Judgement Under Uncertainty:
An Empirical Evaluation of NHL Draft Picks
Other Sports

1. Abstract

1.1. Introduction

Are National Hockey League (NHL) executives effectively assessing the value of their draft picks? This paper constructs a rigorous framework for market values of NHL draft picks and their deviation from pick value based on player performance. Past research has been insufficient in several regards, including small sample of draft picks, lack of detailed statistical analysis, or ineffective comparison methodology for different positions. This paper addresses these deficiencies and provides effective strategies to optimize player return from the NHL Entry Draft.

1.2. Methodology

Draft trades were webscraped from ProSportsTransactions [1]. 356 trades from 1980-2020 involving only draft picks were separated into two groups: 191 involving picks from the current year, and 165 involving both current and future picks. Applying Thaler and Massey's methodology, a two-parameter Weibull distribution was used to model the picks:

$$\sum_{i=1}^{m} v(t_i{}^H) = \sum_{j=1}^{n} v(t_j{}^L) \tag{1}$$

$$v(t_i{}^r) = e^{-\lambda(t_i{}^r - 1)^\beta} \tag{2}$$

where m picks are traded from the team trading down for n picks from the team trading up, and β and λ are the parameters to be estimated [2]. Combining these equations:

$$t_i{}^H = \left(-\frac{1}{\lambda}\log\left(\sum_{j=1}^{n} e^{-\lambda(t_i{}^r - 1)^\beta} - \sum_{i=2}^{m} e^{-\lambda(t_i{}^H - 1)^\beta}\right)\right)^{1/\beta} + 1 \tag{3}$$

The point shares of players from the 1980-2010 draft classes were then webscraped from hockey-reference.com [3]. This dataset included 7751 players: 4451 forwards, 2532 defensemen, and 768 goalies. The point-shares of each player was normalized against their draft class. The mean value of each draft pick was then modeled using a two-parameter Weibull distribution. This process was repeated for each position.

In addressing the deficiencies outlined in the introduction, this methodology uses a 40-year sample of draft trades, a statistical analysis method which models the NFL Trade Value Chart, and a point-shares statistic which applies a positional adjustment.

1.3. Results

Applying (3), the distribution was modeled with $\lambda = 0.304$ and $\beta = 0.581$ (MPE = 9.91%), acheiving an R^2 score of 0.934 (See Figure 1).
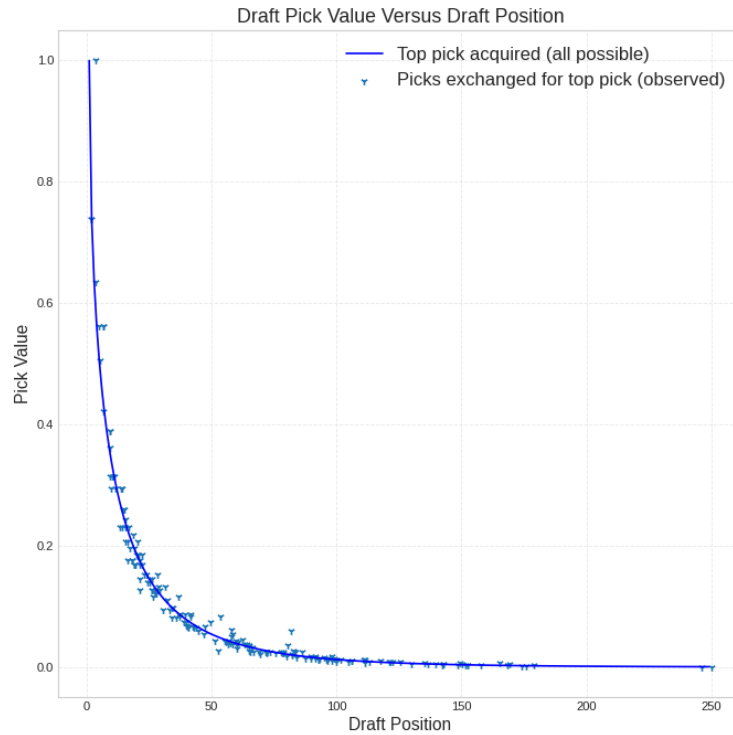

Figure 1: Estimated value of each pick and the observed value of the picks exchanged.

Table 1: Using the parameters, each draft pick value was calculated.

Pick #	Value	Pick #	Value	Pick #	Value	Pick #	Value	Pick #	Value
1	1000.00	16	230.81	31	111.56	46	62.30	105	10.93
2	737.86	17	218.23	32	106.95	47	60.12	110	9.65
3	634.61	18	206.64	33	102.59	48	58.03	115	8.53
4	562.40	19	195.93	34	98.46	49	56.03	120	7.57
5	506.49	20	186.00	35	94.55	50	54.12	125	6.72
6	460.97	21	176.77	36	90.84	55	45.68	130	5.99
7	422.76	22	168.18	37	87.31	60	38.82	135	5.34
8	390.00	23	160.16	38	83.96	65	33.17	140	4.77
9	361.47	24	152.67	39	80.77	70	28.49	150	3.83
10	336.33	25	145.65	40	77.74	75	24.58	160	3.09
11	313.98	26	139.07	41	74.85	80	21.29	170	2.51
12	298.93	27	132.89	42	72.10	85	18.52	180	2.05
13	275.85	28	127.07	43	69.48	90	16.16	190	1.68
14	259.45	29	121.60	44	66.97	95	14.14	200	1.38
15	244.50	30	116.43	45	64.58	100	12.42	210	1.14

Applying this regression to 165 trades involving future draft picks, teams lost, on average, 42.4% of their future pick value.

Using the above technique, the point-shares analysis yielded $\lambda = 0.420$ and $\beta = 0.391$ (MSE $= 0.0018$). Beyond the first seven picks, every draft pick has a higher valuation than that of the market. For example, the market value of the 50th pick is 3x less than its actual worth. Positional analysis yielded defensemen and goalies in later rounds having significantly higher value than forwards.

1.4. Conclusion

NHL executives are not effectively assessing the value of their draft picks. Teams demonstrate overconfidence in their ability to choose, trading up for picks that have lower value than they estimate, and present bias in trading away future picks which have higher value. These results exemplify the biases existing across major sports despite strong economic incentives. Organizations can apply this research to manage their draft assets by trading down and trading for future picks, while drafting more defensemen and goalies later in the draft.

References

[1] F. Marousek, "Hockey Draft Pick Transactions," *Hockey draft pick transactions*. [Online]. Available: https://www.prosportstransactions.com/hockey/DraftTrades/Years/. [Accessed: 15-Aug-2021].

[2] C. Massey and R. H. Thaler, "The loser's Curse: Overconfidence vs. market efficiency in the National Football League Draft," *SSRN Electronic Journal*, 2010.

[3] "NHL entry and Amateur draft history," *Hockey*. [Online]. Available: https://www.hockey-reference.com/draft/. [Accessed: 15-Aug-2021].