Analyzing the Value of Consistency Among NHL Players Performance

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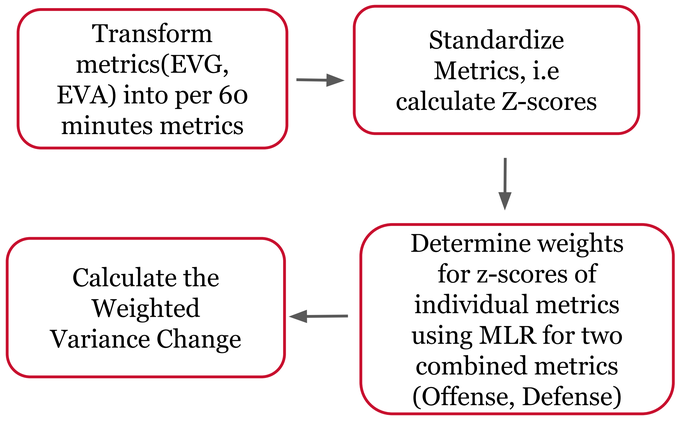
Background & Data

Background
Consistency, the quality of being able to maintain high or low level performance, is the hallmark of athlete importance and investment.

Research Question
Do NHL teams value consistently performing NHL players?

Data
10 seasons (2015-16 season to 2024-25 season) of combined advanced, basic and miscellaneous on ice performance statistics data from Hockey-Reference and salary data from CapWages

Methods

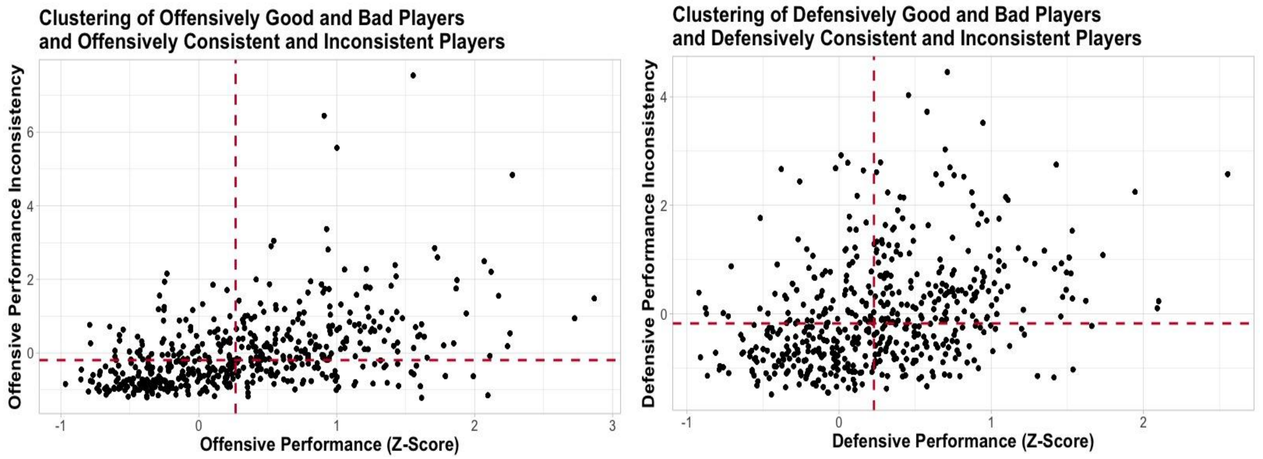


The **Weighted Variance Change** of overall trend in a player's offensive and defensive performance consistency is given by

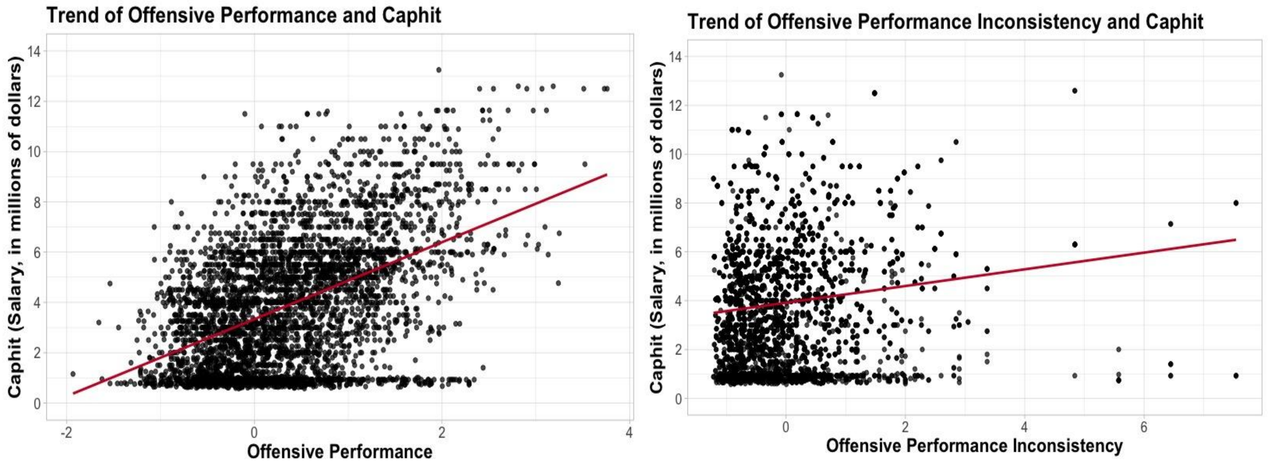
$$\frac{\sum_{i=1}^{n} w_i \cdot (x_n - \bar{x}_w)^2}{\sum_{i=1}^{n} w_i}$$

where the numerator is the variance difference of a metric from one season to the next and the weights are games played (GP) for each season.

Results



Figures 1, 2. Players clustered into 4 quadrants of different offensive and defensive consistencies and skill levels: Top left - low skill, inconsistent, Bottom left - low skill, consistent, Top right - high skill, inconsistent, Bottom right - high skill, consistent



Figures 3, 4. Linear trends of Offensive Performance and Consistency against a player's cap hit

Table 1. Linear Regression Outputs of Three Models on Cap Hit

	Combined Model	Offensive Model	Defensive Model
(Intercept)	−7.957***	−8.024***	−8.425***
	(0.246)	(0.243)	(0.262)
Offensive Performance	1.292***	1.220***	
	(0.058)	(0.040)	
Defensive Performance	−0.105		1.111***
	(0.068)		(0.050)
Offensive Inconsistency	0.270***	0.273***	
	(0.042)	(0.040)	
Defensive Inconsistency	0.008		0.122***
	(0.035)		(0.036)
Age	0.209***	0.210***	0.209***
	(0.007)	(0.007)	(0.008)
Avg. Time on Ice	0.328***	0.329***	0.361***
	(0.008)	(0.008)	(0.009)
Off. Performance X Off. Inconsistency	−0.169***	−0.170***	
	(0.030)	(0.028)	
Def. Performance X Def. Inconsistency	−0.043		−0.256***
	(0.039)		(0.040)
Number Observations	4031	4031	4031
R2	0.530	0.529	0.453

* p < 0.05, ** p < 0.01, *** p < 0.001

Table 2. Top 5 Players in Offensive Performance and Consistency

	Offensive Performance	Offensive Inconsistency
Sidney Crosby	2.096	−1.149
Cale Makar	1.615	−1.216
John Tavares	1.607	−0.903
Mark Scheifele	1.449	−0.892
Jakub Voracek	1.366	−0.808

Table 3. Top 5 Players in Defensive Performance and Consistency

	Defensive Performance	Defensive Inconsistency
Patrice Bergeron	1.538	−1.030
Cale Makar	1.412	−1.176
David Pastrnak	1.304	−1.148
Quinn Hughes	0.916	−1.006
Tomas Hertl	0.888	−0.861

Discussion

- Teams value performance far more than consistency, especially offensive performance
- Offensive performance, age, and ice time are the strongest salary predictors
- Inconsistency sometimes increases salary, likely reflecting teams paying for high upside rather than steadiness
- Interaction effects show high performers are penalized if too inconsistent, but inconsistency alone isn't rewarded
- Defensive contributions are harder to price, with weaker model fit and smaller effects
- Teams favor offense, usage, and experience; defense and intangibles are undervalued

Works Cited & Repository