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ECON 0150

Final Project

Taxes & Talent: An Economic Analysis of NHL Scoring Incentives

Introduction and Question

The National Hockey League operates under a hard salary cap, meaning every team has the exact same amount of money to spend on player salaries which was $88 million for the 2024-25 season. However, tax laws vary significantly across North America. We hypothesize that teams in low-tax jurisdictions possess a competitive advantage in the labor market. By offering higher real wages (net income) for the same nominal cap hit, these teams should be able to attract superior offensive talent at a lower cost than their high-tax competitors.

For example, a player earning $10 million in Florida (0% state income tax) takes home significantly more net income than a player earning the same gross salary in Ontario or California (where combined marginal rates can exceed 50%). Our research question asks:

Do NHL teams located in jurisdictions with lower effective tax rates score more goals? This project analyzes whether this financial advantage translates into measurable on-ice performance.

Data Description and Sources

The performance data was sourced from Moneypuck.com (2024), specifically using the Goals For metric for all NHL teams. To account for season-to-season variance such as things like injuries or luck, we calculated the average goals scored per team across the available seasons in the dataset.

For the tax data, we compiled 2024-2025 effective tax rate estimates for all 32 NHL franchise locations using data from PuckPedia and The Hockey News. These rates include federal, state/provincial, and local income taxes applicable to high-income earners.

Summary Statistics

The average effective tax rate across the 32 franchises is 46.5%, with significant variation ranging from a low of 40.2% (Seattle Kraken) to a high of 53.2% (Montreal Canadiens). The outcome variable, Average Goals, has a mean of approximately 1.16 across the sample.

One major adjustment was required for franchise relocation. The Arizona Coyotes franchise became the Utah Hockey Club starting in the 2024-25 season. To ensure historical performance data was preserved but attributed to the correct current tax jurisdiction, we reclassified all Arizona data as "Utah Hockey Club" and applied Utah's effective tax rate (approx. 43.6%).

Methodology
To quantify the relationship between tax burdens and offensive output, we employed an Ordinary Least Squares (OLS) simple linear regression model. The model estimates the equation:

$$Y = \beta_0 + \beta_1 X + \epsilon$$

Where Y is the Average Goals Scored and X is the Effective Tax Rate (%). The coefficient beta1 isolates the expected change in goals scored for every 1 percentage point increase in the tax rate. A negative coefficient would support our hypothesis that higher taxes correlate with lower scoring. This simple model focuses on the bivariate relationship and does not control for confounding factors such as coaching quality or draft position.

Results and Analysis

Effect of Tax Rate on Average Goals Scored (Multi-Season)
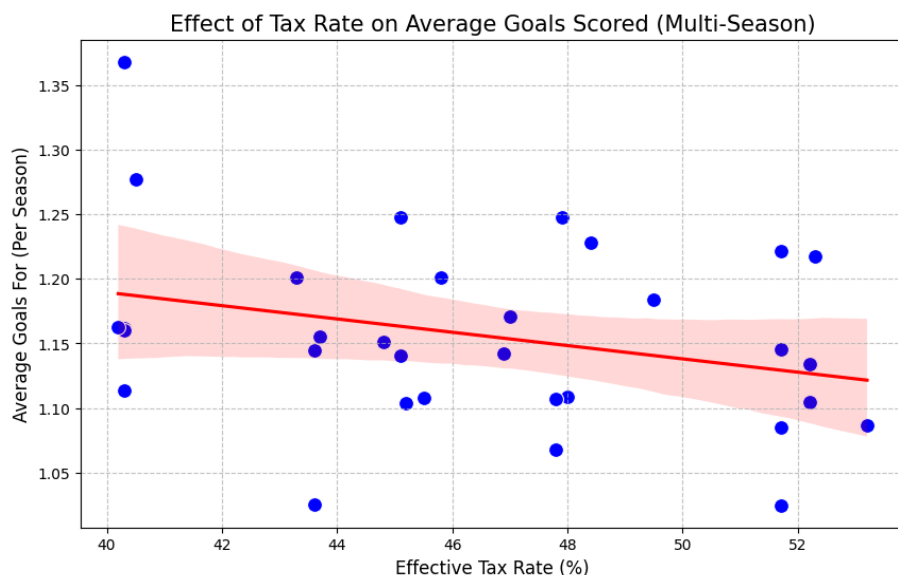
The visualization shows a visible downward trend with the (Tampa Bay Lightning being in upper left with an average goals of 1.367939), suggesting that as tax rates rise, scoring output tends to decrease. The regression analysis yielded the following results:

- Coefficient beta: -0.0051
- P-Value: 0.096
- R-Squared: 0.090

Interpretation:

The coefficient of -0.0051 indicates a negative relationship. For every 1% increase in a team's tax rate, their average scoring output decreases by approximately 0.005 goals. While the effect size is small, the direction supports the economic hypothesis.

The P-value of 0.096 indicates that this result is marginally statistically significant at the 10% level, though it falls just outside the standard 5% threshold ($p < 0.05$). This suggests there is roughly a 90% probability that the relationship between taxes and goals is real and not due to random chance. The R-squared value of 0.090 implies that effective tax rates explain roughly 9% of the variation in NHL scoring, confirming that while taxes are a factor, they are not the sole driver of success.

Model Validity
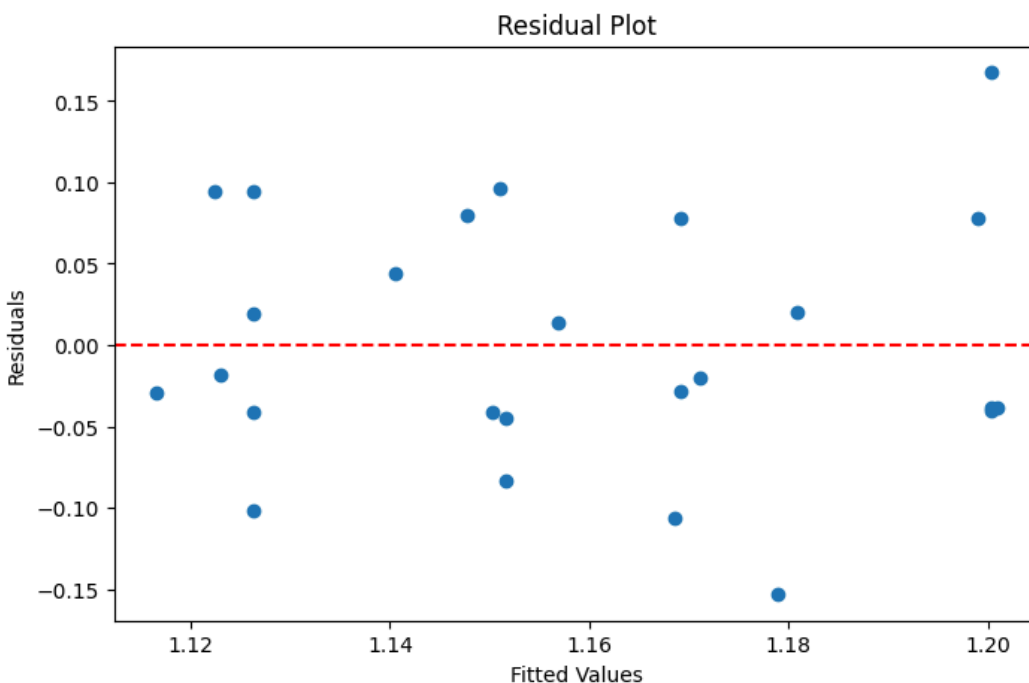
To assess the validity of the model, we examined the residual plot. The residuals appear randomly distributed around the horizontal axis with no obvious non-linear patterns or fan shapes (heteroscedasticity). This suggests that the linear model is an appropriate fit for this data and the assumptions of OLS are generally met.

Conclusion

Our analysis provides suggestive evidence that NHL performance is influenced by economic incentives. The data shows a marginally significant negative correlation between tax rates and goals scored, supporting the theory that low-tax environments help teams acquire better talent. However, the relatively low R-squared value indicates that while taxes provide a competitive edge, they are not a guarantee of winning; factors like coaching, drafting, and injuries likely account for the remaining 91% of the variance.

Future analysis could be improved by calculating Jock Taxes (taxes paid in every state games are played in) for a more precise effective tax rate or by controlling for the average age of the team's roster.

References

1. Moneypuck.com. (2024). *NHL Teams Data (All Situations)*. Retrieved from http://moneypuck.com/data.htm.
2. PuckPedia & The Hockey News. (2024). *NHL Player Tax Burden Analysis*. (Used to estimate 2024 effective tax rates by jurisdiction).
3. Python Libraries: Pandas, Statsmodels, and Seaborn were used for data processing and regression analysis.