NHL SALARY PREDICTOR: TOP 10 MOST UNDERPAID NHL HOCKEY PLAYER DURING 2018/2019 SEASON

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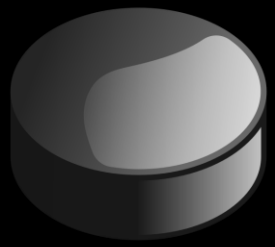
INTRODUCTION

- Player stats are the main source of data used during salary negotiations
- Strong offense attracts fans(goals, assists), strong defense (Hits, Blocked shots, Takeaways) wins championships
- Model to evaluate player salary are useful to NHL management teams and general sports fans interested in sports economics



DATA

- Player stats (basic and advanced) from the 2018-2019 season was collected from https://www.hockey-reference.com/leagues/NHL_2019_skaters.html
- Player salary details were extracted from https://www.spotrac.com/nhl/rankings/

PLAYER	Salary
Connor McDavid	12500000
John Tavares	11000000
Carey Price	10500000
Patrick Kane	10500000
Jonathan Toews	10500000
William Nylander	10200000

Player	CF%	oiSH%	TOI/60	TK
Justin Abdelkader\abdelju01	46	6.7	15:23	9
Pontus Aberg\abergpo01	51.5	7.8	14:36	15
Vitaly Abramov\abramvi01	40.9	0	13:52	4

Player	Age	Pos	GP	G	A	PTS	EVG	PPG	GWG	EVA	PPA	S	BLK	HIT	FOW	FOL
Justin Abdelkader\abdelju01	**31**	**LW**	**71**	**6**	**13**	**19**	**4**	**1**	**0**	**12**	**1**	**95**	**34**	**185**	**52**	**51**
Vitaly Abramov\abramvi01	**20**	**RW**	**1**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**1**	**0**	**0**	**0**
Noel Acciari\acciano01	**27**	**C**	**72**	**6**	**8**	**14**	**6**	**0**	**2**	**8**	**0**	**99**	**36**	**221**	**200**	**203**

DATA

Assumptions:

- Players who played on multiple teams had their stats combined
- Players who played fewer than 25 games were excluded to avoid potential outliers
- Only forwards were included as they are evaluated differently with defensemen and goalie

Stats Explanation:

- CF% (Corsi For at Even Strength): Above 50% means team had more puck control when player was on-ice
- oiSH% (On-Ice shooting percentage): Team's shooting percentage when player was on-ice
- TK (Takeaways), PPG (power-play goals), EVA(even strength assist), FOW (Face off won)

METHODOLOGY

- Multiple Linear Regression Model
- Dependent Variable: Salary
- Independent Variables: Age, Even-strength goals, Even-strength assist, Power-play goals, Power-play assist, block shots, hits, CF%, oiSH%, Takeaways, Points/Game

Predicted Formula using 80% data set for training and 20% for testing

- Salary = 271915.283*(Age)-2175.34239*(EVG)-304.971710*(EVA)-22295.3934*(PPG)+17810.4999*(PPA)-3151.58102*(Blk)+100.658950*(Hit) -52667.1487(CF%)-179646.565*(oiSH%)+24805.7123(TK)+5399262*(PointsPerGame)-3340986.63

ANALYSIS

Top 10 underpaid players according to model:

Note: Variance score: 0.62 where 1 is perfect prediction

Age	Player	PointsPerGame	EVG	HIT	BLK	CF%	TK	oiSH%	Salary In Million (USD)	Salary_Prediction In Million (USD)	Difference In Millions (USD)
22	Mikko Rantanen	1.18	15	59	41	53.9	39	9.8	0.894	5.158	4.264
21	Sebastian Aho	1.01	23	65	34	57.2	81	10.0	0.925	5.169	4.244
22	Brayden Point	1.16	21	31	43	51.9	35	11.1	0.687	4.677	3.99
25	Nikita Kucherov	1.56	26	44	31	52.6	58	11.8	4.766	8.515	3.748
24	Jake Guentzel	0.93	33	105	47	52.7	45	10.3	0.734	4.433	3.698
39	Chris Kunitz	0.18	5	85	15	50.9	13	6.4	1.0	4.676	3.676
21	Auston Matthews	1.07	25	28	60	53.1	57	10.0	0.925	4.593	3.668
37	Matt Hendricks	0.12	0	80	16	47.9	5	5.2	0.700	3.990	3.290
33	Brad Richardson	0.41	16	63	55	49.0	27	7.7	1.25	4.348	3.098
21	Mathew Barzal	0.76	15	25	56	52.2	66	8.0	0.863	3.908	3.044

DISCUSSION

7 players had high PointsPerGame and EVG as key offensive stats. Below players all received lucrative contract extensions

- Austin Matthews: 5Y/58 Million
- Sebastian Aho:5Y/42 Million
- Mikko Rantanen: 6Y/55.5 Million
- Brayden Point: 3Y/20 Million
- Nikita Kucherov: 8Y/76 Million
- Jake Guentzel: 5Y/30 Million
- Matt Barzal (Rumor of long contract extensions- Soure: https://eyesonisles.com/2020/02/19/islanders-mathew-barzal-will-get-paid-next-contract/)

3 players are defensive minded players with high HIT and CF% makes them invaluable especially during play-offs. Example- Chris Kunitz was key contributor to Penguins & Ducks Stanley cup runs

CONCLUSION

- Project shows the complexity of predicting player value
- Both offensive and defensive stats are important for a player's value and teams have shown to offer large contracts to "defensive specialists"
- More season's data are required for more accurate model