

What is the relationship between spending, retention, and competitive success?

By Dr. Adam Cocco, Anthony Montanaro, and Alan Grosbach

Executive Summary

In this analysis, competitive success was defined as winning percentage and relationships were explored between competitive success and sport expense, sport revenue, retention rate, and net return. Since winning percentage was the metric used to operationalize competitive success, this analysis focused on team sports rather than individual sports. Overall, this analysis revealed significant positive relationships between sport expense and competitive success. This analysis did not reveal a significant relationship between competitive success and sport revenue. This is likely due to low sport revenues reported by a vast majority of NAIA institutions. Furthermore, no significant relationships were discovered when analyzing the correlations between competitive success and retention rate or competitive success and net return. The inconclusive results in these areas support the need for further analysis with longitudinal data.

Practical Considerations:

- ▼ Do men's or women's team sport programs at your institution have higher winning percentages? How does this correlate with spending on men's and women's team sport programs at your institution?
- ▼ What sport(s) at your institution generate the highest amounts of sport-related revenue? Do these sport(s) also generate higher winning percentages compared to other sport programs with relatively lower sport-related revenues?
- ▼ What types of initiatives can you implement at your institution to provide a stronger relationship between a team's winning percentage and retention within that sport?
- ▼ What challenges do you foresee with adding more JV program offerings for sports at your institution?

Success in sports is synonymous with winning. But besides talented athletes and coaches, what external factors contribute to competitive success? Conversely, what benefits can be realized from a winning athletic program? This research brief explores these questions by examining the relationship between sport expense and winning percentage, as well as the relationship between winning percentage and retention.



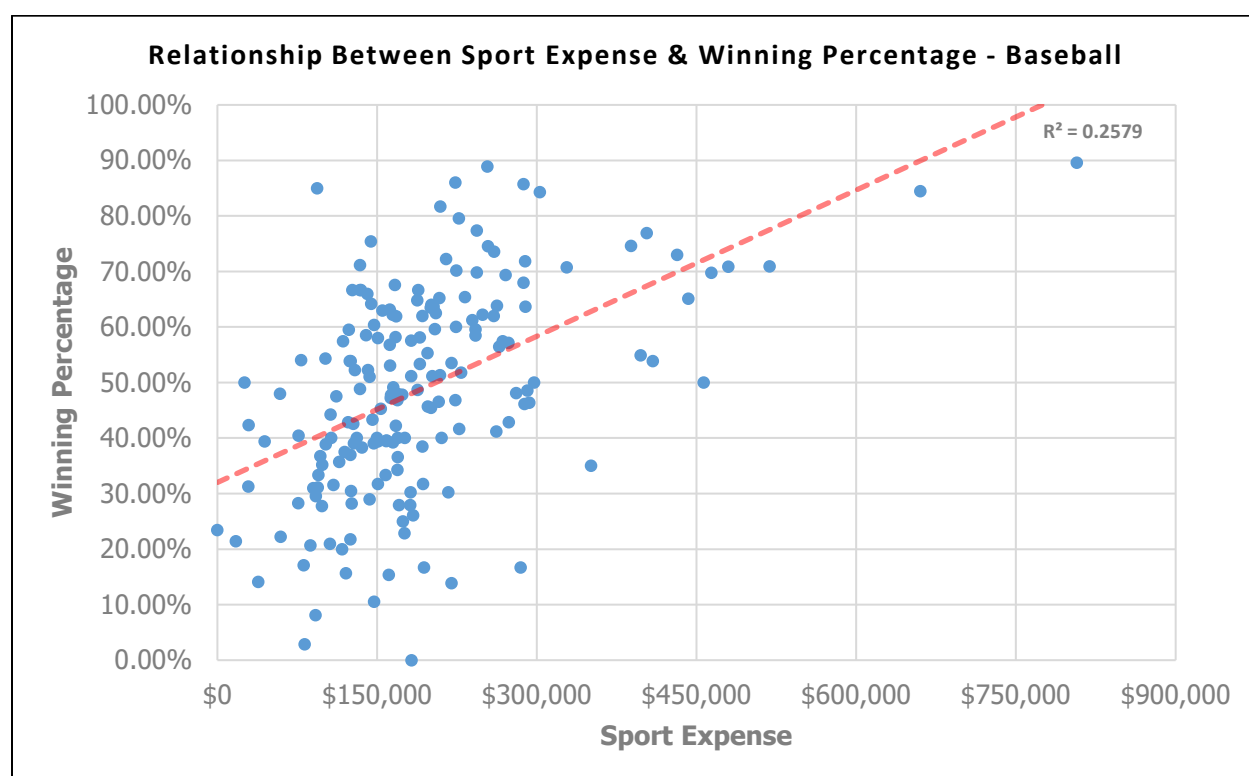
Prior research has suggested positive relationships between sport program expenditures and winning. For example, a study of NCAA Division I Power-5 baseball programs between 2007 and 2014 revealed sport program expenditures explained about 18% of the difference in winning percentages between programs during this timeframe¹.

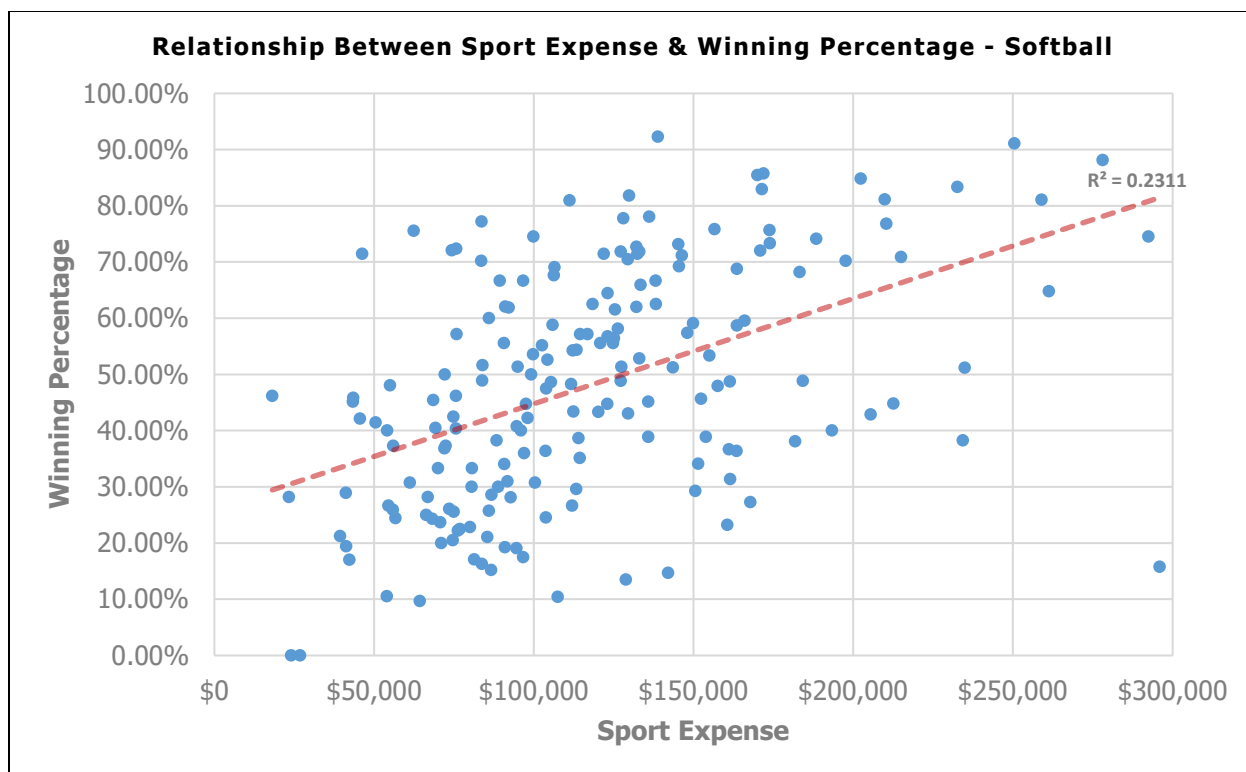
Additionally, research conducted prior to ROA indicated a stronger relationship between athletic program operating expenses and overall athletic program success for NAIA institutions compared to NCAA Division I, II, and III programs². This finding was attributed to the NAIA not providing large shares of revenue to member institutions when compared with the NCAA. Therefore, individual institution investment in sport programs at the NAIA level can lead to larger impacts on the competitive success of NAIA sport programs.

This analysis utilized sport program expenditures and winning percentage data from the 2020-2021 academic year to investigate this relationship among six men's team sports (baseball, basketball, football, lacrosse, soccer, and volleyball) and five women's team sports (basketball, lacrosse, soccer, softball, and volleyball).

Sport program expenditures mainly consist of personnel and operations expenses. While postseason and recruiting expenses are also included in total expenditure, they are minimal when compared to personnel and operations.

Overall, the findings mimic those from prior research: there is a significant, positive relationship between spending and winning among NAIA institutions. The following two graphs provide examples of the positive relationship between expenditures and competitive success for baseball and softball. The upward sloping linear trendlines on each graph indicate institutions with higher spending on these programs tend to also realize higher winning percentages from their teams in these sports.





Overall, the average expenditure for sports included in this analysis ranged from a high of \$470,928 (football) to a low of \$83,344 (men's volleyball).

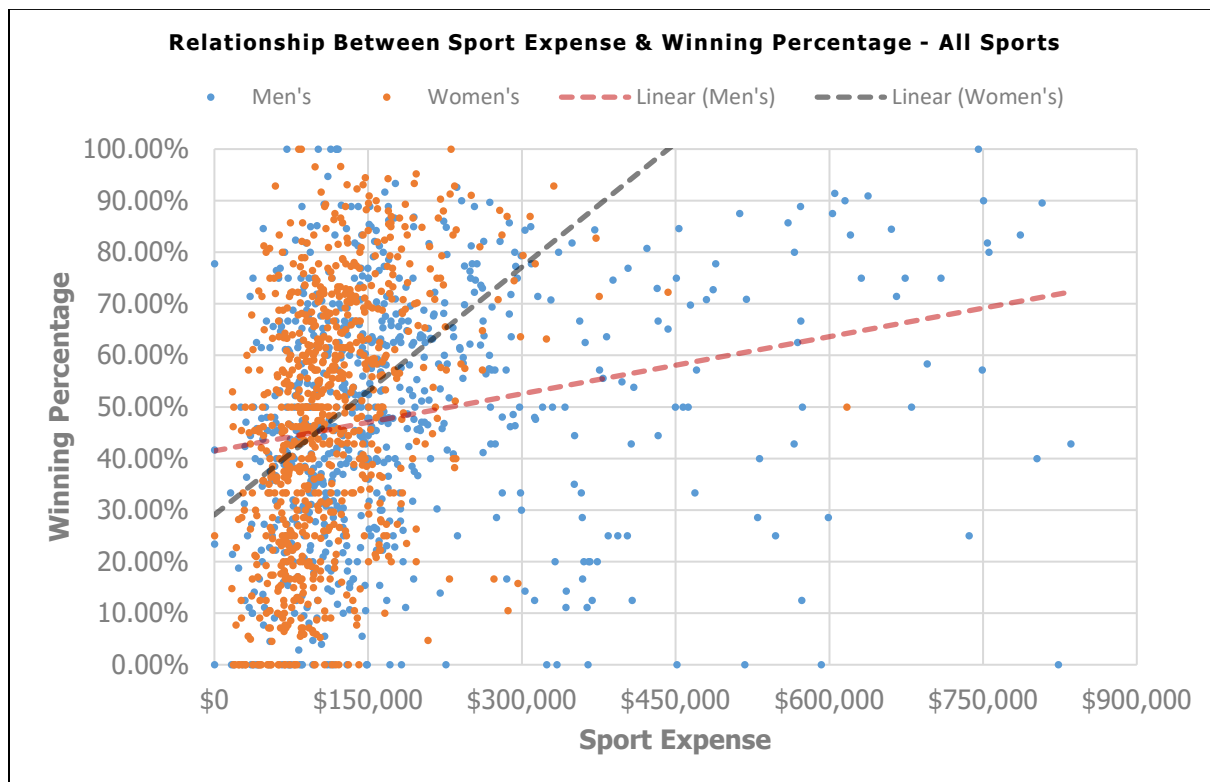
The relationship between spending and winning percentage was further analyzed by examining how much variance in winning percentage was explained by expenditure. Essentially, this analysis attempts to show how the proportion of differences in winning percentage between programs is caused by differences in expenditures between programs.

Results fluctuated from a high of 25.79% of variance in a team's winning percentage explained by program spending (baseball) to a low of 10.19% of variance explained (women's volleyball). The table below provides average program expenditure and percentage of variance in winning percentage explained by program expenditure for each of the sport types examined.



Sport	Gender	Average Expense	Win % Explained
Baseball	Men's	\$191,896	25.79%
Lacrosse	Women's	\$86,411	24.34%
Softball	Women's	\$117,493	23.11%
Volleyball	Men's	\$83,344	19.83%
Basketball	Men's	\$154,588	17.31%
Soccer	Women's	\$103,926	17.19%
Lacrosse	Men's	\$108,573	16.69%
Basketball	Women's	\$133,879	13.47%
Soccer	Men's	\$110,104	11.64%
Football	Men's	\$470,928	10.53%
Volleyball	Women's	\$101,790	10.19%

The following chart displays the relationship between sport spending and winning percentage for all men's and women's sport teams included in this analysis. The data shows a stronger relationship between sport expenditure and winning percentage among women's sports than men's sports, as evidenced by the more upward sloping trendline for women's sports on the chart.



The relationship between a program's winning percentage and sport revenue generated was also analyzed. However, no significant relationships were found for any men's or women's sport program. This finding is due to the relatively low sport program revenues reported by NAIA institutions. Out of the 1,671 sport programs included in this analysis, 1,597 (95.5%) reported revenues below \$100,000. The lack of variability between sport programs relative to revenues generated did not allow for significant relationships to be found when comparing revenue to winning percentage.

Next, an examination of the relationship between winning percentage and retention was conducted. For this analysis, relationships were investigated between winning percentage from the 2019-2020 academic year and retention in the 2020-2021.

Overall, results proved inconclusive. The only sport that demonstrated a significant relationship was women's lacrosse, where prior year winning percentage explained 26.5% of the variance in current year retention. All other sports showed insignificant relationships between these two variables.

It is likely that the inconclusive results from this analysis stemmed from the impact of the global pandemic, on both 2019-2020 sport competition and 2020-2021 retention. Furthermore, the pandemic created an adverse effect on retention across higher education, as indicated by decreases in retention rates across most NAIA sports for 2020-2021 compared to the prior year. Therefore, further analysis on the relationship between winning percentage and retention is required in the coming years as the impact of the global pandemic on athletic competition and retention diminishes.



Notes:

¹Caro, C.A., & Elder, A. (2017). The relationship between spending and winning in college baseball: Is this the new 'arms race' in college athletics? *International Journal of Sports Science & Coaching*, 12(3), 381-397.

²Lawrence, H.J., Li, M., Regas, J.S., & Kander, J. (2012). National Association of Collegiate Directors of Athletics Directors' Cup standings: Predictors of success. *Journal of Issues in Intercollegiate Athletics*, 5, 207-224.

ROA retention data used in this research included 240 NAIA institutions for the 2020-2021 academic year and 70 NAIA institutions for the 2019-2020 academic year.

Winning Percentage = $(\text{Wins} + 0.5 \times \text{Ties}) / (\text{Wins} + \text{Losses} + \text{Ties})$

Sport Expense = (Recruiting Expense + Personnel Expense + Operations Expense + Postseason Expense)

Sport Revenue = (Ticket & Program Sales + Ad Sales + Sponsorships)

Retention Rate = $[\text{Returning Students} / (\text{Total Students} - \text{Graduates})] \times 100\%$

Key Takeaways:

- ▼ There is a significant relationship between sport expenditure and winning percentage at the NAIA level. Baseball (25.79%), women's lacrosse (24.34%), and softball (23.11%) witnessed the most variance in winning percentage explained by an institution's expenditure on those sports.
- ▼ Overall, there is a stronger relationship between sport expenditure and winning percentage for women's team sports (basketball, lacrosse, soccer, softball, and volleyball) compared to men's team sports (baseball, basketball, football, lacrosse, soccer, and volleyball).
- ▼ There is no significant relationship between winning percentage and sport revenues generated. This is due to the relatively low level of sport revenues reported by NAIA institutions (95.5% of sport programs included in this analysis reported sport-related revenue below \$100,000).
- The relationship between prior year winning percentage and current year retention was inconclusive. This is likely due to the impact of the global pandemic on both athletic competition and retention over the past two years.

