

Abstract

This study explores the relationship between allocation of payroll and player retention to team performance in the National Hockey League (NHL). Specifically, the analysis focused on payroll allocation and player retention to measure team investment and team stability, respectively. Results revealed a positive correlation between payroll allocation and team performance, with teams that invest more in talent achieving better records. Additionally, we find that teams with high player retention rates also tend to perform better, suggesting that team stability is a key factor in success on the ice. These findings have important implications for NHL team management and suggest that strategic investments in talent and efforts to retain key players can lead to better performance and more successful seasons.

Introduction

- The NHL is a highly competitive sports league with success determined by various factors
- Payroll allocation and player retention are critical aspects of team management
- Payroll allocation refers to the amount of money a team invests in its players
- Player retention refers to a team's ability to keep its key players over time
- Understanding the relationship between payroll allocation, player retention, and team success can provide valuable insights for NHL team management.

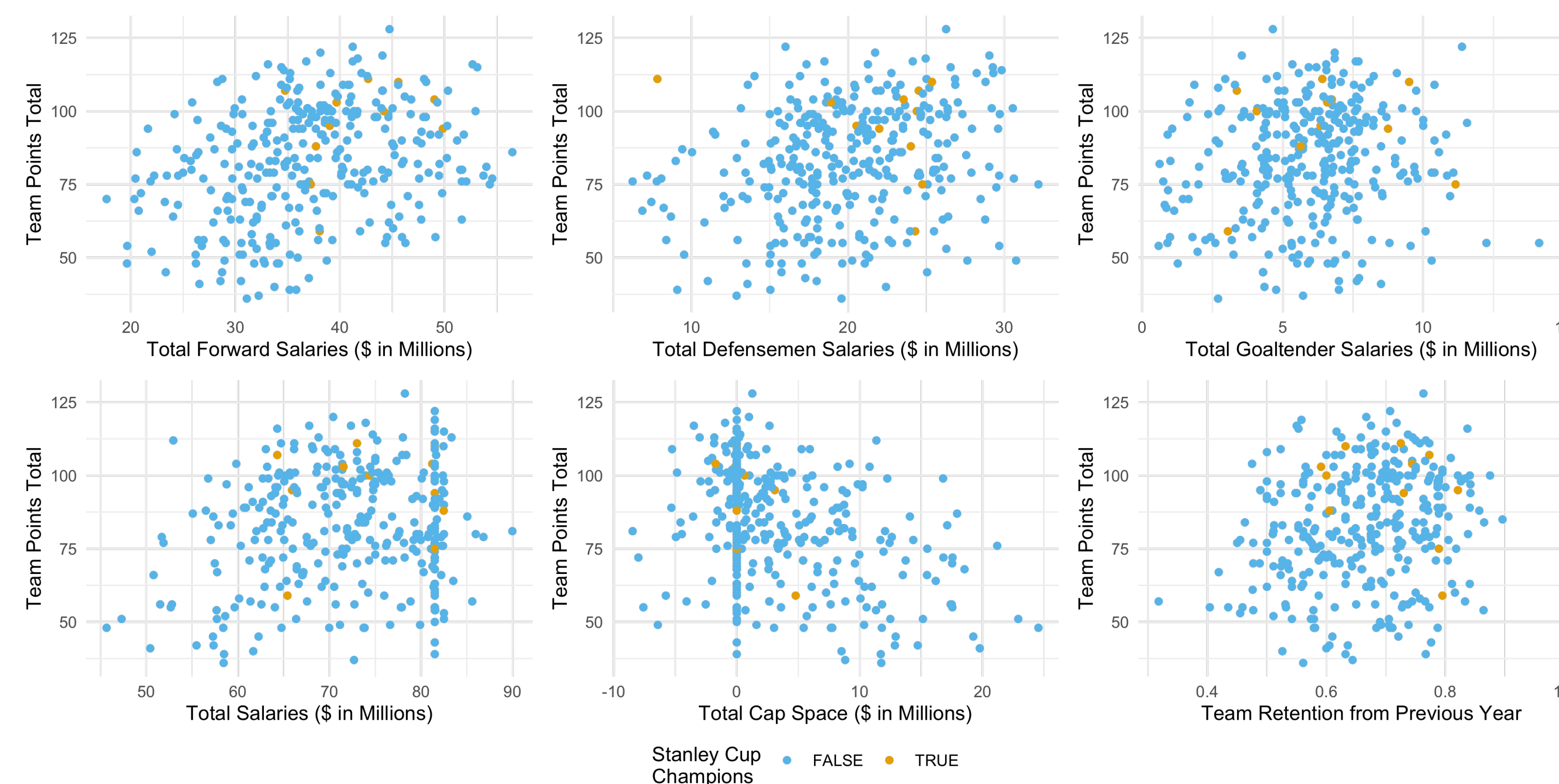
Hypotheses

- Positive correlation between team retention, payroll usage and regular season success in the NHL
- Teams with high player retention rates and larger payrolls are expected to perform better in the regular season
- Investing in talent and retaining key players promote team stability and cohesion, important factors for success in the NHL
- Higher payrolls provide teams with greater resources to acquire and retain top talent, giving them a competitive advantage
- Overall, we expect to find a strong positive relationship between team retention, payroll usage, and regular season success in the NHL.

Methods

- Data was collected from hockeydb.com (Rosters) and spotrac.com (payroll) from 2012-2022
- Conducted simple and multiple linear regression analyses
- Used data visualization techniques
- Conducted an analysis of skedasticity and multicollinearity
- Identified patterns and relationships in the data
- Assessed the strength and significance of the relationship between team retention, payroll usage, and regular season success in the NHL

Results



- We visualized the explanatory variables to check for any immediate, eye-catching trends
- From the visuals, we see a relationship between Total Team Points and Forward Salaries, Defensemen Salaries, and Total Cap Space
- We ran stepwise models, both forward and backward to find the best model
- This yielded a model with the explanatory variables in the table below
- While some of the graphs may not appear to show a clear relationship, they are still significant predictors

	Estimates	VIF	Correlation
Intercept	99.9658	NA	NA
Forward Salaries	0.6643	1.9858	0.296
Defense Salaries	0.7757	1.3067	0.259
Goaltender Salaries	0.7842	1.0791	0.091
Total Cap	-0.9179	2.8396	0.158
Cap Space	-1.4068	2.3194	-0.374
Player Retention	13.5283	1.1130	0.198

	Test Statistic	df	p-value
Breusch-Pagan Test	6.7935	6	0.3404

- Cap Space, Forward Salaries, and Defense Salaries have the largest impact on Total Points
- Goaltender Salaries has the smallest impact
- Using Variance Inflation Factor, we see Total Cap and Cap Space are moderately correlated with other explanatory variables
- Breusch-Pagan test shows that heteroskedasticity is not a concern

Conclusions

- Weak positive correlations between team retention, payroll usage, and regular season success in the NHL (excluding Cap Space)
- Higher player retention rates and larger payroll allocations tended to result in better regular season performance
- Other factors, such as coaching and team strategy, may also play a role in determining team success
- Strongest correlation between payroll allocation and team success for forwards and defensemen, weaker for goaltenders
- Strategic investments in talent and efforts to retain key players are important, particularly for certain positions
- Insights may also apply to playoff success and could be useful for teams looking to improve their overall performance

References

Lewis, M. (2003). Moneyball: The art of winning an unfair game. W.W. Norton.

Piepiora, Paweł, and Zbigniew Piepiora. 2021. "Personality Determinants of Success in Men's Sports in the Light of the Big Five" International Journal of Environmental Research and Public Health 18, no. 12: 6297. <https://doi.org/10.3390/ijerph18126297>

Schuckers, Michael E. and Argeris, Steve. 'You Can Beat the "market": Estimating the Return on Investment for NHL Team Scouting'. 1 Jan. 2015 : 111 – 119.

Payroll Data: spotrac.com
Roster Data: hockeydb.com

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