

The NHL Salary Cap and Competitive Balance

Econ 438 – Paper 3

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History & Pre-Existing Literature

Lee, 2020

During the 2004-05 collective bargaining negotiations with the desire to implement a salary cap, NHL teams were spending approximately 75% of their revenues on player salaries, which is much more than other North American professional leagues.

Lee, 2020

Investigated the effects of unrestricted free agency and the salary cap on NHL competitive balance. The study concluded that unrestricted free agency had minimal impact, but that the salary cap increased competitive balance.

Grossman, 2010

Analyzed how competitive balance and team revenues were impacted by the introduction of a hard salary cap. He found that team revenues, especially for smaller-market teams, benefited but he did not conclusively show that competitive balance improved.

Grant, 2008

Examined whether implementing a salary cap resulted in redistributing top talent across teams. He concluded that there was evidence that it led to more equitable distribution of talent.

Brinkman, 2006

Focused on revenue sharing's role alongside payroll caps in promoting competitive balance. He found that payroll alone did not determine team performances, but other factors such as management decision were significant.

Lee, 2021

Found increased parity post-cap introduction based on year-to-year performance correlations between winning percentages before versus after introducing free agency rules combined with stricter payroll limits.

Statistical Metrics

The Gini coefficient for each season was calculated using the formula:

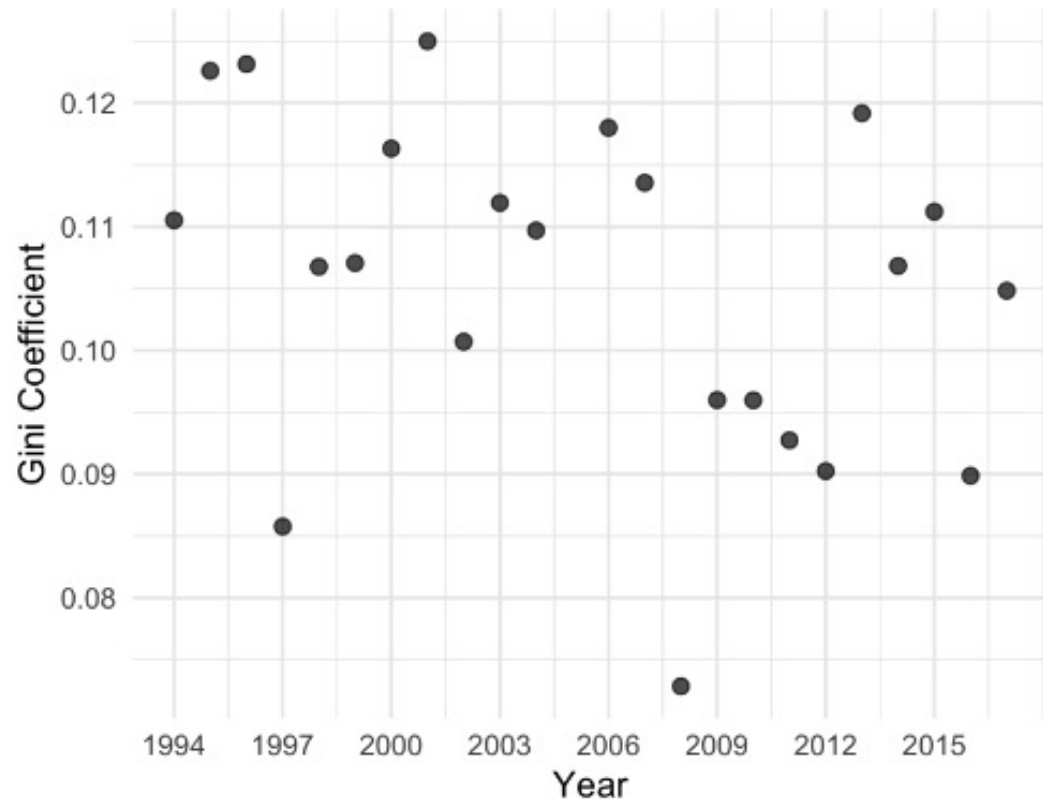
$$G = \frac{\sum_{i=1}^n \sum_{j=1}^n |x_i - x_j|}{2n^2\bar{x}}$$

Where x_i and x_j are the win percentages of teams i and j , n is the number of teams, and \bar{x} is the mean win percentage.

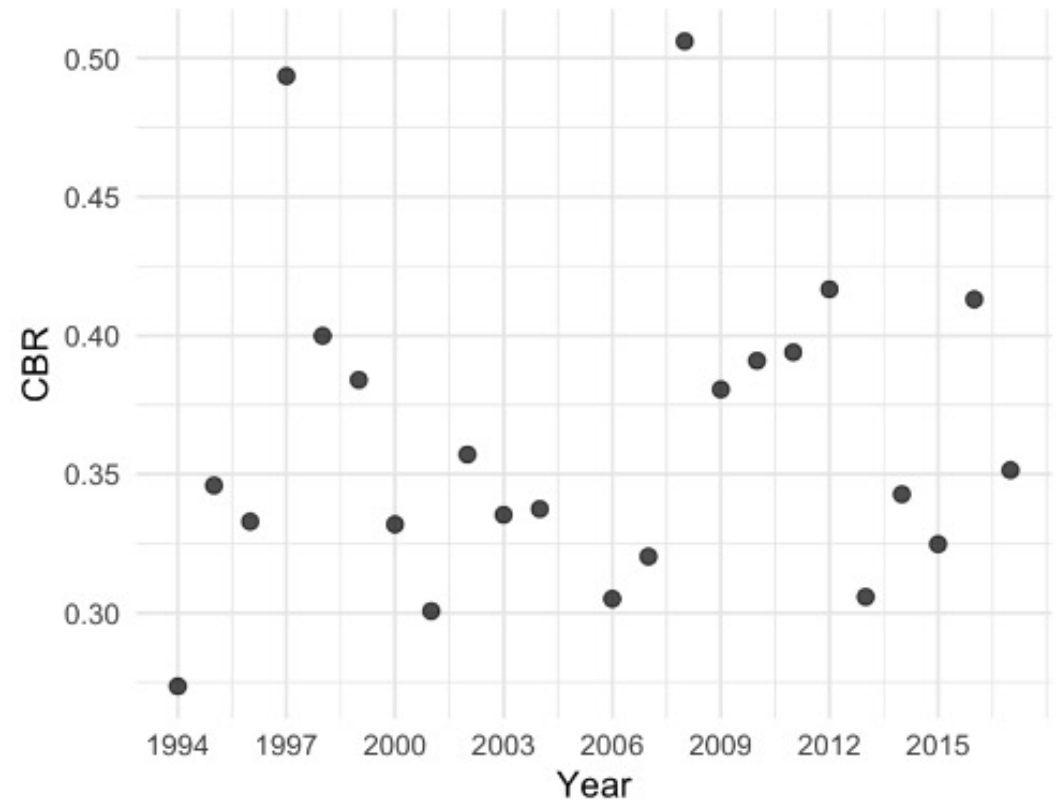
The CBR was calculated for each season using the formula:

$$CBR = \frac{\sigma_{\text{actual}}}{\sigma_{\text{ideal}}}$$

Where σ_{actual} is the standard deviation of team win percentages in a season, and σ_{ideal} is the standard deviation in a perfectly balanced league.



(a) Gini Coefficients



(b) Competitive Balance Ratios

Regression Equations

$$\text{gini} = \beta_0 + \beta_1 \times \text{year} + \beta_2 \times \text{cap} + \epsilon$$

Table 2: Gini Regression Results

| | <i>Dependent variable: gini</i> | |
|-------------------------|---------------------------------|------------------------|
| | <i>With Outlier</i> | <i>Without Outlier</i> |
| year | -0.00004 (0.001) | -0.00003 (0.001) |
| cap | -0.009 (0.012) | -0.009 (0.011) |
| Constant | 0.192 (1.630) | 0.640 (1.499) |
| Observations | 23 | 22 |
| R ² | 0.144 | 0.245 |
| Adjusted R ² | 0.058 | 0.165 |
| Residual Std. Error | 0.013 (df = 20) | 0.012 (df = 19) |
| F Statistic | 1.682 (df = 2; 20) | 3.080* (df = 2; 19) |

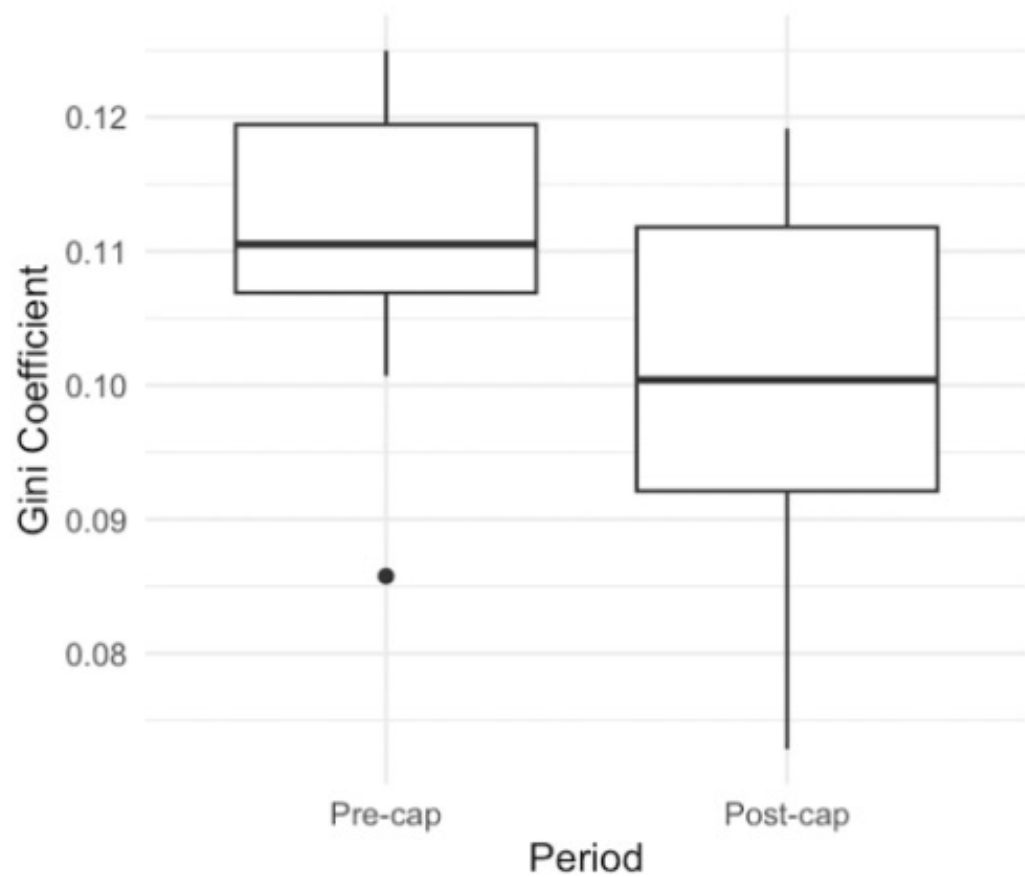
Note: *p<0.1; **p<0.05; ***p<0.01

$$\text{CBR} = \beta_0 + \beta_1 \times \text{year} + \beta_2 \times \text{cap} + \epsilon$$

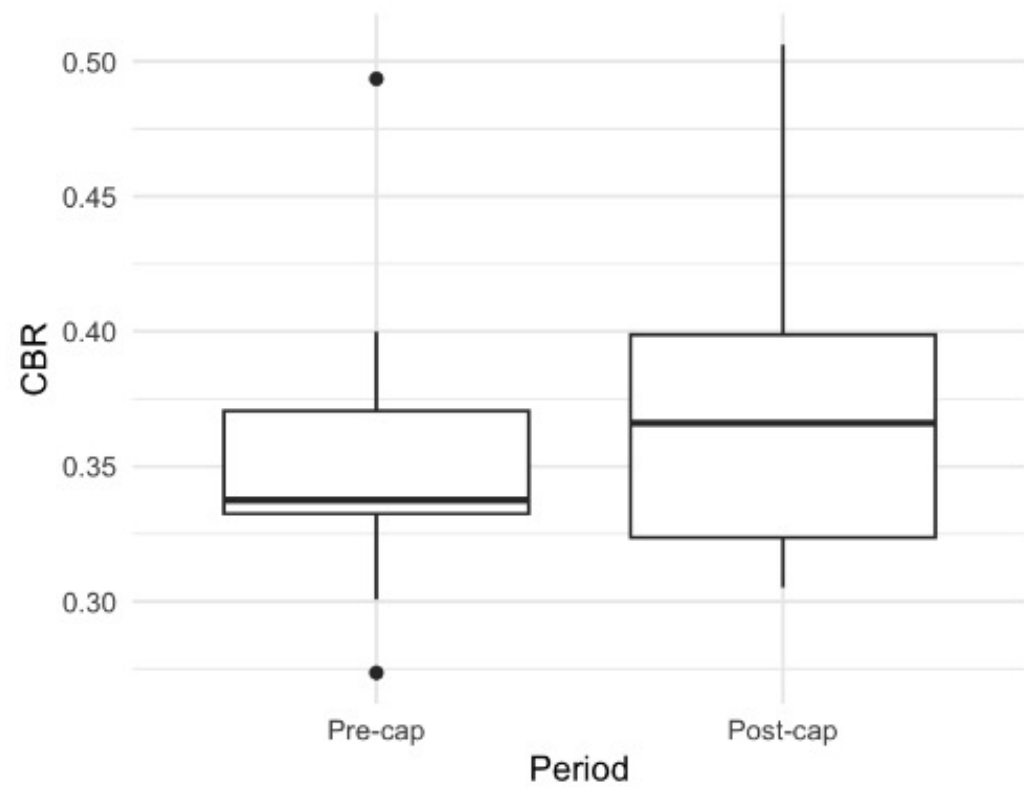
Table 3: CBR Regression Results

| | <i>Dependent variable:</i> |
|-------------------------|----------------------------|
| | CBR |
| year | -0.001 (0.004) |
| cap | 0.031 (0.053) |
| Constant | 2.541 (7.472) |
| Observations | 23 |
| R ² | 0.027 |
| Adjusted R ² | -0.070 |
| Residual Std. Error | 0.059 (df = 20) |
| F Statistic | 0.280 (df = 2; 20) |

Note: *p<0.1; **p<0.05; ***p<0.01



(a) Gini Coefficients



(b) Competitive Balance Ratios

Results

| Metric | Gini | CBR |
|-------------------------|---------|--------|
| Pre-cap gini | 0.1109 | 0.7506 |
| Post-cap gini | 0.1009 | 0.8591 |
| Difference (Post - Pre) | -0.0099 | 0.1086 |
| Z-score | -0.0772 | 0.6594 |
| P-value | 0.5308 | 0.2548 |

While some studies have shown clear benefits of caps in other leagues, my findings suggest that in the NHL, the impact may be less pronounced or confounded by other factors. This aligns with the varied findings across different sports leagues, indicating that the effectiveness of salary caps may be context-dependent and influenced by league-specific factors.

- The salary cap has helped prevent escalating player costs and improved league sustainability, but has faced criticism for potentially limiting player earnings, especially for star players.
- Teams have attempted to circumvent the cap, leading to periodic adjustments in collective bargaining agreements to close loopholes.
- While concerns exist about the cap's impact on the NHL's global competitiveness, the league has largely maintained its status as the premier hockey league worldwide.