Factors Affecting the Winning Percentages of Division III Football Teams

Michael Schrader and Eli Fults
Linfield Department of Economics • Spring 2017

I. Abstract

We study factors affecting the winning percentages of Division III football teams. Using data from the NCAA for the 2014 through 2016 seasons, we find that both offensive and defensive outcomes equally affect winning percentages. Our results suggest that when it comes to winning, there is no statistically significant difference between the impact of having a more prolific offense or having a solid defense.

II. Empirical Model and Variables

We specify a team’s winning percentage, WP, as a function of the following variables:

Offensive Variables

- DRY: The average number of yards per game gained by the offense throwing the football; passing yards per game.
- ORY: The average number of yards per game gained by the offense running the football; rushing yards per game.
- OCONV: The percentage of the time that on third down the offense reaches the line to gain for a first down; third down conversion percentage.

Defensive Variables

- DRY: The average number of yards per game given up by the defense throwing the football; passing yards allowed per game.
- DRY: The average number of yards per game given up by the defense running the football; rushing yards allowed per game.
- DTRN: The average number of times per game that the defense turns the ball over to the defense by either fumbling the ball or allowing an interception; turnovers lost per game.
- OCONV: The percentage of the time that on third down the offense reaches the line to gain for a first down; third down conversion percentage.

III. Theory and Hypotheses

The marginal effects of DRY and DRY were both hypothesized to be negative because as a defense allows the offense to pass and pass for many yards, the more likely it is the defense is allowing the opposing offense to score points.

The marginal effect of DRY was hypothesized to be positive because it allows the defense to force a fumble or interception; turnovers gained per game.

The marginal effect of OCONV was hypothesized as positive because a defense is preventing the opposing offense to convert on third down.

IV. Data

Panel data set of 243 NCAA Division III Football Teams from the 2014 through 2016 seasons
Sample size: 730

Our data came from the NCAA website in Excel spreadsheet form. We were able to find data for all 243 teams Division III for the 2014 through 2016 seasons.

V. Empirical Results

<table>
<thead>
<tr>
<th>Variable</th>
<th>Coefficient</th>
<th>Std. Error</th>
<th>t-Statistic</th>
<th>Prob.</th>
</tr>
</thead>
<tbody>
<tr>
<td>WP</td>
<td>0.392</td>
<td>0.026</td>
<td>14.91</td>
<td>0.000</td>
</tr>
<tr>
<td>DPY</td>
<td>0.124</td>
<td>0.015</td>
<td>8.07</td>
<td>0.000</td>
</tr>
<tr>
<td>DRY</td>
<td>-0.154</td>
<td>0.014</td>
<td>-11.07</td>
<td>0.000</td>
</tr>
<tr>
<td>DRY</td>
<td>-0.154</td>
<td>0.014</td>
<td>-11.07</td>
<td>0.000</td>
</tr>
<tr>
<td>DSCK</td>
<td>1.626</td>
<td>0.023</td>
<td>71.23</td>
<td>0.000</td>
</tr>
<tr>
<td>OSCK</td>
<td>0.532</td>
<td>0.016</td>
<td>32.44</td>
<td>0.000</td>
</tr>
<tr>
<td>OTRN</td>
<td>-0.064</td>
<td>0.018</td>
<td>-3.56</td>
<td>0.000</td>
</tr>
<tr>
<td>OCONV</td>
<td>0.093</td>
<td>0.013</td>
<td>7.35</td>
<td>0.000</td>
</tr>
</tbody>
</table>

VI. Conclusions

- We found evidence that supports the theory that both defensive and offensive variables affect winning percentage. More balanced teams are more likely to have higher winning percentages.
- All estimated coefficients were statistically significant at the one-percent level, and all coefficients had the expected signs.
- A Wald test indicates that the marginal effects of the explanatory variables were not jointly equal to zero and that they helped to explain variation in winning percentage.
- Considering the marginal effects of defense versus offense on winning percentage, we found no statistical difference between the two.