The Impact of Previous Losses on Match Attendance: Which Teams' Fans Turn Away?

Václav Šmíro

Institute of Economic Studies, Charles University,

RWTH Aachen University (Erasmus Exchange)

June 17, 2025

Abstract

This paper examines how recent match outcomes influence stadium attendance in the Czech football league. Using match-level data and a fixed-effects panel regression, we find that a loss in the previous game leads to a significant decrease in home attendance, suggesting a short-term reaction of fans to team performance. Additional heterogeneity analysis indicates that this effect varies across clubs, reflecting differences in supporter loyalty and performance sensitivity.

Introduction

As football continues to grow into a global phenomenon, it draws in a rapidly expanding and increasingly diverse fan base. This raises fundamental questions about fan behavior: why do people support certain teams, and what factors influence their loyalty? While traditional explanations often emphasized family ties and local affiliations, contemporary football fandom is increasingly shaped by team performance and success.

This study investigates how match outcomes, specifically losses, influence fan attendance in the Czech football league. The goal is to identify which clubs have loyal supporters and which rely more heavily on recent success to fill the stands.

Data description

The analysis is based on match-level data from the Czech Football Chance Liga for the 2024/2025 season. The dataset was obtained from the publicly accessible website https://www.livesport.cz. It includes a total of 258 matches, covering the regular season (30 rounds) and subsequent playoff rounds. The league structure features three postseason groups based on final standings: a championship group, a mid-table group, and a relegation group. After the playoffs, the team finishing last is automatically relegated, while the 14th and 15th teams compete in a play-off with the 2nd and 3rd teams from the Czech National League.

The cleaned dataset includes the following variables:

- Attendance_percentage
  Type: float
  The percentage of the stadium's total capacity occupied during the match. Serves as a proxy for match-day attendance intensity. Ranges from 0% to 100%.

- previous_loss
  Type: binary (0/1)
  Equals 1 if the home team lost its previous match, and 0 otherwise. Captures short-term performance effects on attendance.

- is_derby
  Type: binary (0/1)
  Indicates whether the match is a local derby (1 = yes, 0 = no). Derbies generally attract more fans due to regional rivalries.

- vs_big_team
  Type: binary (0/1)
  Equals 1 if the away opponent is a traditionally popular or strong team. These matches tend to generate greater spectator interest.

- is_weekend
  Type: binary (0/1)

Indicates whether the match was played on a weekend. Weekend fixtures typically allow for higher attendance due to scheduling convenience.

- weather_code_coco
  Type: categorical (integer)
  A numerical code representing weather conditions at kickoff (e.g., sunny, cloudy, rainy). Weather can impact attendance decisions.

- temperature_at_kickoff
  Type: float (°C)
  Temperature at the start of the match in degrees Celsius. Extreme conditions may discourage or encourage attendance.

- home_team
  Type: categorical (string)
  The name of the home team playing the match.

Methodology & Results

To investigate the determinants of match attendance in the Czech Football League, we estimate a linear panel data model using Fixed Effects (FE) estimation. Since attendance patterns may vary substantially between clubs (due to fan base size, stadium capacity, etc.), a team fixed-effects approach is appropriate to isolate within-team variation.

We estimate the following model using the PanelOLS estimator with clustered standard errors at the team level:

$$attendance\_percentage_{i_t} = \alpha_i + \beta 1 * previous\_loss_{i_t} + \beta 2 * is\_derby_{i_t} + \beta 3 * vs\_big\_team_{i_t} + \beta 4 * is\_weekend_{i_t} + \beta 5 * weather\_code\_coco_{i_t} + \beta 6 * temperature\_at\_kickoff_{i_t} + \varepsilon_{i_t}$$

Where:

- i indexes teams and t indexes matches,
- α_i represents team fixed effects,
- Standard errors are clustered by team to account for intra-team autocorrelation

On **Table 1**. We can see the estimated coefficient for previous_loss is −4.64 and statistically significant at the 1% level (p = 0.0006). This implies that, on average, a team that lost its previous match experiences a decrease in attendance by approximately 4.64 percentage points in their next home game, holding other factors constant and within the same team. This result suggests that fans are sensitive to recent team performance and are less likely to attend after a poor result.

Table 1: Panel OLS

Panel Regression Results

	Dependent variable: attendance_percentage
	Model
	(1)
const	45.448***
	(5.014)
previous_loss	-4.640***
	(1.691)
is_derby	10.531
	(9.813)
vs_big_team	40.135***
	(4.522)
is_weekend	2.943
	(4.578)
weather_code_coco	0.109
	(0.292)
temperature_at_kickoff	0.458***
	(0.127)
R-squared (within)	0.511
F-statistic	40.75
P-value	0.0000
Observations	258
N. of groups	18
R^2	0.511
Residual Std. Error	15.250 (df=234)
F Statistic	40.752*** (df=24; 234)
Note:	*p<0.1; **p<0.05; ***p<0.01

The F-test for poolability rejects the null hypothesis that all teams share a common intercept (p-value < 0.001). I do not perform the Hausman test, as fixed effects are theoretically preferred, because teams differ in historical background and fan-base strength, making correlation between team-specific effects and regressors likely. Therefore, the random-effects assumption is implausible, and the fixed-effects model is used directly. The within R^2 is 0.511, indicating that approximately 51% of the within-team variation in attendance is explained by the model.

Bootstrap

To assess the robustness of the fixed-effects estimates, I implement a non-parametric cluster bootstrap, resampling entire teams with replacement. This procedure preserves the time-series structure within clubs and provides inference that is more robust to heteroskedasticity, non-normality, and the small number of clusters.

Consistent with bootstrap theory, point estimates remain unchanged; only the standard errors and confidence intervals are re-estimated. In **Table 2,** confidence intervals confirm the robustness of the main fixed-effects results. The effects of *previous_loss*, *vs_big_team*, and *temperature_at_kickoff* remain statistically significant, with confidence intervals excluding zero. In contrast, *is_derby*, *is_weekend*, and *weather_code_coco* show confidence intervals covering zero.

Table 2: Bootstrap

Bootstrapped Confidence Intervals

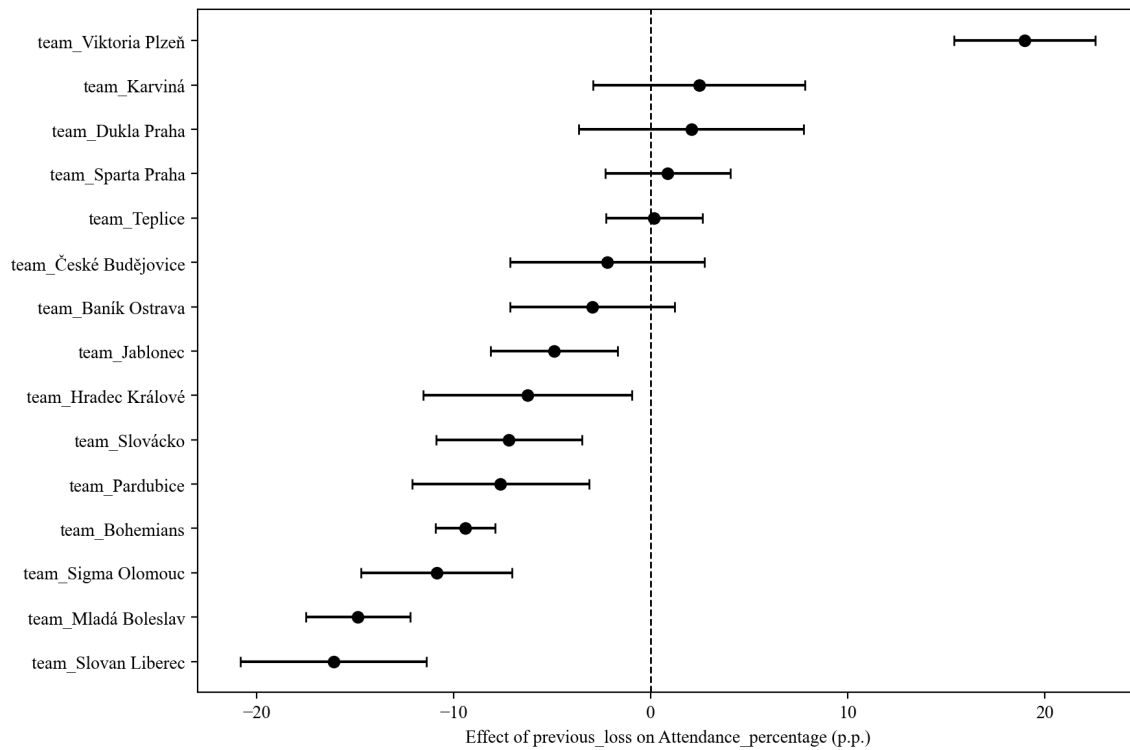| Variable	coef	boot_se	ci_lower_95	ci_upper_95
previous_loss	-4.640338	1.706237	-8.120991	-1.452885
is_derby	10.530742	10.048930	-6.844933	31.817976
vs_big_team	40.135248	4.657362	31.306958	49.424364
is_weekend	2.942809	4.674248	-5.952085	12.011673
weather_code_coco	0.109433	0.295938	-0.418684	0.703172
temperature_at_kickoff	0.458285	0.132369	0.202202	0.724434

Which Teams' Fans Turn Away?

We observe that, within the Czech football league, a previous loss has a statistically significant negative impact on match attendance. To further explore heterogeneity in this effect, we estimate a panel fixed-effects model with team-clustered standard errors and team-specific interactions of previous losses. Out of the 18 clubs in the dataset, we analyse 15 teams.

We exclude two teams because they participate only in the end-of-season playoff (the 2nd and 3rd teams from the second league played against the 14th and 15th teams from the first league). Additionally, Slavia Praha is excluded because it did not record a single home defeat during the sample period, meaning its previous_loss variable exhibits no within-team variation.

This approach allows us to assess whether some clubs are more affected by recent losses than others, and to identify where "success fan" behaviour is most prevalent. For detailed regression outputs, see the **Appendix**.

Table 3: Heterogeneity of the Previous Loss Effect Across Teams (95% CI)

In **table 3** we can see teams like Mladá Boleslav and Slovan Liberec show large and statistically significant drops in attendance after a loss (-14.9 p.p. and -16.1 p.p., respectively). Similar declines appear for Sigma Olomouc, Bohemians, and Pardubice, all of which also exhibit significantly negative effects. These patterns point to more result-dependent fan bases, where a recent defeat substantially lowers matchday turnout.

On the other hand, several clubs show no statistical significance to a previous loss. Baník Ostrava, Karviná, Teplice, Dukla Praha, and even Sparta Praha display small effects, suggesting that their supporters maintain relatively stable attendance regardless of recent performance.

In contrast is Viktoria Plzeň, where attendance actually increases after a loss (+19.0 p.p., $p < 0.01$).

Conclusion

In summary, this study finds that the most statistically significant factor affecting match attendance is whether the home team plays against a well-known and successful opponent, particularly Slavia Praha, Sparta Praha, or Viktoria Plzeň. Additionally, both temperature and recent performance, meaning whether the team lost its previous match, show a significant effect on fan turnout.

At the individual team level, the teams whose fans turn away most clearly after a loss are Mladá Boleslav, Sigma Olomouc, Bohemians, Pardubice, and especially Slovan Liberec, which exhibits the strongest success-fan effect in the league.

Acknowledgements

Appendix:

PanelOLS Estimation Summary

Dep. Variable:	attendance_percentage
Estimator:	PanelOLS
No. Observations:	258
Date:	Mon, Nov 24 2025
Time:	12:49:14
Cov. Estimator:	Clustered
R-squared:	0.5354
R-squared (Between):	0.3110
R-squared (Within):	0.5354
R-squared (Overall):	0.3592
Log-likelihood:	-1044.2
F-statistic:	12.675
P-value:	0.0000
Distribution:	F(20,220)
F-statistic (robust):	-2.872e+17
P-value (robust):	1.0000
Distribution (robust):	F(20,220)
Entities:	18
Avg Obs:	14.333
Min Obs:	1.0000
Max Obs:	17.000
Time periods:	76
Avg Obs:	3.3947
Min Obs:	1.0000
Max Obs:	8.0000

Parameter Estimates

Variable	Coef	Std. Err.	T-stat	P-value	Lower CI	Upper CI
is_derby	9.4812	10.336	0.9173	0.3600	-10.889	29.852
vs_big_team	39.975	4.6574	8.5830	0.0000	30.796	49.154
is_weekend	2.4906	4.6407	0.5367	0.5920	-6.6553	11.636
weather_code_coco	0.0828	0.3495	0.2368	0.8130	-0.6060	0.7715
temperature_at_kickoff	0.4742	0.1353	3.5038	0.0006	0.2075	0.7409
prev_loss_team_team_Baník Ostrava	-2.9691	2.1242	-1.3977	0.1636	-7.1554	1.2173
prev_loss_team_team_Bohemians	-9.4099	0.7741	-12.156	0.0000	-10.935	-7.8844
prev_loss_team_team_Dukla Praha	2.0457	2.9102	0.7029	0.4828	-3.6898	7.7812
prev_loss_team_team_Hradec Králové	-6.2593	2.6978	-2.3201	0.0212	-11.576	-0.9424
prev_loss_team_team_Jablonec	-4.9044	1.6462	-2.9791	0.0032	-8.1488	-1.6600
prev_loss_team_team_Karviná	2.4398	2.7398	0.8905	0.3742	-2.9599	7.8395
prev_loss_team_team_Mladá Boleslav	-14.871	1.3512	-11.005	0.0000	-17.534	-12.208
prev_loss_team_team_Pardubice	-7.6348	2.2885	-3.3361	0.0010	-12.145	-3.1245
prev_loss_team_team_Sigma Olomouc	-10.869	1.9560	-5.5567	0.0000	-14.724	-7.0139
prev_loss_team_team_Slovan Liberec	-16.103	2.4062	-6.6923	0.0000	-20.845	-11.361
prev_loss_team_team_Slovácko	-7.2087	1.8861	-3.8219	0.0002	-10.926	-3.4915
prev_loss_team_team_Sparta Praha	0.8466	1.6191	0.5229	0.6016	-2.3443	4.0376
prev_loss_team_team_Teplice	0.1668	1.2448	0.1340	0.8935	-2.2865	2.6201
prev_loss_team_team_Viktoria Plzeň	18.975	1.8267	10.388	0.0000	15.375	22.575
prev_loss_team_team_České Budějovice	-2.2189	2.5114	-0.8836	0.3779	-7.1683	2.7305