# Who Bears the Risk of Subsidized Sports Venues?*

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## Abstract

Sports venue subsidies create long-term obligations, yet the corresponding fiscal impact analyses rarely incorporate uncertainty and instead treat all estimates as certain. We show that incorporating uncertainty in tax revenue growth and interest rates reveals significant downside risk, often exceeding venue construction costs. Under uncertainty, the subsidies represent a transfer of risk from team owners to taxpayers, even when the expected outcome is positive and estimates are implausibly optimistic. Reserving 2–10% of construction costs to compound over the loan term is sufficient to offset the risk without relying on tax revenues unrelated to venue's operations.

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# 1 Introduction

Public financing of sports venues is often justified by impact studies that claim the initial spending will be "paid for" through tax revenue or corresponding economic benefits (Bradbury et al. (2024)). Academic research has largely focused on questioning this "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, particularly those used to support construction proposals, typically treat all estimates as certain. In this paper, we introduce uncertainty into the fiscal analysis and, using Monte Carlo simulations calibrated to a potential relocation of the Chicago Bears to Indiana, construct an upper bound on the downside exposure.

First, we show that public spending reallocates financial risk from team owners to taxpayers and estimate its magnitude. Second, we show that just two sources of uncertainty, tax revenue growth and interest rate volatility, are sufficient to generate downside exposure exceeding initial construction costs. Lastly, we suggest imposing an insurance requirement on team owners equal to approximately 2–10% of total project costs. This reserve, when invested and allowed to grow over the venue's lifespan, is expected to cover the principal on the bonds used to finance construction and limits the ability to threaten team relocation while the public remains responsible for the debt.

Public subsidy for a sports venue represents a long-term liability borne by taxpayers; estimating its magnitude is necessary for risk assessment and management. Here we provide an upper bound on the fiscal risks stemming from this liability using assumptions that consistently overstate tax revenue collections. In our most optimistic specification, average tax receipts exceed the initial $1 billion financing cost by $3 billion over the venue's lifetime, with uncertainty limited to tax revenue growth and interest rate volatility. Under these conditions, the average value of the worst 1 percent of outcomes is approximately –$609 million. When we relax the assumptions slightly so that the average public benefit above the financing cost is "only" $900 million, the mean of the worst 1 percent of outcomes falls to –$1.5 billion, and the mean of the worst 10 percent is –$1.2 billion. The original fiscal

impact analysis conceals the magnitude of potential downside risks by omitting uncertainty, potentially instilling a false sense of confidence in the project. As a result, even when the expectations are favorable, taxpayers could be responsible for more than the initial construction costs long after the venue ceases operations.

These outcomes mirror those observed in practice. Consider the following examples. 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, 21 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.

Such cases are not isolated, nor are they confined to the past. A potential move of the Chicago Bears to Indiana has already attracted public and political attention, underscoring the broader significance of such projects and the need for rigorous risk assessment.[2] This raises two broader questions: how should risks borne by the public be assessed and managed, and to what extent should uncertainty be incorporated into fiscal impact analyses of prospective projects? From this perspective, we view this study as a template for future analyses, ensuring that taxpayers are informed not only about average outcomes but also about downside exposure, and potential avenues to manage the risks.

[1]The Indianapolis Star, *Lucas Oil Stadium: What was projected, what happened and what's ahead the next 10 years*, August 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 March 27, 2026, as well as numerous opinion pieces.

# 2 Methodology

## 2.1 Overview

To show that even minimal uncertainty in inputs can produce substantial downside, we use Monte Carlo simulations to model tax revenue and stadium financing costs for a potential Chicago Bears relocation to Indiana. Relying on Monte Carlo simulations to quantify the risk of public projects is a well-established practice; for example, the International Monetary Fund and the World Bank maintain the Public Fiscal Risk Assessment Model, which relies on simulation methods to evaluate fiscal costs and risks of large-scale investments (International Monetary Fund and World Bank Group (2019)). Additionally, even though the input calibration is specific to a potential relocation of the Chicago Bears to Indiana, the conclusions are general, as the results can be interpreted in relative terms and rescaled to match any desired initial outlay.

This specific setting is also particularly well suited to the analysis, as it offers three important advantages over other sports venue construction projects. The first is data availability, which allows us to estimate tax revenue from multiple sources and benchmark it against the fiscal impact statement legally required in Indiana.[3] The second advantage is that it involves a relocation that crosses state lines. From the perspective of local taxpayers, a relocation brings in new income tax revenue, whereas in-state renovations or new construction projects do not. Finally, among all professional American sports, the NFL exhibits the weakest relationship between team performance and revenue, which simplifies the model (Bradbury (2019)). Therefore, by combining optimistic input calibration with the favorable features of this setting, namely interstate relocation and large market size, the analysis provides an upper bound on the fiscal risks associated with publicly financing a sports venue.

Our analysis focuses on the impact of uncertainty in tax revenues and financing expenditures directly attributable to the venue, abstracting from indirect benefits and costs. This approach also allows us to avoid problematic estimates based on contingent valuation

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

(Hausman (2012)). We consider revenues from sales and use taxes (state and local), individual income taxes (state and local), and admissions taxes (local). However, these sources represent a subset of the taxes authorized by the Indiana legislature to finance the stadium. Other authorized tax changes include a 1 percentage point increase in the food and beverage tax in surrounding Lake and Porter counties, as well as a substantial increase in Lake County's innkeeper's tax from 5 to 10 percent. These increases are excluded because they are not directly generated by the venue and apply broadly to all transactions within the relevant tax categories, rather than resulting from the project itself, effectively acting as transfers from taxpayers to team owners (Coates (2007)). The associated growth (Coates and Humphreys (1999)) or an increase in demand (Depken II and Stephenson (2018), Chikish et al. (2019)), however, are unlikely to materialize.

## 2.2 Initial Tax Revenue

We obtain the expected admissions tax revenue from the official fiscal impact statement, where it is reported as $12 million per year. However, we validate the estimate independently using two alternative sets of assumptions. First, we set the average ticket face value at $196,[4] note that there are 8.5 home games per year on average, apply a proposed 12 percent tax, and use a current Soldier Field capacity of 61,500. We assume sellout attendance, which is unlikely given a historical average of around 94.5 percent for the Bears and the possibility of lower utilization in a larger stadium. The corresponding expected annual admissions tax collections are $196 \cdot 61,500 \cdot 8.5 \cdot 0.12 \approx \$12.3$ million. Alternatively, we use official season ticket prices (obtained from Ticketmaster), which exceed the face values that determine team revenue. We weight ticket prices by seating tiers and capacities (upper, middle, and lower decks), while also accounting for venue utilization (attendance) to account for non-taxable markup: $8.5 \cdot (117 \cdot 0.5 + 244 \cdot 0.4 + 582 \cdot 0.1) \cdot 61,500 \cdot 0.945 \cdot 0.12 \approx \$12.7$ million. Both the $12.3 million and $12.7 million estimates are broadly consistent with the $12 million figure reported in the official fiscal impact statement.

[4] A high estimate derived from averaging multiple media-reported figures for the 2025 NFL season.

Income and sales taxes are not itemized in the official fiscal impact statement. Instead, the statement indicates that total income and sales tax revenue from the new Bears stadium is "unknown, but it will be less than the Marion County Stadium PSCDA." It also reports that the Marion County Stadium PSCDA collects over $16 million per year. However, the Marion County special district includes an NFL stadium, an NBA arena, a minor league baseball stadium, a convention center, and is subject to a higher local tax rate.[5] Owing to this lack of specificity, we seek to re-estimate the income and sales tax revenues anew.

Individual income tax collections can be approximated using the NFL salary cap, which limits total player compensation. Since a team plays half of its season at home, the taxable base is estimated by multiplying the salary cap by 0.5. This figure is then multiplied by 1.2 to account for coaching staff compensation and income taxes that may be imposed on the opposing team. This estimate is optimistic because players may reside in other jurisdictions or seek to attribute their income to lower-tax locations. For example, if the Bears relocate to Indiana, players may choose to reside in Chicago or exploit Indiana's differentiated local income taxes by establishing residency in lower-tax Porter County (0.5 percent) instead of Lake County (1.5 percent). Using these assumptions, the estimated annual income tax inflow is $301.2 \text{ million} \cdot (0.0295 + 0.015) \cdot 1.2 \cdot 0.5 \approx \$8 \text{ million}$.

Sales and use taxes are more difficult to estimate due to limited data availability. 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, includes taxable income from sales and admissions as well as non-taxable 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 total and then adjusting the remainder. After accounting for the Packers' home stadium (capacity: 81,441) and characteristics of 2025 season (8 home games), we approximate admissions revenue as $196 \cdot 81,441 \cdot 0.945 \cdot 8/1,000,000 \approx \$120.7$ million. Sales and use tax revenue is then estimated to be $(286.4 - 120.7) \cdot (1 - 0.30) \cdot 0.07 \approx \$8.1$, rounded up to $8.25 million, assuming 30% of the remaining revenue is not

[5]The Lake County local income tax rate is 1.5 percent, while the corresponding rate in Marion County is over 2 percent, with the exact rate varying by year.

subject to the sales tax. Our combined figure of $8 + 8.25 = \$16.25$ million in individual income and sales taxes is consistent with the official projection of over $16 million per year. At the same time, this approach is likely to overstate collections, as the new Bears stadium is expected to earn less than the Marion County Stadium PSCDA, making it consistent with the overall design of the analysis.

Aggregating tax revenues directly generated by the project (admissions, sales and use, and income taxes) results in an initial collections estimate of $12 + 8 + 8.25 = \$28.25$ million.

## 2.3 Public Debt

Financing costs are modeled as a fixed-rate municipal bond with annual coupon payments and $1 billion principal (the maximum borrowing allowed under Indiana SB 27) repaid at maturity. The bond matures in 35 years following Indiana's proposal for a new Bears stadium, slightly above the typical lifespan of a sports venue, estimated at approximately 30 years (Bradbury et al. (2024)). Employing a maturity longer than typically observed in practice limits potential downside by increasing the number of periods in which tax revenues are expected to exceed fixed costs. This is consistent with our goal of estimating an upper bound on the tail risks of public financing. The initial borrowing rate is determined at 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 based on daily 30-year AAA-rated municipal yields from February 2021 to February 2026. The standard deviation of 35-year yields is likely higher than that of observed 30-year yields, further limiting downside. We also assume that the construction commences immediately, with the venue operational and generating tax revenue in the subsequent year.

## 2.4 Tax Revenue Growth

Under the 2020–2030 NFL Collective Bargaining Agreement, the salary cap is directly tied to league revenue, so annual changes in the salary cap provide a convenient proxy for growth in

the overall tax base. In our baseline specification, we simulate the annual tax revenue growth by drawing yearly from the historical NFL growth distribution over the entire financing term. Specifically, for each year we draw a growth rate from a Student's t-distribution with a mean of 0.075, a standard deviation of 0.06, and 29 degrees of freedom. These parameters are estimated using historical salary cap data from its introduction in 1994 through the 2026 season.[6] In an alternative specification, we simulate high revenue growth for the first $\tau$ years and then impose lower growth over the remainder of the project. In this specification, after the period of high revenue growth ends, the growth rate is determined by draws from the historical inflation distribution. We obtain annual inflation by drawing from a Student's t-distribution with a mean of 0.028, a standard deviation of 0.015, and 37 degrees of freedom, with these parameters corresponding to changes in the CPI from 1986 to 2024.[7] The two-period regime reflects a slowdown in growth, for example due to the exhaustion of viewership expansion opportunities or the emergence of legal challenges to media rights negotiations.[8]

Table 1: **Single Simulation Run**

This table reports the results of a single sports venue financing simulation run under the baseline 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** |

[6]See https://operations.nfl.com/inside-football-ops/nfl-operations/nfl-free-agency/nfl-salary-cap/.
[7]We use https://fred.stlouisfed.org/series/FPCPITOTLZGUSA index.
[8]See *Justice Department Opens Investigation Into NFL*, The Wall Street Journal, April 9, 2026.

## 2.5 Balance

We assume that any short-term shortfall arising when tax revenue is insufficient to cover debt service costs is financed using one-year AAA-rated municipal bonds. If there is a surplus, we assume that it is invested in one-year Treasury securities. These assumptions are optimistic, as they imply active capital management on behalf of taxpayers that takes advantage of the difference in borrowing and lending rates. To capture the relationship between Treasury and municipal yields, we model one-year Treasury rates and the municipal spread jointly as a bivariate normal distribution. The mean Treasury yield is estimated using daily data on one-year Treasury rates from January 1986 to February 2026. The mean spread and covariance matrix are estimated from daily Treasury and municipal yield data over the period February 2021 to February 2026. Accordingly, the net surplus or liability consists of the previous balance, the annual interest on that balance, and the difference between inflows and outflows in the current year. These cash flow dynamics are illustrated in Table 1, which presents the output of a single simulation run under the baseline specification. The equations below describe the full system and provide a numerical example under the baseline specification using the same inputs as in Table 1. The only sources of uncertainty are project financing and tax revenue growth, both of which are denoted in bold.

**Public Debt**

$$\begin{aligned}
\boldsymbol{r_{Loan}} &\sim \mathcal{N}(\mu = 0.045,\, \sigma = 0.0097) \\
CF_t^- &= -1000 \cdot (\boldsymbol{r_{Loan}} + \mathbb{1}_{\{t=35\}}) \\
CF_{1\ldots34}^- &= -1000 \cdot 0.055 \approx -54.69 \\
CF_{35}^- &= -1000 \cdot (0.055 + 1) \approx -1,054.69
\end{aligned}$$

**Tax Revenue**

$$\begin{aligned}
\boldsymbol{g_t} &= g_{Infl.,t} + (g_{Cap,t} - g_{Infl.,t})\mathbb{1}_{\{t \leq \tau\}} \\
g_{Cap,t} &\sim T_{29}(\mu = 0.075,\, \sigma = 0.06)
\end{aligned}$$

$$g_{Infl.,t} \sim T_{37}(\mu = 0.028,\, \sigma = 0.015)$$

$$CF^{+}_{t+1} = CF^{+}_{t} \cdot (1 + \boldsymbol{g_t})$$

$$CF^{+}_{1} = CF^{+}_{0} \cdot (1 + g_0) = 28.25 \cdot (1 + 0.093) = 30.88$$

$$CF^{+}_{2} = CF^{+}_{1} \cdot (1 + g_1) = 30.88 \cdot (1 + 0.053) \approx 32.52$$

$$CF^{+}_{35} = CF^{+}_{34} \cdot (1 + g_{34}) = 552.11 \cdot (1 + 0.067) \approx 589.16$$

**Balance**

$$\begin{pmatrix} \boldsymbol{r_t} \\ \boldsymbol{s_t} \end{pmatrix} \sim \mathcal{N}\left( \begin{pmatrix} 0.0344 \\ -0.0124 \end{pmatrix}, \begin{pmatrix} 0.00034 & -0.00015 \\ -0.00015 & 0.00007 \end{pmatrix} \right)$$

$$CF^{Net}_{t} = CF^{Net}_{t-1} \cdot (1 + \boldsymbol{r_t} + \boldsymbol{s_t}\, \mathbb{1}_{\{\boldsymbol{CF^{Net}_{t-1} \leq 0}\}}) + CF^{+}_{t} + CF^{-}_{t}$$

$$CF^{Net}_{1} = 0 \cdot (1 + 0.040) + 30.88 - 54.69 \approx -23.81$$

$$CF^{Net}_{2} = -23.81 \cdot (1 + 0.018) + 32.52 - 54.69 \approx -46.41$$

$$CF^{Net}_{35} = 5,062.23 \cdot (1 + 0.050) + 589.16 - 1,054.69 \approx 4,850.69$$

# 3 Results

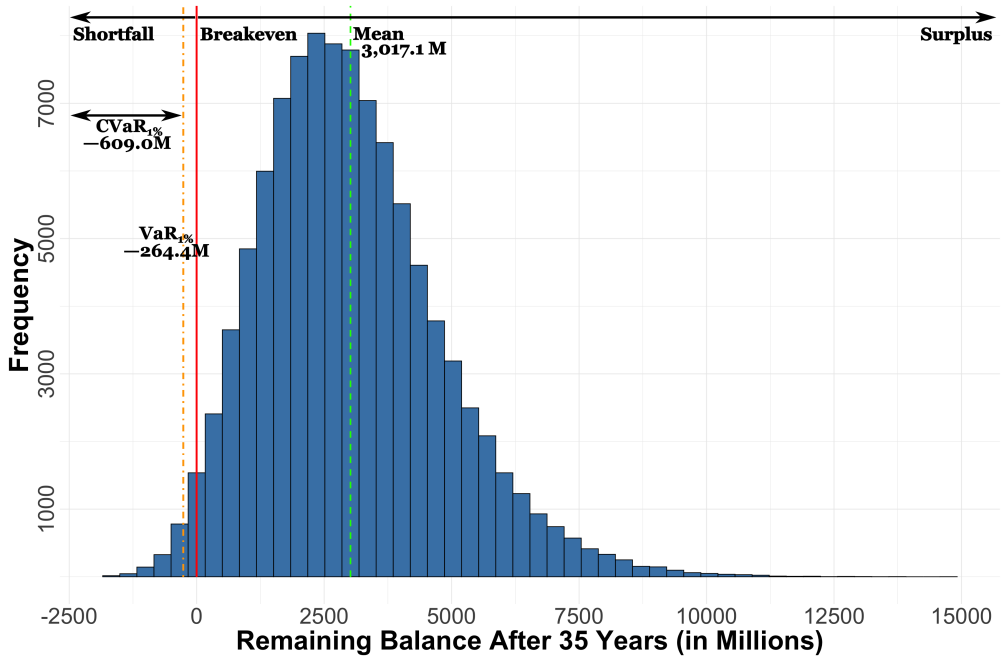
## 3.1 Limited Uncertainty Results in Material Tail Risk

Figure 1 presents the distribution of 100,000 simulated sports venue financing outcomes under the baseline tax revenue growth scenario. The mean of the distribution is $3,017 million, implying that, on average, taxpayers are left with a sizeable surplus. However, sports venues are rarely net positive even after accounting for indirect economic benefits, let alone when considering only tax revenues (Bradbury et al. (2023), Bradbury et al. (2024)). As a result, any estimate of tail risk derived from this distribution represents an upper bound on the true risk. Using standard financial risk metrics, the 1% Value-at-Risk (VaR) and Conditional Value-at-Risk (CVaR) (Jorion (2010), Hull (2023)), the worst 1% of simulations fall below –$264.4 million, with an average of –$609.0 million, representing –26.4% and –60.9% of the $1 billion initial construction cost, respectively. Most importantly, this tail risk arises from very

limited variation in inputs: the model includes only two relatively low-variance sources, tax revenue growth and financing costs.[9]

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

This figure shows the distribution of simulated sports venue financing outcomes (N = 100,000) under the baseline tax revenue growth scenario. Under the baseline scenario, annual growth is simulated by drawing yearly from the historical NFL growth distribution over the entire 35-year financing term (one stage). The outcome is the remaining balance at the end of the financing term, where 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 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.




Public subsidies are inherently risky and tend to receive insufficient scrutiny. Fiscal impact analyses rarely incorporate uncertainty, yet they serve as the basis (or quantitative veneer) for political decision-making, public opinion, and media coverage. Bradbury et al. (2024) note that more comprehensive disclosure of subsidy sources (e.g., including commonly omitted components such as land donations, infrastructure improvements, and tax exemptions), coupled with evidence-based media coverage, would constitute meaningful policy advances. From a risk management perspective, incorporating uncertainty into analysis, rather than

[9]In the Appendix, we examine the impact of the initial borrowing rate on the financing outcome.

focusing solely on expected outcomes, would also advance this goal. Moreover, omitting uncertainty may even be part of the problem, as it can instill a false sense of confidence. Explicitly presenting downside risk can highlight the need for safeguards should outcomes deviate from initial expectations, frame public discussion in terms of risk management, and contribute to the quality of media coverage by recognizing adverse effects.

## 3.2 Fiscal Outcome is a Bet on Sports Revenue Growth

Table 2 shows that the fiscal outcome of public sports venue financing is an implicit bet on tax revenue growth. In an all inflation specification, where the low-growth regime persists throughout the project, the average outcome is highly unfavorable to taxpayers at –$956 million, implying that tax revenue growth in excess of inflation is necessary to recover the initial outlay. This shortfall ($956 million) is close in magnitude to the construction cost of the venue ($1 billion), highlighting the scale of the implied fiscal exposure. In other words, tax revenues generated by the venue itself are insufficient to retire the debt, which would require additional public subsidies. Such subsidies are typically financed through taxes not directly linked to the venue, such as on lodging and prepared meals, which impose costs on non-users and therefore represent a transfer from the public to team owners through the tax system.

Intermediate scenarios, in which a high-growth regime persists for an initial fixed period of 5–30 years, provide an estimate of how shortfall depends on tax revenue growth. At 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, taxpayers may be liable for twice the construction cost. It takes 35 years for the 5% CVaR to turn positive and 25 years for the 5% VaR to do so, indicating that shortfalls may occur even when high growth persists for an extended period. Altogether, these results demonstrate that fiscal risk borne by taxpayers depends directly on sports revenue growth and increases when the growth declines or cannot be sustained. Taxes unrelated to venue operations function as a form of insurance against shortfalls, as they are largely uncorrelated

with venue performance and would be collected regardless of project success. In this context, taxpayers assume the repayment risk and insure team owners against uncertain business growth.

Table 2: **Financing Outcomes and Tax Revenue Growth**

This table characterizes the distribution of simulated sports venue financing outcomes. The reported outcome is the remaining balance after the initial 35-year financing term. Negative values indicate a shortfall (tax revenues were insufficient to fully cover the construction debt and its service), while positive values indicate a surplus. The principal is $1,000 million and is repaid at maturity after 35 annual coupon payments. Each row is represents 100,000 independent simulations. In the baseline (inflation)specification, annual tax revenue growth is simulated by drawing yearly from the historical NFL (inflation) growth distribution over the entire financing term. The remaining specifications assume a two-stage growth process: annual growth is simulated from the historical NFL growth distribution until the year indicated in the row label and then from the historical inflation distribution for the remainder of the term. All statistics are reported in millions of dollars.

| | | | | Value-at-Risk | | | Conditional Value-at-Risk | | |
|---|---|---|---|---|---|---|---|---|---|
| | **Mean** | **StDev** | **Median** | **10%** | **5%** | **1%** | **10%** | **5%** | **1%** |
| **Baseline** | 3,017.1 | 1,773.2 | 2,831.1 | 922.5 | 473.3 | –264.4 | 364.9 | 13.6 | –609.0 |
| **30 Years** | 2,728.8 | 1,676.3 | 2,556.5 | 736.4 | 296.4 | –439.0 | 192.9 | –147.3 | –747.9 |
| **25 Years** | 2,243.6 | 1,519.9 | 2,099.0 | 434.7 | 26.4 | –671.3 | –73.8 | –396.2 | –966.3 |
| **20 Years** | 1,609.1 | 1,308.9 | 1,499.0 | 24.9 | –346.9 | –961.8 | –433.2 | –719.2 | –1,233.9 |
| **15 Years** | 908.3 | 1,091.5 | 832.5 | –434.6 | –744.9 | –1,264.6 | –822.3 | –1,066.3 | –1,518.6 |
| **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 |
| **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 |
| **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 |

## 3.3 Imposing an Insurance Requirement Helps Manage Tail Risk

Despite the nearly (Carlino and Coulson (2004), Coates et al. (2006), Carlino and Coulson (2006)) unanimous academic consensus (Bradbury et al. (2023), Bradbury et al. (2024)) that subsidizing sports venues is not in the interest of taxpayers, such projects continue to be undertaken. Accordingly, we do not seek to advance an additional argument against public subsidies (Humphreys (2019)) or to debate their optimal level (Matheson (2019)).

Instead, an alternative response to this issue is to manage the risk, namely, to require team owners to fund insurance against shortfalls. Publicly subsidizing sports venues exchanges certain construction costs for uncertain future tax revenues, effectively functioning like a

lottery. From this perspective, the insurance mechanism is also grounded in economic theory: a risk-averse agent would always purchase full actuarially fair insurance. However, insurance requirements will only be effective if they align with the incentives of team owners and politicians, who jointly make financing decisions. As with other businesses, team owners seek to maximize profits, so any additional monetary costs should be limited. Politicians' incentives to support publicly financed sports venues are also well understood: the projects are highly visible (Coates and Humphreys (2006)) and generate concentrated benefits, while costs are dispersed across the broader tax base (Peltzman (1976), Becker (1983)).

One potential way to implement the insurance requirement is to set aside a fraction of the total project cost and invest it in financial markets for the duration of the lease or expected useful life of the venue. The required amount would be determined based on the subsidy and conservative assumptions about market returns. Assuming 6.5% annualized market return, fully insuring Indiana's subsidy of $1 billion over 35-year lease period would require only $1,000/1.065^{35} \approx \$110.4$ million, representing approximately 5.5% of the $2 billion project cost. More generally, the required contribution would range from 2% to 10% of the project cost, depending on assumptions about market returns and venue lifespan. This range should be acceptable to both team owners and politicians. Team owners are unlikely to forgo public support in response to a 2–10% increase in project costs and may even leverage the arrangement for reputational benefit by claiming that they are not a burden on taxpayers. Politicians would still retain the full public visibility benefits of a sports venue and could also signal fiscal responsibility by highlighting insurance requirements (Rogoff and Sibert (1988), Rogoff (1990)).

This insurance requirement has additional benefits beyond shortfall coverage. First, it reduces the economic threat of relocation (Humphreys and Zhou (2015)) or demands for venue renovation by reducing the bargaining asymmetry between the municipality and team owners. The scheme makes funds available to settle the debt should a team depart. For instance, it would make the Chicago Bears' seemingly imminent departure from the city more fiscally acceptable. As it currently stands, the municipal government is responsible for roughly

$356 million in remaining public debt from the 2003 Soldier Field renovation.[10] Second, the insurance requirement may allow for the elimination of tax changes initially enacted to finance the facility. Third, this scheme would enable borrowing against the investment. In municipalities with weaker credit profiles, it may reduce initial borrowing rates or debt servicing costs.

While the insurance requirement could be implemented at the state level, it is likely to be more effective if imposed federally. At the state level, it could increase competition by adding another differentiating factor.[11] On the other hand, implementing this policy at the federal level may instead reduce interstate economic competition for professional team sports. This can be accomplished by conditioning the tax-exempt status of municipal bonds on the purchase of insurance, an approach that has an advantage over eliminating the exemption altogether (Poterba and Verdugo (2011), Drukker et al. (2020)). If the exemption is eliminated, stadiums would likely continue to be publicly financed, but at a higher cost to local taxpayers. In contrast, conditioning the tax benefits on the purchase of insurance would broadly reduce downside exposure, regardless of the venue's ultimate location.

# 4 Conclusion

This paper examines how public financing of sports venues shifts risk from team owners to taxpayers. We construct a distribution of financing outcomes using Monte Carlo simulations of tax revenues and stadium financing costs, calibrated to a potential relocation of the Chicago Bears to Indiana. To bound uncompensated tail risk from above, we deliberately impose implausibly optimistic assumptions under which, on average, tax revenues exceed costs, leaving the public with a surplus. Even under these highly favorable assumptions, tail risk remains substantial, with downside exposure often exceeding initial construction costs. Most importantly, just two sources of uncertainty, tax revenue growth and interest rate

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

[11]The Minneapolis Fed, *Congress Should End the Economic War Among the States*, January 1, 1995.

volatility, are sufficient to produce this downside exposure, raising a broader question about risk assessment and management practices in public projects. Incorporating uncertainty into the analysis, rather than focusing solely on expected outcomes, can highlight the need for safeguards should outcomes deviate from initial expectations, frame public discussion in terms of risk management, and improve the quality of media coverage by recognizing adverse effects.

However, given that venues continue to be subsidized despite the academic consensus against such transfers, we propose conditioning public financing on insuring the full subsidy amount. Requiring team owners to purchase insurance also reduces the threat of relocation, which is often used to extract additional public funding. However, for any solution to be viable, it must be acceptable to both team owners and politicians; otherwise, it is unlikely to be adopted. The proposal satisfies both requirements: it does not materially increase project costs while allowing for seemingly credible fiscal responsibility signaling. More generally, this approach shifts the focus toward managing downside risk rather than maintaining blanket opposition to subsidies. We view this paper as a blueprint for developing risk management solutions that reduce taxpayer downside exposure while remaining aligned with the incentives of the involved parties.

# References


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, 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 benefit of the NFL: Reply. *Journal of Urban Economics*, 60(1):132–138, 2006. https://doi.org/10.1016/j.jue.2006.02.002.

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.

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. 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.

Jerry Hausman. Contingent Valuation: From Dubious to Hopeless. *Journal of Economic Perspectives*, 26(4):43–56, 2012. 10.1257/jep.26.4.43.

John C. Hull. *Risk Management and Financial Institutions*. John Wiley & Sons, 2023. ISBN 9781119932482.

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.

Brad R. Humphreys and Li Zhou. Reference-dependent preferences, team relocations, and major league expansion. *Journal of Economic Behavior & Organization*, 109:10–25, 2015. https://doi.org/10.1016/j.jebo.2014.11.007.

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

Philippe Jorion. *Financial Risk Manager Handbook: FRM Part I / Part II*. John Wiley & Sons, 2010. ISBN 9780470904015.

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.

# Appendix

In this section, we examine the impact of the initial borrowing rate on the financing outcome. Figure A1 presents fiscal outcomes (remaining balance, y-axis) as a function of initial financing rates that determine annual coupon payments (x-axis); each panel includes 100,000 independent simulations.

In the high-growth baseline scenario (Panel A), tax revenues increase at rates drawn annually from the historical NFL growth distribution over the entire financing term. The majority of observations lie above the x-axis and are widely dispersed, indicating that taxpayers are likely to realize a surplus after 35 years, though its magnitude varies. In the low-growth inflation scenario (Panel B), tax revenues grow at rates drawn from the historical inflation distribution. Here, most observations lie below the x-axis and are tightly clustered, indicating that taxpayers are likely to incur a shortfall after 35 years. Notably, these surpluses (shortfalls) arise largely irrespective of the level of the initial financing rate, suggesting that tax revenue growth dynamics are more important than financing conditions.

Intermediate scenarios (Panels C–H) illustrate financing outcomes when periods of high tax revenue growth are followed by low growth. There is a clear relationship between the dispersion of outcomes and the average tax revenue growth rate. Even five years of high growth is sufficient to visibly increase 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 substantial share of observations remains below the x-axis (Panel F). These patterns suggest that under low growth, shortfalls are structural, as tax revenues are insufficient from the outset to cover costs, reflected in the clustering of points below the x-axis. Under high growth, downside risk is driven primarily by uncertainty, as reflected in the dispersion of outcomes.

Taken together, these results reinforce one of the main findings: the fiscal outcome of public sports venue financing is an implicit bet on tax revenue growth. The dispersion of outcomes, which contributes to downside risk, is also driven by growth uncertainty, with initial borrowing rates playing a secondary role.

Figure A1: **Financing Rate Needed to Break Even**

This figure illustrates the relationship between financing rate and remaining balance across different tax revenue 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.