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Salary Distribution in the NFL

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RESEARCH COLLOQUIUM

2018

PITTSBURGH STATE UNIVERSITY



INTRODUCTION

- The effect of Salary Distribution in the NFL on a team's winning percentage
 - Positional Spending
 - Superstar Effect



PURPOSE & CONTRIBUTION OF THE STUDY

- Determine if there is an 'optimal' strategy for General Managers to construct their lineups
- Are certain positions over/under valued?
- Is there a "Superstar Effect" in the NFL



LITERATURE REVIEW

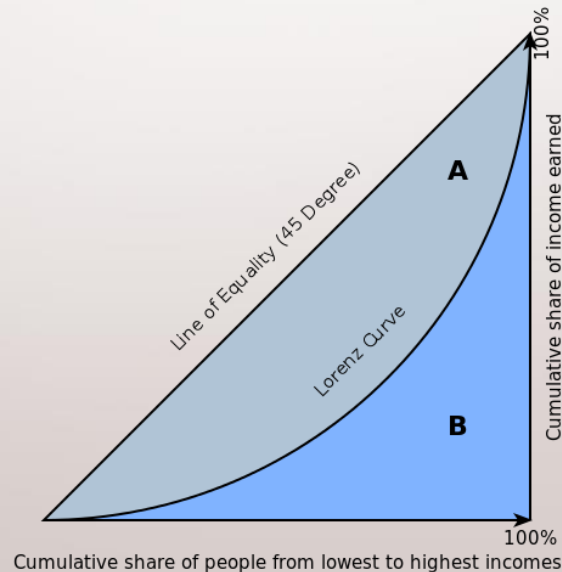
- Positional Spending is broken down into the following variables:
 - QBS, RBS, FBS, WRS, TES, OLS, DLS, LBS, DBS, STS
 - According to Winsberg 2014, overspending on offensive line has a negative correlation with team performance, and paying more than the league average on quarterback also has negative effects on team performance
- The Current NFL Salary Cap is \$167 Million

Example of an NFL Contract

<u>Year</u>	<u>Base Salary</u>	<u>Signing Bonus</u>	<u>Miscellaneous</u>	<u>Cap Hit</u>
2013	\$600,000	\$2,000,000		\$0
	\$2,600,000			
2014	\$1,600,000	\$2,000,000		\$500,000
	\$4,100,000			
2015	\$2,600,000	\$2,000,000		\$500,000
	\$5,100,000			
2016	\$3,600,000	\$2,000,000		\$500,000

Literature Review (cont)

- Superstar Effect is measured using a Lorenz Curve & with the Gini Coefficient
- A 2014 Study by Philippe Cyrene looked at the superstar effect using the Gini Coefficient on winning percentage in the NHL
 - He found that teams generally do better when they pay one player a higher percentage of team income.



Empirical Model

$W = f(\text{GINI}, \text{SALARY}, \text{QBS}, \text{RBS}, \text{FBS}, \text{WRS}, \text{TES}, \text{OLS}, \text{DLS}, \text{LBS}, \text{DBS}, \text{STS})$

-where GINI= gini coefficient, SALARY= total salary spent on active roster, QBS, RBS..... STS = Total active dollars spent on Quarterbacks, Running Backs.... and Special Team's players

- This study uses a pooled cross-sectional time series data set and Pooled Least Squares (PLS) regression model.

DATA

- Data from Spotrac \Rightarrow Excel \Rightarrow Eviews
- Sample from all 32 NFL Teams for 5 seasons (2013-2014 through 2017-2018)
- Gini Calculated by:

$$\Sigma(C*(P+2*R))$$

Where C= Player's cap hit %

P= Player's weight as % of total
population

R= % Richer than

Results

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	8.397685	0.588387	14.27237	0.0000
GINI	-13.73730	0.901886	-15.23175	0.0000
SALARY	9.86E-08	2.22E-09	44.49882	0.0000
QBS	7.10E-09	4.93E-09	1.439574	0.1500
RBS	-8.72E-08	1.07E-08	-8.171933	0.0000
FBS	-4.52E-08	3.95E-08	-1.142986	0.2531
WRS	1.23E-08	5.77E-09	2.124523	0.0337
TES	-2.62E-08	1.12E-08	-2.335040	0.0196
OLS	-7.91E-08	5.92E-09	-13.35363	0.0000
DLS	1.64E-08	4.21E-09	3.899507	0.0001
LBS	5.23E-09	5.94E-09	0.881970	0.3778
DBS	-4.82E-08	5.15E-09	-9.368872	0.0000
STS	-1.35E-07	2.21E-08	-6.075180	0.0000
R-squared	0.360884	Mean dependent var		7.975000
Adjusted R-squared	0.359383	S.D. dependent var		3.098588
S.E. of regression	2.480066	Akaike info criterion		4.656983
Sum squared resid	31411.77	Schwarz criterion		4.673591
Log likelihood	-11908.88	Hannan-Quinn criter.		4.662797
F-statistic	240.3107	Durbin-Watson stat		1.419671
Prob(F-statistic)	0.000000			

THE EMPIRICAL MODEL

Findings

- NOT Significant Variables (3):
 - QBS, FBS, and LBS
- Significant Variables (9):
 - GINI, SALARY, RBS, WRS, TES, OLS, DLS, DBS, STS
 - General Managers can obtain 1 more win by:
 - GINI: -13.74 coefficient.
 - Salary: + \$10,141,987.83

THE EMPIRICAL MODEL

Positional Results

General Managers can obtain 1 more win by:

Overpaid (most to least):

- STS: -\$7,407,407.41
- RBS: -\$11,467,889.91
- OLS: -\$12,642,225.03
- DBS: -\$20,746,887.97
- TES: -\$38,167,983.93

Underpaid: (most to least)

- DLS: \$60,975,609.76
- WRS: \$81,300,813.01

THE EMPIRICAL MODEL

Conclusions

- There is no “superstar effect” in the NFL
- More spending on the active roster leads to more wins
- There is evidence that certain positions are overpaid/underpaid
 - Findings agree with Winsberg 2014 that offensive line is overvalued.
 - Inconclusive evidence as to the effect of quarterback spending on team wins
- Recommended that further research required to understand fully

QUESTIONS?

