhound racing by comparing within-region changes over time, rather than differences across regions at a point in time. Standard errors are computed in a manner appropriate for panel data, ensuring valid statistical inference.

A key identifying assumption of the DiD approach is that, absent greyhound racing, employment trends in treated and control regions would have evolved similarly. We assess this assumption using a formal parallel trends test. The test statistic indicates statistically distinguishable pre-treatment trends, which suggests some divergence prior to treatment. While this finding warrants caution in interpretation, the inclusion of fixed effects and the long panel dimension mitigate some concerns by absorbing persistent differences and common shocks.

Estimated coefficients represent the average treatment effect of greyhound racing on employment. Given the logarithmic specification, the main estimate can be interpreted as a percentage change in employment associated with greyhound racing activity. Model fit statistics indicate that the specification explains a substantial share of observed employment variation, consistent with expectations for a two-way fixed effects panel model.

For a detailed explanation of both our models, see the ***Technical Appendix*** at the end of this document.

Results

We examined how legalizing greyhound racing affected local employment levels using a difference-in-differences (DiD) model with county-level data 1969–2022. The goal was to compare employment trends in counties that adopted greyhound racing with those that never did, while accounting for broader economic changes over time. To further evaluate the quality of the control and treatment groups, we conduct three DiD tests. The first is on the full sample of 55 West Virginia counties. The second two tests limit the treatment pool to 31 counties with more than 10,000 employees over the full time period and 13 counties with more than 25,000 employees. These results appear in ***Table 1***.

The DiD model in the full sample shows a modest positive association between greyhound racing and employment. After a county legalized greyhound racing, its employment growth was, on average, about 0.38% higher than would otherwise be expected. This finding is statistically significant and suggests that greyhound racing delivers a very modest economic boost to the counties in which it was introduced.

In our smaller samples of counties with more than 10,000 and 25,000 employees respectively, these results lose their statistical significance. Importantly, both the smaller samples experienced better model diagnostics. The share of the employment variance explained within the model rose from 19% to 31% and then 56%. This reflects the increasing similarity of these counties to those that host greyhound racing. One important inference of this is that the smaller samples reflect a more comparable treatment and control group, which gives us more confidence in those results.

However, additional diagnostic checks reveal that in the full sample, this estimated growth is unlikely to reflect a true causal impact of greyhound racing. Counties that legalized racing were already experiencing stronger economic growth before adoption. In the smaller samples, the differences in growth prior to the start of greyhound racing either disappeared altogether or were far less statistically certain.

Within the large sample, this means the two groups — adopting and non-adopting counties — were not on similar economic trajectories before legalization, which is a key condition for attributing later differences to the policy itself. As a result, the DiD model may be picking up broader economic growth in adopting counties rather than the effects of greyhound racing.

To better understand how differences in growth trends affect these results, we undertook a Goodman-Bacon (2021) decomposition. The Goodman–Bacon results indicate that nearly all identifying variation comes from treated-versus-never-treated comparisons, the estimate is not meaningfully affected by potentially problematic comparisons among treated units themselves.

The estimated reduction in employment associated with greyhound racing reflects differences between regions that host greyhound racing and otherwise similar regions that never do, rather than artifacts of treatment timing or internal comparisons among treated jurisdictions. These findings held across all three sample sizes.

This still leaves us with two concerns. The first is that the counties that host greyhound racing were growing at a higher rate prior to the appearance of greyhound racing, than those that did not. A second concern is that the DiD model accounts for the 'average treatment effects' in greyhound host counties over all the observed years after they were introduced.

Table 1. Estimation Results of Staggered Difference-in-Difference
Source: Calculations using data from the U.S. Bureau of Economic Analysis.

Coefficient	Full Sample	Employment > 10,000	Employment > 25,000
Greyhound Racing	0.003790** (2.14)	0.004987 (1.34)	-0.000685 (-0.20)
N (i, t)	2,915 (55, 53)	1,212 (31, 53)	505 (13, 53)
TWFE	Yes	Yes	Yes
Adjusted R2	0.19	0.31	0.56
F-Statistic	7.41***	7.65***	8.69***
Parallel Trend Statistic	-3.26***	-0.33	-2.04*

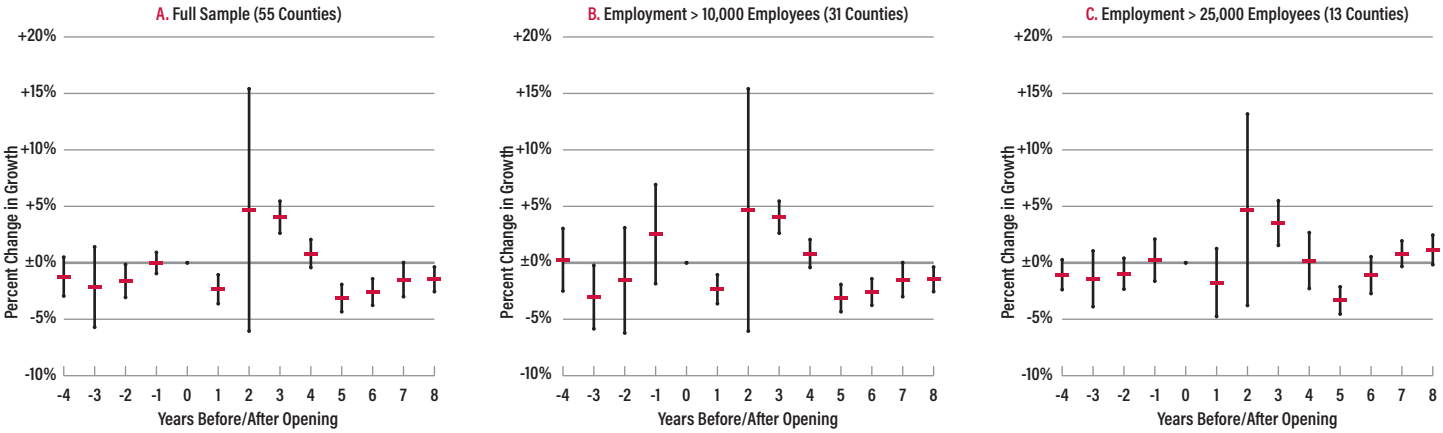
An 'event study' partially mitigates these concerns, especially in evaluating the persistence of the growth effect reported in the DiD estimates above. To do so, we estimate four years before and eight years after the opening of greyhound racing. This permits us to estimate the level of divergent growth between those counties that host greyhound racing, and those that did not. If there is meaningful divergence, as the DiD suggests, we can subtract that from the DiD estimates above.

For a detailed explanation of both our DiD and event study models, see the ***Technical Appendix*** at the end of this document.

The event study also permits us to observe any anticipatory effects, such as construction or relocation of households and businesses in advance of the opening of greyhound racing. More importantly, this event study allows us to observe the persistence of effects across time. This allows us to observe whether greyhound racing had a transient, or permanent effect, and how long that effect lasts.

To test this, we conducted an unbalanced event study, with four years of pre-treatment and eight years of post-treatment effects. The model estimates show no evidence of differential pre-treatment trends in employment. Following the opening of greyhound racing, counties experience a delayed increase in employment that peaks approximately two to three years after treatment. These gains dissipate over time, with employment returning to baseline and becoming modestly negative in later

Figure 1. Event Study of Greyhound Racing's Effect on Employment in West Virginia — A. Full Sample; B. Employment > 10,000; & C. Employment > 25,000
Source: Calculations using data from the U.S. Bureau of Economic Analysis. • Note: Corresponding tables in Appendix B.



years. The results suggest that greyhound racing generates short-run employment growth but does not produce sustained long-term labor market benefits.

See ***Figure 1***. This visual evidence is especially important given the formal parallel trends test reported earlier. It is also useful because the results are substantively identical in all three cases. The event study indicates that any pre-treatment differences are economically small and not distinguishable from zero over multiple periods. From a policy perspective, this strengthens confidence that post-treatment changes are not driven by pre-existing trends.

The interpretation of the event studies across three different control groups suggests that the effects noted in the difference-in-difference estimate are, at best, transient and small. If we focus our attention on the models with the higher levels of similarity in the treatment and control groups (i.e., the better of the experimental samples), we find no effect of greyhound racing on total employment in the counties in which it took place.

Taken together, the event study supports three key conclusions:

1. Parallel trends appear plausible: There is no meaningful evidence of differential pre-treatment employment trends.
2. Effects are delayed: Employment does not respond immediately but declines in subsequent periods.
3. Positive effects are, at best, transient and small.

For policy analysis, this pattern is consistent with the interpretation that greyhound racing is associated with modest, temporary increases in local employment.

Importantly, this strongly implies no other economic effects. Greyhound racing is a labor-intensive activity, with an unusually large share of lower-paid employees (Bowen, Deskins, Christiadi and Augustine, 2014). If there is no measurable labor market effect, there cannot be an effect on Gross Domestic Product. While we do not have county-level GDP available earlier than 2001, that is not consequential in this case. From these results, a very safe conclusion is that greyhound racing has no effect on GDP.

Discussion: Why Only Modest Effects?

A substantial body of economic research examines whether gambling activities (e.g., casinos, racetracks, and lotteries) generate net new economic activity or instead displace existing local spending. The prevailing finding in this literature is that gambling often crowds out other forms of consumption, limiting or negating its net economic benefits.

Early theoretical work emphasizes that gambling expenditures largely represent a reallocation of discretionary spending rather than an expansion of total consumption. Consumers face fixed budget constraints, so increased spending on gambling reduces expenditures on other local goods and services, including retail, dining, and entertainment (Grinols, 1995; Walker and Jackson, 2007). This substitution effect is particularly pronounced in local and regional markets, where gambling venues primarily attract residents rather than new visitors.

Empirical studies frequently find weak or negative net employment and income effects from gambling expansion. Grinols and Omorov (1996) and Grinols and Mustard (2006) show that while gambling facilities may create direct jobs, these gains are often offset by losses in competing sectors, such as restaurants and retail. Similarly, Walker (2008) finds that local income gains from gambling are modest once displacement effects are accounted for. Hicks (2009) found that 'racinos' (a combination racetrack and casino venue) resulted in modest job creation, but jobs of much lower than average county wage.

More recent work using panel data and quasi-experimental methods reinforces these conclusions. Studies employing difference-in-differences designs find little evidence that gambling increases overall employment or wages at the county or regional level, despite substantial localized investment (Hicks, 2003; Cotti, Walker, and Tefft, 2010; Humphreys and Marchand, 2013). In some cases, gambling expansion is associated with declines in non-gambling employment, suggesting crowding out rather than net growth.

The crowding-out effect may be especially strong for gambling activities that lack a strong tourism component, such as racetracks or small casinos. When gambling venues primarily serve local populations, spending is more likely to substitute away from existing local businesses rather than attract external revenue (Walker and Sobel, 2016). As a result, the economic development rationale for gambling is often weaker than anticipated by policymakers.

Overall, the literature suggests that gambling should be viewed less as a tool for economic development and more as a redistributive activity within local economies, with limited potential to generate sustained net employment growth.

Potential Fiscal Effects

The fiscal effect of any economic activity is a consequence of its size, the level and type of taxes imposed, the cost of public services supporting the activity and the subsidies received by the activity. Rarely are data on all of these clearly available, particularly estimates of government expenditures to provide public services, or in taxes paid by firms and households.

One common way to judge the fiscal effect is to model economic effects through an input-output model. Commercial I-O models, such as IMPLAN, REMI, or JobsEQ often have tax estimates included.[8] There are two important recent studies conducted on the sector using this approach.

Spectrum Gaming Group performed a study for the West Virginia Gaming Commission in 2015. They reported that direct state subsidies now account for roughly 95% of all purse payments to greyhound owners. This means that without these subsidies owners would receive almost no gaming profits and the industry would be economically unsustainable. The slate of purse money — the prize funds that go to owners and breeders — is therefore almost entirely backed by gambling revenue from other casino activity, not revenue earned directly from greyhound racing itself.

When comparing fiscal inputs (subsidies) with the broader economic output, the same study references a West Virginia University economic impact estimate that found that the greyhound racing industry contributed about $31.2 million in total direct and indirect economic activity in the state in 2012 (Bowen, Deskins, Christiadi and Augustine, 2014). That work, which is the most detailed and useful of the input-output models, reports that state subsidies for purses and development funds in 2012 totaled approximately $29 million. Again, this means the industry's total measured impact barely exceeded the tax revenues deployed into the industry through subsidies.

Importantly, the direct fiscal benefit to the state in terms of taxes is very small compared with the subsidy spending. State tax revenue generated by the broader racing industry (including greyhound racing) was estimated at around $4.6 million, but much of that comes from the larger horse racing portion of the industry rather than dog racing alone. Because greyhound racing's wagering and attendance have declined over decades, state and local revenue from live dog racing has also fallen sharply, making the subsidy dependency more pronounced relative to actual racing-linked taxes and fees (Bowen, Deskins, Christiadi and Augustine, 2014).

Bowen, Deskins, Christiadi and Augustine (2014) estimated that greyhound racing generated about $31.2 million in total annual economic impact in the state (counting direct and indirect business and employment effects), along with 350 to 450 jobs in 2012. They report that of that total, only $413,000 in state tax revenue was directly generated by the greyhound sector in 2012.

This study didn't explicitly provide the direct effects, but using the current multiplier for racetracks in West Virginia, of 1.8, the imputed 2012 direct effect of greyhound racing was roughly $17.5 million. With direct taxes of $413,000, the effective tax rate on greyhound racing in West Virginia is roughly 2.36%. The average effective tax rate on businesses in West Virginia is between 4.5% and 4.7% (Council on State Taxation, 2025).

To put this more plainly, the input-output models that have been used to estimate the fiscal effects (with their well-known likelihood of overstating economic effects) report almost no fiscal effect of greyhound racing. Applying the estimates of effects from our DiD and event studies shown above, would result in fiscal effects that are in the non-positive range (a lower bound estimate would be below zero).

In practical terms, fiscal support for greyhound racing does not pay for itself in either economic output or tax revenue; the subsidies essentially keep the industry afloat rather than generate a net positive return for the state. The bulk of the economic activity tied to greyhound racing is supported by other diverted gambling revenue, and much of the purse money awarded goes to participants who live outside West Virginia.

8. These commercial products are described in some detail on https://implan.com/, https://www.remi.com/, and https://www.chmura.com/.

Taken together, the findings suggest that greyhound racing does not function as a viable long-run economic development strategy for West Virginia.

Summary and Conclusion

Greyhound racing in West Virginia persists as a unique legacy industry, sustained not by market demand but by statutory subsidies drawn from casino gaming revenues. This study set out to assess whether that persistence is associated with measurable economic benefits, particularly employment growth, in the counties that host greyhound racing facilities. Using a long county-level panel spanning 1969 to 2022 and modern difference-in-differences techniques, the analysis provides a careful and transparent examination of the industry's economic footprint.

The core empirical finding is that counties with greyhound racing experience slightly higher employment growth than comparable counties that never adopted racing; however, these effects are modest and transient.

At the same time, the evidence suggests that these positive effects should not be interpreted as a simple causal effect of greyhound racing itself. Counties that legalized racing were already on stronger economic trajectories prior to adoption, and formal tests detect statistically meaningful differences in pre-treatment trends.

An event study suggests that the positive effects are likely due to a short burst of activity after opening that dissipates after two years, suggesting that the positive value of the DiD reflects primarily an average effect that dissipates within three years after opening. There is little evidence of anticipatory effects or abrupt employment changes at the time of adoption.

These labor market effects largely preclude the need for income or GDP estimates, for which data is limited. An earlier study of all racinos in West Virginia reports no per-worker income effects, due primarily to the low wage composition of marginal job changes (Hicks, 2009).

At the same time, fiscal effects might, in theory, constitute a positive contribution of greyhound racing to the state. The evidence of this, from Bowen, Deskins, Christiadi and Augustine (2014) and derivative work makes very clear that they are not. Almost the entire economic effects of greyhound racing are derived from subsidies. There is simply no net fiscal benefit of greyhound racing on West Virginia.

The primary subsidy comes from a statutory transfer of about 10% of gross gaming revenue from video lottery and other casino games at the state's two racinos into greyhound racing purse accounts and the Greyhound Breeding Development Fund. These are mandated transfers passed through the West Virginia Lottery to support racing payouts.

In recent years, this has resulted in roughly $15 million to $22 million annually in subsidies for greyhound racing purses and breeder funds — far exceeding revenue from live wagering alone and accounting for about 95% to 97% of total purses. This is roughly equivalent to all the direct effects of this sector on the West Virginia economy. In other words, the entirety of the economic effect of greyhound racing comes from transfer of state tax dollars, from other forms of gaming, to the operators of greyhound racing.

Taken together, the findings suggest that greyhound racing does not function as a viable long-run economic development strategy for West Virginia. While it sustains a narrow set of direct jobs and activities, it does not reverse broader employment decline and may divert spending away from other sectors where public investment would yield better labor market outcomes, higher productivity and empirically detectable economic effects.

For policymakers, this implies that continued public support for greyhound racing should be evaluated not on claims of economic growth, but in terms of distributional effects, opportunity costs, and alternative uses of public resources. As West Virginia considers the future of its gaming and racing policies, the evidence presented here indicates that maintaining greyhound racing is unlikely to produce broad-based or sustainable economic gains.

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Appendix

Credits

Stock Photography

Photos from Unsplash: Jannik Selz (pg. 1), Filipp Romanovski (pg. 6), Valeriano G (pg. 9).

Publication Production

Note: The views expressed in this publication are solely those of the author, and do not represent those of funders, associations, any entity of Ball State University, or its governing body.

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Technical Appendix: Difference-in-Differences and Event Study Methods

This study uses county-level panel data to examine the employment effects of greyhound racing. The unit of observation is the county–year. Employment is measured as total employment at the county level, and the primary outcomes of interest are the log level of employment and the log change in employment. Counties enter treatment status in the first year in which greyhound racing is legally permitted or operational. Counties that never allow greyhound racing during the sample period serve as the control group.

Table A1, Summary Statistics

n = 2,970	Mean	Median	Maximum	Minimum	Std. Dev.
Employment	14,836	8,284	136,954	922	19,942

The baseline empirical approach employs a difference-in-differences (DiD) framework to estimate the average effect of greyhound racing on county employment growth. The DiD specification is given by:

$$dLn\ (E_{i,t}) = \beta\ (GR_{i,t}) + u_i + \gamma_t + e_{i,t}$$

...where $dLn\ (E_{i,t})$ denotes the annual growth rate of employment in county i at time t, $GR_{i,t}$ is an indicator variable equal to 1.0 in county years in which greyhound racing is allowed, u_i are county fixed effects, and γ_t are year fixed effects. The error term $\varepsilon_{i,t}$ captures idiosyncratic shocks to county employment. Standard errors are clustered at the county level to account for serial correlation within counties over time, following the guidance of Bertrand, Duflo, and Mullainathan (2004).

The coefficient β captures the average difference in employment growth between treated and untreated counties after netting out time-invariant county characteristics and common macroeconomic shocks (Angrist and Pischke 2009). Because the dependent variable is expressed as a log difference, the coefficient can be interpreted as an approximate percentage-point change in annual employment growth associated with allowing greyhound racing.

A key identifying assumption of the DiD framework is that, absent treatment, employment trends in treated and control counties would have evolved in parallel (Ashenfelter, 1978). Formal tests and visual inspection of pre-treatment trends indicate statistically significant differences between treated and untreated counties prior to treatment. This evidence suggests that a static DiD estimate may conflate treatment effects with pre-existing differences in employment trajectories.

To address this concern, the analysis adopts an event study framework that allows treatment effects to vary flexibly over time relative to the year of treatment. The event study specification is given by:

$$Ln\ (E_{i,t}) = \sum_{k=-K}^{L} \delta_k 1\ \{t\text{-}T_i = k\} + u_i + \gamma_t + e_{i,t}\ \ k \neq 0$$

...where T_i denotes the first year in which county i allows greyhound racing, and the indicator variables capture event time k, defined as the number of years relative to treatment. The year immediately preceding treatment $(k = 0)$ is omitted and serves as the reference period. County and year fixed effects are included, and standard errors are clustered at the county level.

This specification follows the canonical two-way fixed-effects event-study approach used in applied labor and regional economics (Autor, 2003; Goodman-Bacon, 2021). To avoid imprecise estimates driven by sparse data, extreme leads and lags are grouped where necessary.

The estimated event study coefficients for pre-treatment periods are generally small and statistically indistinguishable from zero, with no consistent pattern of divergence prior to treatment. This supports the plausibility of the parallel trends assumption once treatment timing is modeled explicitly (Autor, 2003). In contrast, post-treatment coefficients reveal a dynamic response of employment to the introduction of greyhound racing.

Specifically, employment levels show little immediate response in the year of treatment or the year immediately following treatment. Positive employment effects emerge with a lag of approximately two to four years after treatment, suggesting a delayed response consistent with capital investment, facility development, or subsidy-driven operational expansion. However, these gains are not persistent. In later post-treatment periods, estimated coefficients decline in magnitude and eventually turn negative, indicating that early employment increases dissipate over time.

Continued next page »

Because the dependent variable in the event study is the log level of employment, the estimated coefficients can be interpreted as percentage differences in employment relative to the pre-treatment baseline year (Wooldridge, 2010). The dynamic pattern suggests that greyhound racing generates short-run employment gains that are not sustained in the long run.

The contrast between the static DiD estimate and the event study results highlights an important limitation of conventional two-way fixed effects DiD models in settings with staggered treatment adoption. As shown by Goodman-Bacon (2021), static DiD estimates average treatment effects across different post-treatment horizons, potentially obscuring meaningful heterogeneity in dynamic responses. The event study framework clarifies that the average DiD effect combines early positive employment responses with later declines.

Recent methodological advances emphasize that two-way fixed effects event studies may produce biased estimates in the presence of heterogeneous treatment effects across cohorts and over time (de Chaisemartin and D'Haultfoeuille, 2020; Sun and Abraham, 2021). While the estimates presented here rely on the conventional specification for transparency and comparability, the interpretation focuses on broad dynamic patterns rather than precise long-run point estimates. The results should therefore be interpreted as descriptive evidence of local employment responses rather than definitive estimates of long-term causal effects.

Overall, the DiD and event study evidence indicates that allowing greyhound racing is associated with modest, delayed increases in county-level employment that fade over time. This pattern is consistent with policy-induced activity that temporarily supports employment but does not generate durable, market-driven labor market growth.

Appendix B: Corresponding Data for Event Study

Data corresponds with *Figure 1. Event Study of Greyhound Racing's Effect on Employment in West Virginia — Panel A. Full Sample; Panel B. Employment > 10,000; & Panel C. Employment > 25,000* (Figure found on page 7).

Table B1. Event Study of Greyhound Racing's Effect on Employment in West Virginia

Panel A. Full Sample (55 Counties)

Source: Calculations using data from the U.S. Bureau of Economic Analysis.

Years Pre/Post	Effect	Hi	Low
-4	-0.012213	0.00500168	-0.02942768
-3	-0.021494	0.01408588	-0.05707388
-2	-0.016082	-0.00155644	-0.03060756
-1	-0.000151	0.00915116	-0.00945316
0		0	0
1	-0.023441	-0.0106618	-0.0362202
2	0.0468	0.15406884	-0.06046884
3	0.040429	0.05457628	0.02628172
4	0.008191	0.02053116	-0.00414916
5	-0.031289	-0.01922912	-0.04334888
6	-0.025915	-0.01422164	-0.03760836
7	-0.014915	0.00017504	-0.03000504
8	-0.014628	-0.00372256	-0.02553344

Panel B. Employment > 10,000 (31 Counties)

Source: Calculations using data from the U.S. Bureau of Economic Analysis.

Years Pre/Post	Effect	Hi	Low
-4	0.002691	0.0303564	-0.0249744
-3	-0.030408	-0.00236628	-0.05844972
-2	-0.015614	0.03096932	-0.06219732
-1	0.025368	0.06922888	-0.01849288
0		0	0
1	-0.023441	-0.0106618	-0.0362202
2	0.0468	0.15406884	-0.06046884
3	0.040429	0.05457628	0.02628172
4	0.008191	0.02053116	-0.00414916
5	-0.031289	-0.01922912	-0.04334888
6	-0.025915	-0.01422164	-0.03760836
7	-0.014915	0.00017504	-0.03000504
8	-0.014628	-0.00372256	-0.02553344

Panel C. Employment > 25,000 (13 Counties)

Source: Calculations using data from the U.S. Bureau of Economic Analysis.

Years Pre/Post	Effect	Hi	Low
-4	-0.010558	0.0026524	-0.0237684
-3	-0.014174	0.01051612	-0.03886412
-2	-0.00963	0.0040312	-0.0232912
-1	0.002364	0.02093892	-0.01621092
0		0	0
1	-0.017481	0.01253836	-0.04750036
2	0.047	0.13177196	-0.03777196
3	0.035198	0.05492932	0.01546668
4	0.001978	0.02668968	-0.02273368
5	-0.033355	-0.02133628	-0.04537372
6	-0.010935	0.005333	-0.027203
7	0.008069	0.01938604	-0.00324804
8	0.011453	0.02452228	-0.00161628