

BENEFITS ON COLLEGE ATHLETIC SUCCESS:AN APPLICATION OF THE PROPENSITY SCORE DESIGN

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Abstract

- **Study Focus:** Refining Anderson’s analysis on athletic success and institutional metrics using the random forest method
- **Original Methodology:** Used bookmaker data and propensity score design to create probabilities for football teams winning games
- **Enhancement:** Implemented Random Forest regression for better predictions.
- **Results:**
 - Slight increase in alumni athletic operating donations (10,790 for each additional win)
 - Slightly larger decrease in non-athletic donations (-23,970 for each additional win)
 - Major increase in overall alumni donations (-228,100 for each additional win)
- **Insights:** Random Forest revealed complex relationships, enhancing analytical robustness.

Introduction

- **Anderson’s Objective:** Examine the impact of football wins on university health metrics like donations and acceptance rates.
- **Methodology:** Used propensity score matching based on team win likelihood.
- **Enhancement Strategy:** Implement Random Forest for more accurate propensity scores, reduced overfitting, and decreased endogeneity.
- **Hypothesis:** Random Forest will yield more precise outcomes and uncover deeper variable relationships.

Effects of Football Wins on Outcomes

Table: Effects of Football Wins on Various Outcomes										
		STE				Replication				
		Coeff.	P-val	Conf. Int.		Coeff.	P-val	Conf. Int.		
Alumni Athletic Oper-	ating Donations	191,200 (65,000)	0.001	63,800	-318,600	191,240 (65,035)	0.004	63,700	-318,700	
Alumni Nonathletic	Operating Donations	-137,400 (96,100)	0.210	-325,756	-50,956	-137,410 (96,077)	0.156	-325,700	-50,900	
Total Alumni Do-	nations	267,400 (266,900)	0.450	-255,744	-790,544	267,380 (266,945)	0.319	-255,800	-790,600	

Methodology

- Methodology:**
- Utilized **Machine Learning Techniques:** Random Forest and Logistic Regression.
 - Calculated propensity scores to adjust for potential confounders.
 - Employed nearest neighbors matching to compare schools with similar profiles but different levels of athletic success.
- Results:**
- More robust analysis due to inclusion of ML techniques.
 - Revealed nuanced insights into how changes in sports performance influence donation behavior.

Findings

- **Propensity Score Matching (PSM) Results:**
 - Additional football win led to a non-significant increase in athletic donations.
 - Non-significant decrease of -137,412 observed in non-athletic donations.
 - Substantial growth in overall alumni donations of 267,379 despite the above.
- **Advanced Machine Learning (ML) Techniques Results:**
 - Smaller, yet more precise adjustments in donation patterns.
 - Athletic donations showed a non-significant change of 10,790 (p-value = 0.412).
 - Significant decrease in non-athletic donations from STE with -137,412 to -23,970.
 - Total alumni donations significantly positively affected, albeit with a smaller impact magnitude than PSM indicated.
- **ML Implications:**
 - Nuanced results highlight the value of integrating ML methodologies.
 - Enhanced understanding of the dynamics between collegiate sports success and alumni donation behaviors.

Discussion

- **Methodological Comparison:**
 - **STE:** Large increase in donations post-football wins.
 - **ML:** More conservative, often non-significant results.
- **Alumni Donations:**
 - **Athletic:**
 - **STE:** Coefficient: 191,200 (p = 0.001).
 - **ML:** Coefficient: 10,790 (p = 0.412).
 - **Nonathletic:**
 - **STE:** Coefficient: -137,400 (p = 0.210).
 - **ML:** Coefficient: -23,970 (p = 0.719).
- **Total Donations:**
 - **STE:** Coefficient: 267,400 (p = 0.450).
 - **ML:** Coefficient: -228,100 (p = 0.187).
- **Implications & Strategy:**
 - Possible donation shifts towards athletic programs.
 - Recommend reviewing university financial strategies.

Conclusions

- **Random Forest Application Findings:**
 - Smaller impact of football wins on alumni donations.
 - Athletic donations: Coefficient of 10,790.
 - Nonathletic donations: Coefficient of -23,970.
 - Overall negative relationship in total donations.
- **Implications for University Funding:**
 - Possible reduction in sports funding due to low returns or losses.
 - Potential improvement in educational facilities and institutional health.
- **Future Research Directions:**
 - Explore impacts of different university departments on institutional health.
 - Identify programs yielding the greatest returns for strategic funding.
 - Potential to enhance higher education quality nationwide.

Literature Review, Distribution Graphs, References, Google Colab Links

