



Football I

Produced by Dr. Mario | UNC STOR 390



Overview of Football











- 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 Up a Down
 - Downs in Football are Important Resources







- 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 Magin
 - Passing YDS/ATT
 - Rushing YDS/ATT
 - TOs Committed

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







- Defensive Predictors of the Scoring Margin
 - Passing YDS/ATT Allowed
 - Rushing YDS/ATT Allowed
 - Defensive TOs Caused



- Difference Between PEN
- Difference Between Return TDs (Off Fumbles, Interceptions, Kickoffs, and Punts)

YDS = Yards ATT = Attempts

TO = Turnover

PEN = Penalty

TD = Touchdown





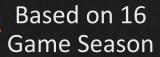


- Regression on the Team Level
 - Covers 2003 2006 Seasons
 - All Predictors are Significant Except the Intercept
 - **♦** RSQ of 0.87
 - Standard Error of 35
 - Approximately 95% of the Time, the True Scoring Margin Would Be Within 70 Points
- Interesting Insight
 - Coefficients for Passing Efficiency Triple Coefficients for Defensive Efficiency
 - Extra Passing YDS/ATT Worth 61.67 PTS (+3.85 PTS/G)
 - Extra Rushing YDS/ATT Worth 26.44 PTS (+1.65 PTS/G)
 - What is the Problem with This Interpretation?

PTS = Points YDS = Yards

ATT = Attempts

G = Games









Correlation Matrix of Predictors



| | Returned for TD | Penalty Differential | OFF Pass Yds. per Att. | OFF Rush Yds. per Att. | OFF Turnovers | DEF Pass Yds. per Att. | DEF Rush Yds. per Att. | DEF Turnovers |
|---------------------------|--------------------|-------------------------|---------------------------|---------------------------|------------------|---------------------------|---------------------------|------------------|
| Returned for TD | 1 | -0.10949 | 0.07646 | 0.15469 | -0.31181 | -0.21578 | -0.08204 | 0.37086 |
| Penalty Differential | -0.10949 | 1 | -0.17464 | -0.03113 | 0.13023 | 0.06286 | -0.1739 | -0.10505 |
| OFF Pass Yds. per Att. | 0.07646 | -0.17464 | 1 | 0.0999 | -0.44827 | 0.01083 | 0.17965 | 0.15363 |
| OFF Rush Yds. per Att. | 0.15469 | -0.03113 | 0.0999 | 1 | -0.31013 | 0.06501 | 0.09502 | -0.03066 |
| OFF Turnovers | -0.31181 | 0.13023 | -0.44827 | -0.31013 | 1 | -0.02521 | -0.09825 | -0.13314 |
| DEF Pass Yds. per Att. | -0.21578 | 0.06286 | 0.01083 | 0.06501 | -0.02521 | 1 | 0.2759 | -0.29984 |
| DEF Rush Yds. per Att. | -0.08204 | -0.1739 | 0.17965 | 0.09502 | -0.09825 | 0.2759 | 1 | -0.14402 |
| DEF Turnovers | 0.37086 | -0.10505 | 0.15363 | -0.03066 | -0.13314 | -0.29984 | -0.14402 | 1 |
| Turnovers | 0.37086 | -0.10505 | 0.15363 | -0.03066 | -0.13314 | -0.29984 | -0.14402 | 1 |





- Modified Regressions for Scoring Margin
 - *Regression Based ONLY on Passing Info (RSQ = 0.7)
 - Regression Based ONLY on Rushing Info (RSQ = 0.06)

TO = Turnover



- Offensive TOs Worth 3.7 Points
- Defensive TOs Worth 3.4 Points
- Overall, TO Worth Approximately 3.55 Points







- Relationship Between Passing and Rushing Stats
 - Correlation of 0.10 Between Passing YDS/ATT and Rushing YDS/ATT
 - Many Believe Rushing Improves the Passing
 - Contradicts the Actual Seasonal Data
 - Why Low Correlation? Possibly Due to Payroll Decisions







Final Inspiration

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

- Mahatma Mario