Football I

Produced by Dr. Mario | UNC STOR 538

Overview of Football

What Makes Teams Win

- Two Ways Offense Gains Yards
  - Passing
  - Rushing

YDS = Yards
ATT = Attempt

- Analysis by Bud Goode
  - Statistician from the 1960s
  - Passing YDS and Rushing YDS Not Effective
  - Showed YDS/ATT Good Predictors of Success
  - Measures of Efficiency are Better Than Counts
  - Both Passing and Rushing Attempts Use a Down
  - Downs in Football are Important Resources

What Makes Teams Win

- Scoring Margin for a Team
  - Related to the Spread
  - Formula

$$Scoring\ Margin = PTS\ For\ - PTS\ Against$$

  - Positive Margin = Team Won
  - Negative Margin = Team Lost

- Offensive Predictors of the Scoring Margin
  - Passing YDS/ATT
  - Rushing YDS/ATT
  - TOs Committed

PTS = Points
YDS = Yards
ATT = Attempt
TO = Turnover

What Makes Teams Win

- Defensive Predictors of the Scoring Margin
  - Passing YDS/ATT Allowed
  - Rushing YDS/ATT Allowed
  - Defensive TOs Caused
- Differential Predictors of the Scoring Margin
  - Difference Between PEN
  - Difference Between Return TDs (Off Fumbles, Interceptions, Kickoffs, and Punts)

YDS = Yards
ATT = Attempts
TO = Turnover
PEN = Penalty
TD = Touchdown

What Makes Teams Win

- Regression on the Team Level
  - Covers 2014 – 2017 Seasons
  - All Predictors are Significant Except Penalty Difference
  - RSQ of 0.79
  - Standard Error of 44
  - Approximately 95% of the Time, the True Scoring Margin Would Be Within 88 Points

PTS = Points
YDS = Yards
ATT = Attempts
G = Games

- Interesting Insight
  - Coefficients for Passing Efficiency Triple Coefficients for Defensive Efficiency
  - Extra Passing YDS/ATT Worth 69.04 PTS (+4.3 PTS/G)
  - Extra Rushing YDS/ATT Worth 23.24PTS (+1.45 PTS/G)
  - What is the Problem with This Interpretation?

Based on 16 Game Season

What Makes Teams Win

	Coefficients	Standard Error	t Stat	P-value	Lower 95%	Upper 95%
Intercept	0	#N/A	#N/A	#N/A	#N/A	#N/A
RET TD	9.872342	2.157991168	4.574783396	1.16958E-05	5.599669837	14.14501449
PENDIF	-0.443983	0.229640086	-1.933385498	0.055544099	-0.898654202	0.010688576
PY/A	69.04335	5.904116666	11.69410275	1.49694E-21	57.35360686	80.73308707
RY/A	23.24033	8.870679499	2.619904014	0.009931475	5.677000772	40.80365688
TO	-4.996646	0.700715051	-7.130782236	8.14422E-11	-6.384013477	-3.609279406
DPY/A	-53.68362	7.309871105	-7.343990609	2.72827E-11	-68.15666081	-39.21058869
DRY/A	-39.19238	11.02076077	-3.556231617	0.000539424	-61.01271724	-17.37203856
DTO	2.014417	0.701369345	2.872120361	0.004822265	0.625754685	3.403079667

What Makes Teams Win

- Modified Regressions for Scoring Margin
  - Regression Based ONLY on Passing Info (RSQ = 0.63)
  - Regression Based ONLY on Rushing Info (RSQ = 0.17)

- Impact of Turnovers
  - Offensive TOs Costs 4.99 Points
  - Defensive TOs Worth 2.01 Points
  - Overall, TO Worth Approximately 3.5 Points

TO = Turnover

What Makes Teams Win

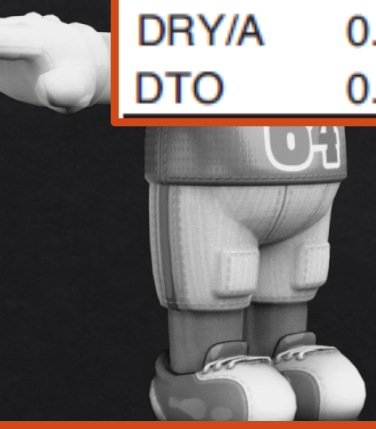
- Relationship Between Passing and Rushing Stats
  - Correlation of 0.12 Between Passing YDS/ATT and Rushing YDS/ATT
  - Many Believe Rushing Improves the Passing
  - Contradicts the Actual Seasonal Data
  - Why Low Correlation?

YDS = Yards
ATT = Attempt

What Makes Teams Win

- Correlation Matrix of Predictors

	RET TD	PENDIF	PY/A	RY/A	TO	DPY/A	DRY/A	DTO
RET TD	1							
PENDIF	–0.0411544	1						
PY/A	0.11048133	–0.0159983	1					
RY/A	–0.0576343	0.14013158	0.117779	1				
TO	–0.0812525	0.00623663	–0.3247161	–0.1171398	1			
DPY/A	–0.231602	–0.0861299	–0.0057858	0.04259182	0.24926699	1		
DRY/A	0.01902488	–0.220135	0.22861	–0.0454787	–0.2443873	0.23895137	1	
DTO	0.20411428	–0.0429489	0.11200158	–0.1535111	–0.0576773	–0.1431152	0.14203155	1



Final Inspiration

If you don’t remember if you played football, you probably played football.

- Mahatma Mario