Who Bears the Risk of Subsidized Sports Venues?*

Vitaliy Ryabinin
Indiana University Northwest
viryab@iu.edu
www.vr19.org

Sierra Livingston
Indiana University Northwest
siliving@iu.edu

Abstract

Sports venue subsidies transfer risk from team owners to taxpayers, yet corresponding fiscal impact analyses rarely include uncertainty. We introduce volatility into interest rates and tax collections in simulations calibrated to a potential Chicago Bears relocation to Indiana. Before discounting, tail losses can exceed the amount of public borrowing even under assumptions favorable to the project. A reserve of 12.5–15% of the initial borrowing covers the principal with near certainty. Full protection against relocation costs far more; the implied value of the threat is at least 25–35% of the amount borrowed.

Keywords: Sports Venue Financing, Fiscal Impact Analysis, Risk Management.

JEL Classification: H20, H42, H71.

*Vitaliy Ryabinin's (corresponding author) contact address is Indiana University Northwest, 3400 Broadway, Dunes Medical/Professional Building 1127, Gary, IN 46408. Sierra Livingston is an undergraduate student at IU Northwest, https://www.linkedin.com/in/sierralivingston/.

1 Introduction

Public financing of sports venues is often justified by fiscal impact studies claiming that the initial spending will be "paid for" through tax revenue or related economic benefits (Bradbury et al. (2024)). Existing research largely focuses on questioning the "paid for" claim by estimating the magnitude of the subsidy (e.g., Drukker et al. (2020)) or measuring the resulting economic benefits (Bradbury et al. (2023)). However, these analyses typically treat all estimates as certain. In this paper, we introduce uncertainty into the projections and, using Monte Carlo simulations, show that public spending reallocates financial risk from team owners to taxpayers.

The paper offers three findings. First, even under favorable assumptions, the average outcome in the worst 1% of simulations is a loss. If growth declines even slightly, the averages for the worst 5% and the worst 10% turn negative as well. If growth declines further, to the rate of inflation, the nominal losses become very deep, in some cases more than double the initial borrowing. Second, the downside risk is at least partly manageable. Requiring team owners to contribute 12.5% to 15% of the borrowing covers the principal by maturity with a probability of at least 99%. Third, we recover an implied value of the relocation threat, with a lower bound of 25% to 35% of the amount borrowed. The true value of the threat is likely higher, which makes it harder to hedge.

We estimate the fiscal risks in a setting calibrated to a potential relocation of the Chicago Bears to Indiana. This setting offers several advantages over other sports venue projects without sacrificing generality, as the same sources of risk apply to any venue. The proposed move comes with official estimates: Indiana requires a fiscal impact statement as part of the legislative process, which provides a benchmark for our results. It also crosses state lines, so the project brings income tax collections that would otherwise accrue to another jurisdiction. In addition, among all professional American sports, the NFL exhibits the weakest relationship between team performance and revenue (Bradbury (2019)), which allows us to abstract from on-field outcomes.

We deliberately stack the assumptions in the project's favor and then ask how much risk

remains. Initial revenues are set at levels likely to exceed realistic outcomes, uncertainty is calibrated to its lowest plausible values, the relocation crosses state lines and brings in income taxes that would otherwise accrue to another jurisdiction, and financing terms are very favorable. The resulting estimates therefore describe a very favorable scenario: if a project carries substantial risk under these assumptions, it carries at least as much in practice.

In the specification most favorable to the project, taxable revenue grows with the historical NFL salary cap for all 35 years, resulting in the average net balance at maturity of $3,017.1 million. Uncertainty is limited to tax revenue growth and interest rate volatility. Even so, the average of the worst 1% of outcomes is –$609.0 million. In practical terms, a project that looks highly advantageous on the surface can still leave taxpayers with a shortfall. Fiscal impact studies typically report a single projected outcome, close to the mean, and leave out the possibility of a deficit. This omission makes the project look safer than it is, and the credibility of the agency that issues the analysis lends the omission extra weight.

We also consider two-stage growth: taxable revenue grows with the historical cap for an initial period and with inflation for the remaining years. When growth follows the historical cap for 15 years and then declines to inflation, the average net balance at maturity falls to $908.3 million. In this scenario, the average of the worst 10% of outcomes, –$822.3 million, is more than half the average of the worst 1%, –$1,518.6 million, so the loss is not confined to a few extreme realizations. When cap growth lasts only 5 years, the average net balance at maturity turns negative at –$466.5 million; the averages of the worst 1% and 10% are –$2,126.4 million and –$1,591.4 million, respectively. These deep losses illustrate another omission common in fiscal analyses (both official and promotional, the latter commissioned by the teams): they almost never examine scenarios in which conditions turn out worse than expected.

These outcomes mirror those observed in practice. The Hoosier Dome, later renamed the RCA Dome, opened in 1984, with construction costs shared between private and public parties. It was demolished in 2008 to connect the new Lucas Oil Stadium to the expanded Indiana Convention Center. Public debt from the original construction remained and was

rolled into municipal bonds for the convention center expansion. The exact amount is unknown; an executive director of the Capital Improvement Board noted that it was "not practical to allocate an exact debt amount to the RCA Dome."[1] The new bonds are not expected to be paid off until 2039, 31 years after the stadium was demolished. Another example of public debt outlasting the facility itself is Seattle's King County Stadium (the Kingdome), where construction debt was not fully repaid until approximately 15 years after the stadium was demolished.

We also examine whether a reserve requirement imposed on team owners can limit this exposure. Such a reserve may allow the taxes enacted to finance the facility to be repealed, or allow municipalities to borrow against the reserve. For municipalities with weaker credit, this could also lower borrowing costs. Finally, a reserve that covers both the principal and the remaining coupons protects taxpayers if the team relocates. The need for such a reserve is not hypothetical. A potential move of the Chicago Bears to Indiana has already attracted public and political attention.[2] If the Chicago Bears leave, roughly $356 million in public debt from the 2003 Soldier Field renovation will remain outstanding.[3]

In our analysis, the reserve is initially invested in equities and switches to a portfolio of Treasuries once it is sufficiently large to cover liabilities. We find that a reserve of $125 million, or about 12.5% of the $1,000 million borrowing, fully covers the principal by maturity with 99% probability. A reserve of $150 million reaches full coverage within 5 years with 85% probability. Covering the principal and the remaining coupons is much more challenging: even a $350 million reserve reaches full coverage within 5 years in only 7% of simulations. Reaching full coverage within 10 to 15 years with approximately 50% probability requires $250 million to $350 million, or 25% to 35% of the borrowing. However, relative to the total cost of the project, the reserve requirement is much smaller. While the final total cost of the

[1]The Indianapolis Star, *Lucas Oil Stadium: What was projected, what happened and what's ahead the next 10 years*, 08/17/2018.

[2]The Home Team Act (informally known as the Keep the Bears in Chicago bill) was introduced in March 2026 by Rep. Greg Casar and Sen. Bernie Sanders. Media coverage has been extensive; for example, the Wall Street Journal ran an article titled *Could the Chicago Bears Really Move to... Indiana?* on 03/27/2026, as well as numerous opinion pieces.

[3]Bloomberg, *Chicago Bears Leave Behind $356 Million Stadium Debt as They Ditch City*, 10/23/2025.

project is unknown, the Bears have publicly stated willingness to commit $2,000 million of their own. Measured against a total project cost of at least $3,000 million rather than the borrowing, the reserve would be about 4–5% to cover the principal and about 8–12% to also cover the coupons. The outlay looks smaller on this scale, but covering the coupons is still costly.

2 Methodology

2.1 Initial Tax Revenue

Our analysis incorporates three sources of tax revenue: admissions taxes, individual income taxes, and sales and use taxes. Table 1 summarizes the revenue collected from these sources, which sums to an initial collections estimate of $12 + 8 + 8.25 = \$28.25$ million. We obtain the expected admissions tax revenue from the official fiscal impact statement, where it is reported as $12 million per year.[4] However, elected officials have shown a willingness to support stadium subsidies against the explicit preferences of voters (Bradbury et al. (2024)). Because the fiscal impact estimate may reflect political considerations, we validate it independently.[5]

We anchor individual income tax collections to the 2026 NFL salary cap of $301.2 million.[6] The salary cap is set by the collective bargaining agreement as a fixed share of projected league revenue net of player benefits. This revenue comes from television and media contracts, league-level ventures, postseason play, and some local sources. By limiting total player compensation, the cap provides an estimate of the player income tax base. Because it reflects most sources of league revenue, the cap is also likely to track the compensation of supporting personnel. We multiply the salary cap by 0.5 to obtain the home game tax base, since a team plays about half of its games at home. We then multiply this figure by 1.2 to account for the compensation of coaching staff, front office staff, and facility workers, as well

[4] See Indiana SB 27 and the companion fiscal impact statement, both available at https://iga.in.gov/legislative/2026/bills/senate/27/actions.

[5] An overview is provided in Table 1, with details in Online Appendix OA1.

[6] Our approach follows The Tax Foundation, *Chiefs Players Will Save $287,000 in Income Tax by Playing in Brazil Rather Than California*, 09/04/2025.

as income taxes imposed on visiting teams.[7] Under these assumptions, the estimated annual income tax inflow is $301.2 \cdot 0.5 \cdot 1.2 \cdot (0.0295 + 0.015) \approx \$8$ million, where 2.95% and 1.5% are the Indiana state and Lake County income tax rates, respectively.

Table 1: **Initial Annual Tax Revenue Estimates**

This table reports estimates of initial tax revenue (in millions of dollars) directly generated by the proposed relocation of the Chicago Bears to Indiana. Bracketed rows report estimates obtained using alternative methodologies; they validate the legislative figures and are excluded from the total.

Tax Source	**Jurisdiction**	**Revenue**
Admissions Tax		
Fiscal Impact Statement	Local	12.00
Validation 1: Face Value	*Local*	*[12.30]*
Validation 2: Season Tickets	*Local*	*[12.70]*
Individual Income Tax		
Salary Cap Approach	State, Local	8.00
Sales and Use Tax		
Packers Benchmark	State, Local	8.25
Total Initial Tax Revenue		**28.25**

Validation 1: $196 \cdot 61,500 \cdot 8.5 \cdot 0.12 \approx \$12.3$ million, where \$196 is a high estimate of the average ticket face value, obtained by averaging multiple media-reported figures for the 2025 NFL season; 61,500 is the current capacity of Soldier Field assuming sellout attendance; 8.5 is the average number of home games per year; and 0.12 is the proposed admissions tax rate.
Validation 2: $8.5 \cdot (117 \cdot 0.5 + 244 \cdot 0.4 + 582 \cdot 0.1) \cdot 61,500 \cdot 0.945 \cdot 0.12 \approx \$12.7$ million, where \$117, \$244, and \$582 are per-game season ticket prices for the upper, middle, and lower decks (obtained from Ticketmaster), weighted by each tier's share of seating capacity (50, 40, and 10 percent, respectively); 0.945 is the Bears' historical average attendance.

Limited data availability is the main difficulty in estimating sales and use taxes. However, the nearby Green Bay Packers are publicly owned and therefore disclose partial financial information. In 2025, the Packers reported \$286.4 million in local revenue, which includes both taxable and non-taxable income. Taxable income comes mainly from sales and admissions. Non-taxable income comes from sources such as local media deals, sponsorships, and advertising. We isolate revenue subject to the sales tax by subtracting admissions revenue from the \$286.4 million and then adjusting the remainder. Given the Packers' home stadium capacity

[7] Indiana's exemption for nonresidents who work 30 or fewer days in the state does not apply to professional athletes or team members, making the income earned by visiting players and coaches taxable.

of 81,441, 8 home games in the 2025 season, an average ticket face value of \$196, and 94.5% attendance, we approximate admissions revenue as $196 \cdot 81,441 \cdot 0.945 \cdot 8/1,000,000 \approx \$120.7$ million. Assuming that 30 percent of the remaining revenue is not subject to the 7% sales tax, we estimate sales and use tax revenue as $(286.4 - 120.7) \cdot (1 - 0.30) \cdot 0.07 \approx \$8.1$ million, which we round up to \$8.25 million.

2.2 Modeling Uncertainty

We use Monte Carlo simulations to model uncertainty in financing costs and tax revenue growth. Relying on Monte Carlo simulations to evaluate the risk of public projects is an established practice; for example, the International Monetary Fund and the World Bank maintain the Public Fiscal Risk Assessment Model, which also relies on simulation methods (International Monetary Fund and World Bank Group (2019)). Financing costs are modeled as a fixed-rate municipal bond with annual coupon payments. Consistent with Indiana SB 27, we assume a 35-year maturity for the bond and a \$1,000 million principal, repaid at maturity.[8] The borrowing rate is set at loan origination as a single draw from a normal distribution with a mean of 0.045 and a standard deviation of 0.0097. The mean corresponds to the average yield over the period when the proposal was drafted, and the standard deviation is estimated from daily 30-year AAA-rated municipal yields from February 2021 to February 2026.

Under the 2020–2030 NFL Collective Bargaining Agreement, the salary cap is a fixed share of projected league revenue (from television and media contracts, league-level ventures, postseason play, and some local sources), net of player benefits. Annual changes in the cap therefore provide a proxy for growth in the income tax base. In our initial specification, we simulate annual tax revenue growth by drawing each year from the historical distribution of salary cap growth over the entire financing term. Specifically, each year's growth rate is drawn from a Student's t-distribution with a mean of 0.075, a scale of 0.06, and 29 degrees

[8]Indiana SB 27 provides for roughly \$1,000 million in public financing and requires the team to sign a lease of at least 35 years, with a maximum term of 40 years.

of freedom. The parameters are estimated from salary cap data covering 1994, the year the cap was introduced, through the 2026 season.[9] We choose the t-distribution to account for sampling uncertainty, with degrees of freedom adjusted for the estimated mean and scale.

Table 2: **Single Simulation Run**

This table reports a single simulation run of the sports venue financing under the initial specification. Simulated revenue growth (g_t), Treasury yields (r_t), and municipal bond yields (sum of the jointly simulated Treasury yield and municipal spread, $r_t + s_t$) are reported in decimal form (e.g., 0.071 corresponds to 7.1%). All values are presented from the taxpayers' perspective: positive values denote inflows, while negative values represent liabilities that must be financed. The construction takes one year and the first cash flow is realized at $t = 1$. CF_0^+ and CF_0^{Net} (shown in italics) are not realized; these entries are included to illustrate how the system is initialized. The key outcome is the net balance after 35 years, CF_{35}^{Net} (shown in bold). A positive value indicates that taxpayers have accumulated a surplus, whereas a negative value indicates a liability.

Year t	**Debt Payment** CF_t^-	**Tax Revenue** CF_t^+	**Revenue Growth** g_t	**Treasury Yield** r_t	**Muni Yield** $r_t + s_t$	**Balance** CF_t^{Net}
0	*N/A*	*28.25*	0.093	*N/A*	*N/A*	*0*
1	–54.69	30.88	0.053	0.071	0.040	–23.81
2	–54.69	32.52	0.090	0.029	0.018	–46.41
			...			
34	–54.69	552.11	0.067	0.016	0.016	5,062.23
35	–1,054.69	589.16	*N/A*	0.050	0.028	**4,850.69**

In an alternative specification, we simulate high revenue growth for an initial period and lower growth for the remainder of the project. This two-period regime reflects a slowdown in growth; for example, due to the venue novelty effect wearing off (Coates and Humphreys (2005), Bradbury (2019)), the exhaustion of viewership expansion opportunities, or the emergence of legal challenges to media rights negotiations.[10] After the high-growth period ends, we draw annual growth from the historical inflation distribution, modeled as a Student's t-distribution with a mean of 0.028, a scale of 0.015, and 37 degrees of freedom. These parameters are estimated from annual changes in the CPI from 1986 to 2024.[11]

We assume that construction begins immediately and that the venue is operational and generating tax revenue in the following year. When tax revenue is insufficient to cover debt

[9]See https://operations.nfl.com/inside-football-ops/nfl-operations/nfl-free-agency/nfl-salary-cap/.
[10]See *Justice Department Opens Investigation Into NFL*, The Wall Street Journal, 04/09/2026.
[11]We use the index available at https://fred.stlouisfed.org/series/FPCPITOTLZGUSA.

service, we assume that the shortfall is financed with one-year AAA-rated municipal bonds. Any surplus is invested in one-year Treasury securities. The net surplus or liability in each year therefore consists of the previous balance, the annual interest on that balance, and the difference between the current year's inflows and outflows. We estimate the mean Treasury yield from daily one-year Treasury rates from January 1986 to February 2026, and the mean spread and covariance matrix from daily Treasury and municipal yields from February 2021 to February 2026. Then, a bivariate normal distribution jointly models the one-year Treasury rate and the municipal spread. Table 2 illustrates these cash flow dynamics; Online Appendix OA2 reports the corresponding single simulation run in full.

2.3 Implications of Methodological Choices

Our methodological approach is built around assumptions that consistently favor the project, followed by an assessment of the resulting risk. Initial revenues are set above realistic outcomes, uncertainty is calibrated to its lowest plausible values, and financing terms favor the project. The estimates therefore represent a favorable scenario: if the project carries material risk under these assumptions, then it carries at least as much in practice.

We take the $12 million admissions tax estimate from the legislative fiscal impact statement and then validate it against two estimates that rely on assumptions favoring the project. Both validation estimates are consistent with the reported figure, which allows us to interpret it as an upper-end estimate. Income and sales taxes are not itemized in the official fiscal impact statement. Instead, the statement describes total income and sales tax revenue from the new Bears stadium as "unknown, but it will be less than the Marion County Stadium PSCDA," which collects over $16 million per year.[12] However, the Marion County district includes an NFL stadium, an NBA arena, a minor league baseball stadium, a convention center, and has a higher local tax rate, so $16 million is likely a high estimate for the Bears' stadium. Our combined estimate of $8 + 8.25 = \$16.25$ million in individual income and sales taxes slightly exceeds the $16 million that the statement already presents as a high estimate.

[12]PSCDA stands for Professional Sports and Convention Development Area.

Financing and growth assumptions also favor the project. The 35-year bond maturity exceeds the typical venue lifespan of about 30 years (Bradbury et al. (2024)), which benefits the project by adding periods in which tax revenues are expected to be higher than fixed costs. We calibrate yield volatility to 30-year rates, although 35-year yields likely fluctuate more. Throughout the simulations, we model uncertainty with either normal distributions or Student's t-distributions with at least 29 degrees of freedom, both of which have thinner tails than actual financial returns. Surpluses are reinvested at Treasury rates, implying active capital management on behalf of taxpayers that takes advantage of the difference between borrowing and lending rates. Finally, historical NFL salary cap growth likely overstates tax revenue growth. Income tax revenue is directly linked to the cap, while admissions revenue depends on ticket price increases, which have historically lagged cap growth according to publicly available data.[13] Sales are the component most likely to be overstated, as their growth may more closely track inflation. However, replacing cap growth with inflation for sales alone would also reduce the volatility of that revenue stream, leaving overall risk largely unchanged.

Several deliberate omissions mostly favor the project. The model includes only debt service. It excludes operating, maintenance, capital, and bond issuance costs, and it assumes no construction delays or cost overruns. The analysis also excludes infrastructure improvements, which are often funded largely or entirely by the public. We assume that shortfalls are financed at the AAA one-year municipal rate, which sets the credit risk premium to its minimum; in practice, a shortfall is likely to raise the premium. We also hold tax rates fixed and assume no decline in attendance. Major events are the one exclusion that may work against the project, but their net economic benefits are generally negligible (Baade and Matheson (2004), Bradbury (2024), Stephenson (2026)), while their frequency, cost, and impact are difficult to predict and depend on local conditions.

We likewise exclude the other tax changes authorized by the Indiana legislature to finance the stadium: a 1 percentage point increase in the food and beverage tax in surrounding Lake

[13]Proxied by Super Bowl ticket prices, which may grow faster than ticket prices for an average NFL team.

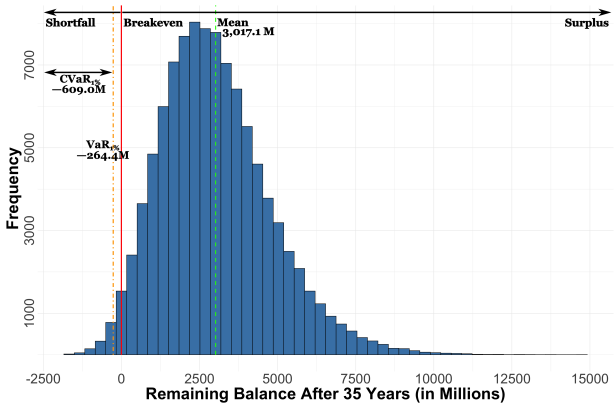
and Porter counties and an increase in Lake County's innkeeper's tax from 5% to 10%. These increases apply broadly to all transactions in their tax categories rather than resulting from the project itself, effectively acting as transfers from taxpayers to team owners (Coates (2007)). The growth or increase in demand that would offset them is unlikely to materialize (Coates and Humphreys (1999), Depken II and Stephenson (2018), Chikish et al. (2019)).

3 Magnitude of Risk Transfer

Figure 1: **Distribution of Simulated Financing Outcomes**

This figure shows the distribution of simulated sports venue financing outcomes (N = 100,000) under two tax revenue growth scenarios: High Growth (Panel A) and Inflation (Panel B). In Panel A, annual growth is drawn each year from the historical NFL growth distribution over the entire 35-year financing term. In Panel B, annual growth is drawn each year from the past inflation distribution. The outcome is the balance at the end of the financing term. Negative values indicate a shortfall, meaning that tax revenues were insufficient to cover the debt and its service, and positive values indicate a surplus. The solid vertical line marks a zero balance, the dashed line marks the mean of the distribution, and the dot-dashed line marks the 1% quantile.

Panel A: High Growth



Panel B: Inflation

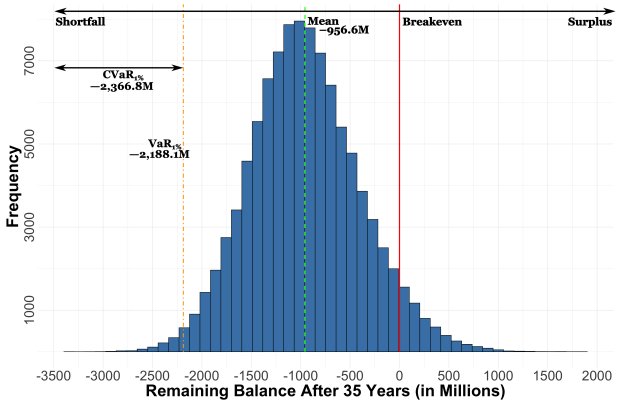


Figure 1 presents the distribution of 100,000 simulated sports venue financing outcomes under two tax revenue growth scenarios: High Growth (Panel A) and Inflation (Panel B). In Panel A, annual growth rates are drawn from the historical NFL growth distribution for each year of the 35-year term. In Panel B, the same procedure is applied to past inflation. The mean outcome under High Growth is $3,017.1 million, implying that taxpayers, on average, are left with a surplus. In contrast, the mean is –$956.6 million when tax revenue growth

matches inflation. This shift in the entire distribution illustrates that public financing of sports venues is an implicit bet on the growth of taxable revenues generated by the venue.

Table 3: **Financing Outcomes and Tax Revenue Growth**

This table reports simulated sports venue financing outcomes under several intermediate growth scenarios bounded by historical cap growth (High Growth) and inflation (Inflation). Each intermediate scenario assumes a two-stage growth process: annual growth rates are drawn from the historical NFL growth distribution through the year specified in the row label and from the historical inflation distribution for the remainder of 35-year term. The outcome is the balance at the end of the term. Negative values indicate a shortfall (tax revenues were insufficient to fully cover the construction debt and its service), and positive values indicate a surplus. The principal is $1,000 million and is repaid at maturity with the last (35th) annual coupon. Each row reports 100,000 independent simulations. All statistics are reported in millions of dollars.

				Value-at-Risk			**Conditional Value-at-Risk**		
	Mean	**StDev**	**Median**	**10%**	**5%**	**1%**	**10%**	**5%**	**1%**
Inflation	–956.6	559.4	–980.3	–1,648.0	–1,839.8	–2,188.1	–1,896.0	–2,054.8	–2,366.8
5 Years	–466.5	689.1	–510.7	–1,310.7	–1,527.2	–1,926.4	–1,591.4	–1,773.2	–2,126.4
10 Years	215.4	886.5	163.9	–882.7	–1,134.7	–1,587.2	–1,207.8	–1,415.7	–1,818.8
15 Years	908.3	1,091.5	832.5	–434.6	–744.9	–1,264.6	–822.3	–1,066.3	–1,518.6
20 Years	1,609.1	1,308.9	1,499.0	24.9	–346.9	–961.8	–433.2	–719.2	–1,233.9
25 Years	2,243.6	1,519.9	2,099.0	434.7	26.4	–671.3	–73.8	–396.2	–966.3
30 Years	2,728.8	1,676.3	2,556.5	736.4	296.4	–439.0	192.9	–147.3	–747.9
High Growth	3,017.1	1,773.2	2,831.1	922.5	473.3	–264.4	364.9	13.6	–609.0

Substantial downside risk remains even under the High Growth scenario. The 1% Value-at-Risk (VaR) and Conditional Value-at-Risk (CVaR) indicate that the worst 1% of outcomes fall below –$264.4 million, with an average loss of –$609.0 million across these outcomes. When annual growth is set equal to inflation, the 1% VaR and CVaR deteriorate to –$2,188.1 million and –$2,366.8 million, respectively.[14] Notably, the difference between VaR and CVaR is considerably smaller in relative terms when annual growth matches inflation rather than historical cap changes. This suggests that the concentration of downside risk also depends on revenue growth. Under High Growth, downside risk is concentrated in a relatively small number of particularly adverse outcomes. In contrast, under Inflation, severe losses are more broadly distributed throughout the lower tail of the distribution.

[14]At a 4.5% discount rate, the Inflation CVaR 1% of –$2,367 million is worth about –$507 million today.

Figure 2: **Financing Rates and Tax Revenue Sufficiency**

This figure illustrates the relationship between financing rate and remaining balance across different growth scenarios. The breakeven rate represents the financing rate at which, on average, the venue fully covers its costs with tax revenue. Black "+" symbols show individual simulated outcomes for a given set of inputs. The dashed line represents the line of best fit, and the solid vertical line marks the breakeven point.

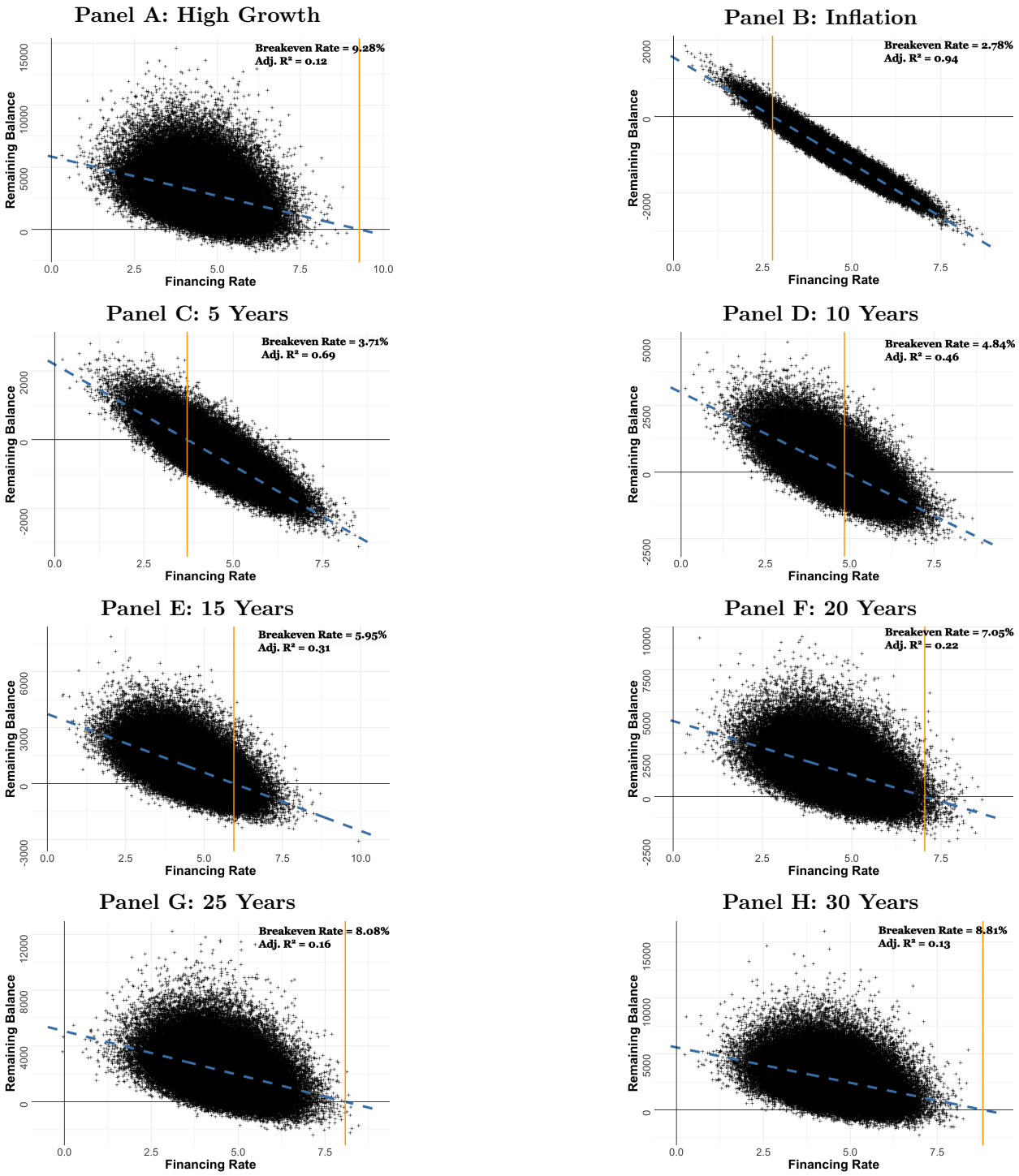


Table 3 focuses on intermediate scenarios in which the High Growth regime continues for a fixed period of 5–30 years before switching to inflation. At the 1% level, CVaR is negative across all specifications, ranging from –$609.0 million to –$2,366.8 million. The 1% VaR is also consistently negative, ranging from –$264.4 million to –$2,188.1 million. Put differently, if taxable revenue growth recedes to inflation within 5 years, the 1% expected shortfall at maturity is more than twice the initial public borrowing. The pattern holds at a less extreme cutoff as well. At the 5% level, it takes 35 years for the CVaR to turn positive and 25 years for the VaR to do the same. These results indicate that shortfalls may occur even when elevated growth continues for an extended period of time. Online Appendix OA3 repeats the simulations with normal distributions throughout. The conclusion remains unchanged, so the results are not driven by distributional assumptions.

Figure 2 complements this analysis by plotting fiscal outcomes, measured by the remaining balance (y-axis), against initial financing rates (x-axis). In the High Growth scenario (Panel A), observations are widely dispersed, suggesting that surpluses and shortfalls occur largely independently of the initial financing rate. In the Inflation scenario (Panel B), observations are tightly clustered, indicating a much stronger relationship between initial financing conditions and the final outcome. Here, breakeven or a small surplus is achieved almost exclusively when the project is financed at or below inflation rates, which is unlikely under most economic conditions. These results also suggest that public subsidies may be less problematic when granted during economic recoveries, when the projects are scarce, financing costs are relatively low, and the subsidy can support employment without transferring material financing risk to taxpayers.

Intermediate scenarios (Panels C–H) illustrate financing outcomes when periods of high tax revenue growth are followed by lower growth. The dispersion of outcomes is clearly related to the average tax revenue growth rate. Even five years of elevated growth visibly increases the dispersion of outcomes (Panel B versus Panel C). However, shifting the entire distribution upward requires sustained high tax revenue growth; even after 20 years, a large share of observations remains below the x-axis (Panel F). These patterns suggest that under

low growth, shortfalls are structural: tax revenues are closely tied to the financing rate and cover financing costs only when the rates are low. In contrast, when the growth rate is high, the wider dispersion of outcomes indicates that downside risk is driven primarily by uncertainty surrounding future tax collections.

4 Insuring Taxpayers Against Uncontrollable Risk

Once a project is financed, taxpayers have no meaningful way to control the risk they have assumed. However, despite the near-unanimous academic consensus that subsidizing sports venues is not in the interest of taxpayers (Carlino and Coulson (2004), Coates et al. (2006), Carlino and Coulson (2006), Bradbury et al. (2023), Bradbury et al. (2024)), such projects continue to be undertaken. Accordingly, we do not seek to advance another argument against public subsidies (Humphreys (2019)) or to debate their optimal level (Matheson (2019)).

Instead, we propose requiring team owners to purchase insurance against potential shortfalls in exchange for public subsidies.[15] An insurance requirement is effective only if it accounts for the incentives of the principal parties in venue construction and financing: team owners and politicians. Like other business owners, team owners seek to maximize profits, which limits their willingness to bear additional costs. Politicians also have well-understood incentives to support publicly financed sports venues. Sports venue projects are highly visible (Coates and Humphreys (2006)) while their costs are dispersed across the broader tax base (Peltzman (1976), Becker (1983)). If the contribution is sufficiently small, team owners are unlikely to forgo public support over the added cost and may even claim reputational credit for not being a public burden. Politicians would retain the full visibility of a sports venue and could also signal fiscal responsibility by pointing to the requirement (Rogoff and Sibert (1988), Rogoff (1990)). The key question, then, is how small the reserve can be while still providing meaningful protection for taxpayers.

Discounted to today, $1,000 million due in 35 years is worth far less. At a 6.5% annualized

[15]Such a requirement is not unprecedented. The Federal Deposit Insurance Corporation, for instance, is funded through fees assessed on member institutions, with premiums tied to their risk profiles.

market return, fully insuring Indiana's \$1,000 million principal requires $1,000/1.065^{35} \approx$ \$110.4 million, or 11% of the amount borrowed. An equity investment, however, is not insurance but a gamble. An equity crash tends to coincide with weak ticket sales, local spending, and tax collections. One way to account for this comovement is to purchase STRIPS that mature when the bond financing the venue comes due. On February 23, 2026, the date of the last SB 27 amendment, the 30-year STRIPS yield is about 5.1%, so full coverage costs $1,000/(1 + 0.051/2)^{70} \approx$ \$172 million.

We design the reserve as follows. At bond issuance, team owners deposit a fraction of the initial public borrowing in an account held by the state, which invests it in equities. Each month, the reserve is compared with the price of a Treasury portfolio that secures the bond payments through maturity. Once the equity position is worth as much as this risk-free portfolio, the equities are sold and the Treasury portfolio is held to maturity, so later market movements no longer affect the taxpayer exposure. We evaluate two versions of the Treasury portfolio. In the first, STRIPS pay the \$1,000 million principal at maturity, so the bond can be retired. In the second, regular Treasuries are added to the STRIPS so that the reserve covers the principal and the remaining coupons. The second portfolio provides leverage against relocation: if the team leaves, local tax revenue stops, and the reserve must pay the remaining coupons as well as the principal. Online Appendix OA4 provides full details of the reserve construction.

Table 4 reports the results. In Panel A, the goal is to cover only the \$1,000 million principal. This case applies when the state wants a way to retire the principal at maturity, which would also let it end some of the taxes that fund the venue. We first ask how small the reserve can be while still reaching full coverage by the end of the term. By month 420, a \$25 million reserve reaches full coverage in only 63.8% of simulations. A 99% probability of full coverage by month 420 requires about \$125 million, or 12.5% of the \$1,000 million. A modest increase to \$150 million raises the probability of full coverage to 84.9% within 60 months, and to above 90% within 120 months.

Table 4: **Likelihood of Reaching Full Coverage**

This table reports simulated outcomes for a reserve initially invested in equities on 02/23/2026 that switches to Treasuries once it can secure $1,000 million at the end of the 35-year term. Each row is based on 50,000 simulations. Reserve is the initial reserve in millions of dollars. Median is the median month in which the reserve reaches full coverage. The Months columns (60 through 420) report the estimated probability of reaching full coverage within the given number of months. In Panel A, the reserve only covers the principal by switching to STRIPS. In Panel B, it also covers the remaining coupons by switching to a portfolio of regular Treasuries and STRIPS. The rise of probabilities in Panel B at month 420 reflects the drop in the cost of full coverage in the final month, when no excess Treasury principal is required.

		Months						
Reserve	**Median**	**60**	**120**	**180**	**240**	**300**	**360**	**420**
	Panel A: Initial Cost							
25	325	0.002	0.011	0.031	0.096	0.238	0.444	0.638
50	246	0.040	0.127	0.250	0.423	0.610	0.767	0.878
75	166	0.170	0.352	0.512	0.670	0.802	0.897	0.952
100	90	0.376	0.583	0.715	0.819	0.902	0.952	0.979
125	41	0.628	0.782	0.858	0.916	0.957	0.980	0.992
150	10	0.849	0.921	0.950	0.972	0.987	0.994	0.998
175	0	1.000	1.000	1.000	1.000	1.000	1.000	1.000
	Panel B: Initial Cost and Remaining Coupons							
50	376	0.000	0.000	0.001	0.059	0.206	0.369	0.829
100	320	0.000	0.001	0.081	0.280	0.437	0.545	0.952
150	258	0.000	0.028	0.242	0.450	0.568	0.639	0.981
200	212	0.000	0.117	0.391	0.565	0.654	0.704	0.990
250	176	0.003	0.244	0.511	0.650	0.718	0.754	0.995
300	147	0.022	0.375	0.608	0.717	0.767	0.795	0.997
350	123	0.074	0.488	0.683	0.769	0.807	0.828	0.998

Panel B defines full coverage as the principal plus all remaining coupons. It is more expensive and calls for a larger reserve: a 99% probability by month 420 now requires $200 million rather than $125 million. Early coverage is harder still. Even a $350 million reserve reaches full coverage within 60 months in only 7.4% of simulations. A $250 million reserve does so within 180 months about half the time (51.1%), and a $150 million reserve passes 50% only after 300 months.[16] Altogether, covering the coupons proves expensive and slow. A smaller reserve weakens the owner's threat to relocate but does not eliminate it. However, it remains unknown how large an added cost owners would accept. Since the reserve is

[16]Online Appendix OA5 reports results with start dates drawn at random from the historical sample. The conclusions remain unchanged.

designed to counter relocation threats, owners may object to the requirement regardless of its size, citing cost as a cover. The reserve weakens their leverage over the public and makes it harder to obtain future subsidies or benefits, such as for venue renovation.

Alternatively, the reserve can be interpreted as an implied value of the relocation threat. Recovering this value requires two choices: a time window in which relocation would impose material losses and the probability that the reserve is sufficiently large within that window. A sufficiently large reserve deters relocation threats by making the losses immaterial. A relocation threat is unlikely immediately after a team moves into a new venue, although we are unaware of any estimate of when such threats begin. Near the end of the venue's life the threat matters less, since only a small share of the debt remains outstanding and, as we have shown, the coupons are the expensive part that a reserve cannot easily cover. A window of 120 to 180 months falls between these extremes. We require a 50% probability of full coverage, the point at which it becomes more likely than not. Under these choices, the relocation threat is worth at least \$250 million to \$350 million, or 25% to 35% of the initial \$1,000 million public borrowing.

It is unknown whether additional expenses of 12.5–15% and 25–35% of the initial borrowing, taken on their own and apart from any loss of future leverage, are large enough to make owners oppose reserve requirements. However, how large the added cost appears depends on the scale. Relative to the total project cost (which is the benchmark against which cost overruns are commonly quoted), these reserve requirements are considerably smaller. Although the final project cost remains unknown, the Bears have expressed willingness to contribute \$2,000 million of their own funds, implying a total project outlay of at least \$3,000 million. Relative to this amount, the corresponding reserves would represent approximately 4–5% of total project cost to cover principal and 8–12% to cover both principal and coupons.

While the reserve requirement could be implemented at the state level, it would be more effective if imposed federally. At the state level, the requirement could intensify competition for teams: if only some states imposed it, the others could advertise its absence to attract

teams.[17] A federal requirement, however, would reduce interstate competition for professional sports teams. Additionally, federal action is preferable to action by a single state or municipality because the subsidy is a fiscal zero-sum game across jurisdictions. If taxpayers in one municipality decline to subsidize a team, taxpayers in another will, and the nationwide transfer to owners does not fall. Federal action could take the form of conditioning the tax-exempt status of municipal bonds on the purchase of insurance, an approach that offers an advantage over eliminating the exemption altogether (Poterba and Verdugo (2011), Drukker et al. (2020)). Even if the exemption is eliminated, stadiums would continue to be publicly financed, but at a higher cost to local taxpayers. Conditioning the exemption on insurance would instead reduce downside exposure regardless of where the venue is built.

5 Conclusion

Public financing proposals for sports venues tend to arrive with government fiscal analyses, which report a single projected outcome without accounting for uncertainty. Proposals are often accompanied by promotional studies as well, typically commissioned by the team or its partners and released to coincide with the project announcement. Such studies typically report large gains in jobs, spending, and tax revenue. Neither set of estimates asks what happens when revenue falls short or addresses the repayment risk borne by taxpayers. This paper takes a different approach: rather than contest the projected benefits, it grants them and asks whether the financing holds up.

We find that the answer depends mainly on tax revenue growth, which in turn depends on the success of a venture that taxpayers do not control. Taxpayers do not directly influence macroeconomic conditions, such as recessions and interest rate movements. Operating decisions, such as ticket pricing, event scheduling, the on-field product, and even team location, remain with the owner regardless of any public subsidy. Transferring control to the public is taboo. For example, NFL rules have barred nonprofit and publicly owned teams since the

[17] The Minneapolis Fed, *Congress Should End the Economic War Among the States*, 01/01/1995.

early 1960s, and the Green Bay Packers, a community-owned nonprofit since 1923, operate only under a grandfather clause.

Even under assumptions selected to give the project every advantage, the 1% expected shortfall at maturity for a $1,000 million initial borrowing is $609.0 million, or 60.9%. If revenue grows only at the rate of inflation, the corresponding shortfall reaches $2,366.8 million. A promotional study typically reports a single projected outcome, usually a surplus that represents the mean or the median. That single number makes for good optics but conceals the dispersion, and with it the probability that taxpayers will have to cover the difference.

We also propose a partial remedy: imposing a reserve requirement on team owners, invested so that it covers the principal (or the principal and remaining coupons) on the bond that finances the venue. A reserve of $125 million to $150 million, roughly 12.5% to 15% of the amount borrowed, reaches full coverage of the principal by maturity with a probability of at least 99%. Such a reserve may also allow at least some of the taxes enacted to finance the venue to be repealed or never imposed. Covering the remaining coupons as well, which protects taxpayers if the team relocates, is far more expensive and takes longer; therefore, a reserve can reduce the relocation threat but not eliminate it. The same procedure also recovers a lower bound on the value of the relocation threat. It is 25% to 35% of the public borrowing, and the true value is likely higher.

The broader lesson for policymakers is that public borrowing dependent on a growing tax revenue is a contingent liability and should be treated as one: priced, funded, and disclosed while the project is under consideration. When financing is granted, it should carry conditions: reserve requirements, clawbacks, and restrictive covenants, including non-relocation clauses.

References

Robert A. Baade and Victor A. Matheson. The Quest for the Cup: Assessing the Economic Impact of the World Cup. *Regional Studies*, 38(4):343–354, 2004. 10.1080/03434002000213888.

Gary S. Becker. A Theory of Competition Among Pressure Groups for Political Influence. *The Quarterly Journal of Economics*, 98(3):371–400, 08 1983. 10.2307/1886017.

John Charles Bradbury. Determinants Of Revenue In Sports Leagues: An Empirical Assessment. *Economic Inquiry*, 57(1):121–140, 2019. https://doi.org/10.1111/ecin.12710.

John Charles Bradbury. Sports stadiums and local economic activity: Evidence from sales tax collections. *Journal of Urban Affairs*, 46(1):139–159, 2024. 10.1080/07352166.2022.2044837.

John Charles Bradbury, Dennis Coates, and Brad R. Humphreys. The impact of professional sports franchises and venues on local economies: A comprehensive survey. *Journal of Economic Surveys*, 37(4):1389–1431, 2023. https://doi.org/10.1111/joes.12533.

John Charles Bradbury, Dennis Coates, and Brad R. Humphreys. Public policy toward professional sports stadiums: A review. *Journal of Policy Analysis and Management*, 43 (3):899–937, 2024. https://doi.org/10.1002/pam.22534.

Gerald Carlino and N. Edward Coulson. Compensating differentials and the social benefits of the NFL. *Journal of Urban Economics*, 56(1):25–50, 2004. https://doi.org/10.1016/j.jue.2004.03.001.

Gerald Carlino and N. Edward Coulson. Compensating differentials and the social benefit of the NFL: Reply. *Journal of Urban Economics*, 60(1):132–138, 2006. https://doi.org/10.1016/j.jue.2006.02.002.

Yulia Chikish, Brad R. Humphreys, Crocker Liu, and Adam Nowak. Sports-Led Tourism, Spatial Displacement, And Hotel Demand. *Economic Inquiry*, 57(4):1859–1878, 2019. https://doi.org/10.1111/ecin.12820.

Dennis Coates. Stadiums And Arenas: Economic Development Or Economic Redistribution? *Contemporary Economic Policy*, 25(4):565–577, 2007. https://doi.org/10.1111/j.1465-7287.2007.00073.x.

Dennis Coates and Brad R. Humphreys. The Growth Effects of Sport Franchises, Stadia, and Arenas. *Journal of Policy Analysis and Management*, 18(4):601–624, 1999.

Dennis Coates and Brad R Humphreys. Novelty effects of new facilities on attendance at professional sporting events. *Contemporary Economic Policy*, 23(3):436–455, 2005. https://doi.org/10.1093/cep/byi033.

Dennis Coates and Brad R. Humphreys. Proximity benefits and voting on stadium and arena subsidies. *Journal of Urban Economics*, 59(2):285–299, 2006. https://doi.org/10.1016/j.jue.2005.10.001.

Dennis Coates, Brad R. Humphreys, and Andrew Zimbalist. Compensating differentials and the social benefits of the NFL: A comment. *Journal of Urban Economics*, 60(1):124–131, 2006. https://doi.org/10.1016/j.jue.2006.01.001.

Craig A. Depken II and E. Frank Stephenson. Hotel Demand Before, During, and After Sports Events. *Economic Inquiry*, 56(3):1764–1776, 2018. https://doi.org/10.1111/ecin.12572.

Austin J. Drukker, Ted Gayer, and Alexander K. Gold. Tax-exempt municipal bonds and the financing of professional sports stadiums. *National Tax Journal*, 73(1):157–196, 2020. https://doi.org/10.17310/ntj.2020.1.05.

Brad R. Humphreys. Should The Construction Of New Professional Sports Facilities Be Subsidized? *Journal of Policy Analysis and Management*, 38(1):264–270, 2019. https://doi.org/10.1002/pam.22099.

International Monetary Fund and World Bank Group. *PPP Fiscal Risk Assessment Model (PFRAM) 2.0: User Manual*, September 2019.

Victor Matheson. Is there a Case for Subsidizing Sports Stadiums? *Journal of Policy Analysis and Management*, 38(1):271–277, 2019. https://doi.org/10.1002/pam.22096.

Sam Peltzman. Toward a More General Theory of Regulation. *The Journal of Law and Economics*, 19(2):211–240, 1976.

James M. Poterba and Arturo Ramirez Verdugo. Portfolio Substitution and the Revenue Cost of the Federal Income Tax Exemption for State and Local Government Bonds. *National Tax Journal*, 64:591–613, 2011. 10.17310/ntj.2011.2S.07.

Kenneth Rogoff. Equilibrium Political Budget Cycles. *The American Economic Review*, 80 (1):21–36, 1990.

Kenneth Rogoff and Anne Sibert. Elections and Macroeconomic Policy Cycles. *The Review of Economic Studies*, 55(1):1–16, 01 1988. 10.2307/2297526.

E. Frank Stephenson. The NFL draft and host-city hotel occupancy. *Contemporary Economic Policy*, Forthcoming, 2026. https://doi.org/10.1111/coep.70034.