Collegiate Basketball Profits

Predicting US school's basketball profit

Standard Deviants STA 210 Final Project
2023.12.06

TOPIC & MOTIVATION

Topic

Using regression analysis to predict US collegiate basketball profit in the school year of 2019 and understand the categorical and quantitative factors of schools that influence profit.

Motivation

We aim to gain insights into the determinants of collegiate basketball profit, which can be of interest to educational institutions and sports enthusiasts, informing investment strategies and future sport program planning.

INTRODUCTION TO THE DATA

TIDYTUESDAY

Scraped from TidyTuesday. Includes collegiate sport observations from years 2015 to 2019.

VARIABLES

City, state, school name, school classification, sector name, sport, participation rate for women and men, expenditures, revenue, total population, etc.

EQUITY IN ATHLETICS DATA ANALYSIS (EADA)

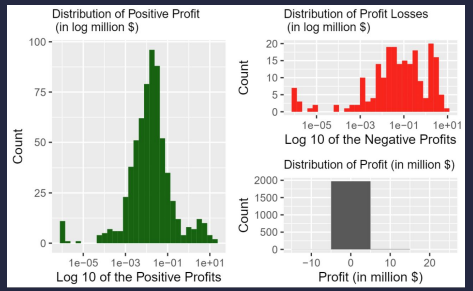
Originally taken from EADA, US Department of Education sector. Equity in Athletics Disclosure Act's annual survey requirement.

RESEARCH QUESTION

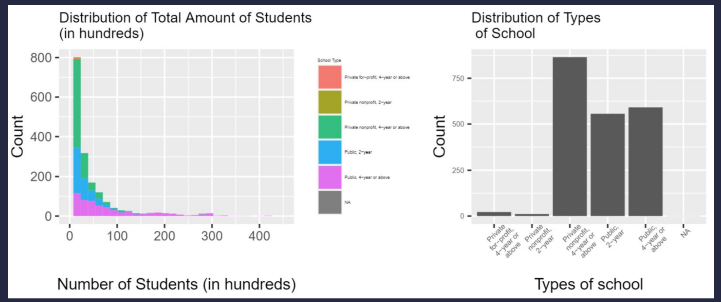
How can we predict collegiate basketball **profit** in USD in 2019 year with participation rate, sector name, classification name, student count, gender ratio, and % women expenditure.

HIGHLIGHTS OF EDA

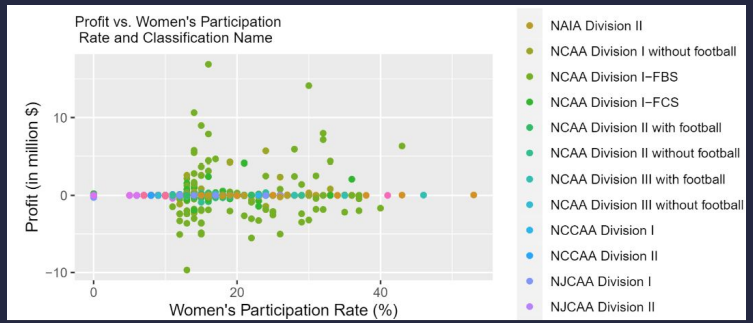
Distribution of response variable



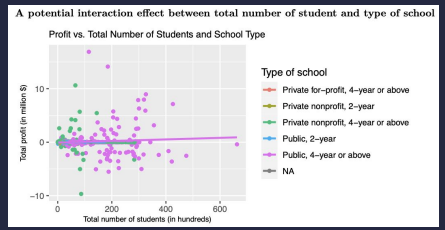
Distribution of the predictor variables

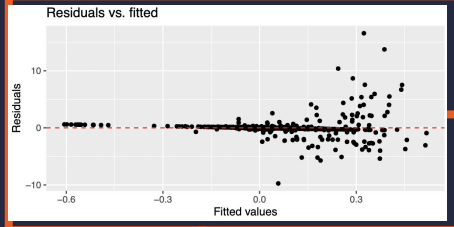


Response variable vs. Predictor variables



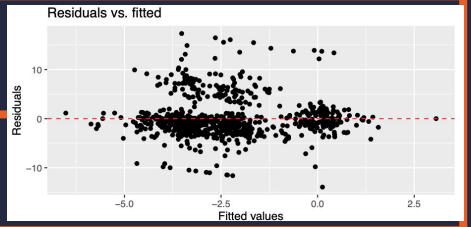
Potential interaction effect between total student count and type of school





FINAL MODEL

$$\widehat{log\_profit} = -2.619 + 0.065 * total\_participation + 0.006 * total\_student\_count - 0.363 * gender\_ratio - 7.178 * percent\_women's\_expenditure$$



Intercept:	For a school that has 0% basketball participation rate, 0 students, 0% of that school's basketball expenditures going towards women's basketball, and the ratio of male population to female population being 0, we expect the profit to multiply by a factor of 0.0728 (exp(-2.619)).
Participation Rate	For every one percent increase in a school's basketball participation rate, we expect on average that the school's profit from basketball in the year 2019 will multiply by a factor of 1.067 (exp(0.065)), holding all else constant.
Gender Ratio	For every one 1 point increase in the ratio of male population divided by female population, we expect on average that the school's profit from basketball in the year 2019 will multiply by a factor of 1.438 (exp(0.363)), holding all else constant.
Student Count	For every 100 student increase in a school's population count, we expect on average that the school's profit from basketball in the year 2019 will multiply by a factor of 1.006 (exp(0.006)), holding all else constant.
% Women Expenditure	For every one percent increase in a school's expenditures that goes towards women's basketball, we expect on average that the school's profit from basketball in the year 2019 will multiply by a factor of 0.00076 (exp(-7.178)), holding all else constant.

INTERESTING MODEL FINDINGS

01

Effect of student gender ratio not significant

term	estimate	std.error	statistic	p.value
(Intercept)	-2.619	0.181	-14.498	0.000
total_partc	0.065	0.032	2.071	0.039
ef_total_count	0.006	0.003	2.318	0.021
gender_r	-0.363	0.394	-0.921	0.358
perc_wom_exp	-7.178	2.013	-3.566	0.000

02

Percentage of women's expenditure is a significant predictor

03

Type of school not useful predictor

04

Total student participation rate is a significant predictor

Conclusions

Discussion

- Using step_recipe(), we concluded that there are no potential interaction effects between gender ratio and percent women expenditure

Limitations

- School year 2019 was the start of COVID 19
- There may be predictors outside the scope of our dataset influencing profit of collegiate basketball

Future Work

- Research longitudinal trends with collegiate basketball profitability
- Study relationship between other sports


THANK YOU