

Kicker Exogenous Analysis

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[146] "year2017_team_CAR"
[147] "year2017_team_IND"
[148] "year2017_team_JAX"
[149] "year2017_team_LAC"
[150] "year2018_team_ARI"
[151] "year2018_team_BAL"
[152] "year2018_team_CAR"
[153] "year2018_team_CLE"
[154] "year2018_team_DET"
[155] "year2018_team_HOU"
[156] "year2018_team_IND"
[157] "year2018_team_KC"
[158] "year2018_team_LAC"
[159] "year2018_team_MIA"
[160] "year2018_team_MIN"
[161] "year2018_team_NE"
[162] "year2018_team_NYG"
[163] "year2018_team_OAK"

[164] "year2018_team_PHI"
[165] "year2018_team_SEA"
[166] "year2018_team_BUF"
[167] "year2018_team_CHI"
[168] "year2018_team_CIN"
[169] "year2018_team_DAL"
[170] "year2018_team_DEN"
[171] "year2018_team_GB"
[172] "year2018_team_NO"
[173] "year2018_team_NYJ"
[174] "year2018_team_PIT"
[175] "year2018_team_SF"
[176] "year2018_team_TEN"
[177] "year2018_team_TB"
[178] "year2018_team_ATL"
[179] "year2018_team_JAX"
[180] "year2018_team_LA"
[181] "year2018_team_WAS"
[182] "year2019_team_ARI"
[183] "year2019_team_BUF"
[184] "year2019_team_CHI"
[185] "year2019_team_CLE"
[186] "year2019_team_DAL"
[187] "year2019_team_IND"
[188] "year2019_team_JAX"
[189] "year2019_team_KC"
[190] "year2019_team_LAC"
[191] "year2019_team_MIN"
[192] "year2019_team_NE"
[193] "year2019_team_NO"
[194] "year2019_team_PHI"
[195] "year2019_team_SEA"
[196] "year2019_team_SF"
[197] "year2019_team_TB"
[198] "year2019_team_ATL"
[199] "year2019_team_BAL"
[200] "year2019_team_CAR"
[201] "year2019_team_CIN"
[202] "year2019_team_DEN"
[203] "year2019_team_DET"
[204] "year2019_team_HOU"
[205] "year2019_team_LA"
[206] "year2019_team_MIA"
[207] "year2019_team_NYG"
[208] "year2019_team_NYJ"
[209] "year2019_team_OAK"
[210] "year2019_team_PIT"
[211] "year2019_team_TEN"
[212] "year2019_team_WAS"
[213] "year2019_team_GB"
[214] "year2020_team_ATL"
[215] "year2020_team_BAL"
[216] "year2020_team_BUF"
[217] "year2020_team_CAR"

[218] "year2020_team_CIN"
[219] "year2020_team_DEN"
[220] "year2020_team_DET"
[221] "year2020_team_JAX"
[222] "year2020_team_KC"
[223] "year2020_team_LA"
[224] "year2020_team_MIN"
[225] "year2020_team_NE"
[226] "year2020_team_NO"
[227] "year2020_team_NYG"
[228] "year2020_team_SF"
[229] "year2020_team_WAS"
[230] "year2020_team_CHI"
[231] "year2020_team_DAL"
[232] "year2020_team_GB"
[233] "year2020_team_HOU"
[234] "year2020_team_LV"
[235] "year2020_team_MIA"
[236] "year2020_team_NYJ"
[237] "year2020_team_TB"
[238] "year2020_team_TEN"
[239] "year2020_team_ARI"
[240] "year2020_team_CLE"
[241] "year2020_team_IND"
[242] "year2020_team_LAC"
[243] "year2020_team_PHI"
[244] "year2020_team_SEA"
[245] "year2020_team_PIT"
[246] "year2021_team_ATL"
[247] "year2021_team_BUF"
[248] "year2021_team_CIN"
[249] "year2021_team_DAL"
[250] "year2021_team_DEN"
[251] "year2021_team_DET"
[252] "year2021_team_HOU"
[253] "year2021_team_KC"
[254] "year2021_team_LA"
[255] "year2021_team_LV"
[256] "year2021_team_MIN"
[257] "year2021_team_NE"
[258] "year2021_team_NO"
[259] "year2021_team_NYG"
[260] "year2021_team_SF"
[261] "year2021_team_TEN"
[262] "year2021_team_ARI"
[263] "year2021_team_BAL"
[264] "year2021_team_CAR"
[265] "year2021_team_CHI"
[266] "year2021_team_GB"
[267] "year2021_team_IND"
[268] "year2021_team_LAC"
[269] "year2021_team_MIA"
[270] "year2021_team_NYJ"
[271] "year2021_team_PHI"

[272] "year2021_team_SEA"
[273] "year2021_team_TB"
[274] "year2021_team_WAS"
[275] "year2021_team_CLE"
[276] "year2021_team_JAX"
[277] "year2021_team_PIT"
[278] "year2022_team_ARI"
[279] "year2022_team_ATL"
[280] "year2022_team_CAR"
[281] "year2022_team_CHI"
[282] "year2022_team_CIN"
[283] "year2022_team_HOU"
[284] "year2022_team_IND"
[285] "year2022_team_LAC"
[286] "year2022_team_MIA"
[287] "year2022_team_MIN"
[288] "year2022_team_NE"
[289] "year2022_team_NYJ"
[290] "year2022_team_SEA"
[291] "year2022_team_TB"
[292] "year2022_team_TEN"
[293] "year2022_team_WAS"
[294] "year2022_team_BAL"
[295] "year2022_team_BUF"
[296] "year2022_team_DAL"
[297] "year2022_team_DET"
[298] "year2022_team_GB"
[299] "year2022_team_JAX"
[300] "year2022_team_KC"
[301] "year2022_team_LA"
[302] "year2022_team_LV"
[303] "year2022_team_NO"
[304] "year2022_team_PHI"
[305] "year2022_team_PIT"
[306] "year2022_team_SF"
[307] "year2022_team_CLE"
[308] "year2022_team_DEN"
[309] "year2022_team_NYG"
[310] "year2023_team_BAL"
[311] "year2023_team_CHI"
[312] "year2023_team_CLE"
[313] "year2023_team_GB"
[314] "year2023_team_IND"
[315] "year2023_team_KC"
[316] "year2023_team_LAC"
[317] "year2023_team_LV"
[318] "year2023_team_MIA"
[319] "year2023_team_MIN"
[320] "year2023_team_NO"
[321] "year2023_team_NYG"
[322] "year2023_team_NYJ"
[323] "year2023_team_SEA"
[324] "year2023_team_SF"
[325] "year2023_team_WAS"

```

[326] "year2023_team_ATL"
[327] "year2023_team_BUF"
[328] "year2023_team_CAR"
[329] "year2023_team_DAL"
[330] "year2023_team_DEN"
[331] "year2023_team_HOU"
[332] "year2023_team_LA"
[333] "year2023_team_NE"
[334] "year2023_team_PHI"
[335] "year2023_team_PIT"
[336] "year2023_team_TEN"
[337] "year2023_team_ARI"
[338] "year2023_team_CIN"
[339] "year2023_team_DET"
[340] "year2023_team_TB"
[341] "year2023_team_JAX"
[342] "is_first_half"
[343] "time_in_half"
[1] "\nFirst 10 rows of yardline columns:"
      yardline_1_10 yardline_11_20 yardline_21_30 yardline_31_40 yardline_41_50
      <int>          <int>          <int>          <int>          <int>
1:          1            0            0            0            0
2:          0            0            0            0            1
3:          0            0            0            0            0
4:          0            0            0            0            0
5:          0            1            0            0            0
6:          0            0            0            1            0
7:          0            0            0            0            0
8:          0            0            0            1            0
9:          0            0            0            0            1
10:         0            0            1            0            0
      yardline_51_60 yardline_61_70 yardline_71_80 yardline_81_90 yardline_91_100
      <int>          <int>          <int>          <int>          <int>
1:          0            0            0            0            0
2:          0            0            0            0            0
3:          0            0            0            1            0
4:          0            0            0            0            1
5:          0            0            0            0            0
6:          0            0            0            0            0
7:          1            0            0            0            0
8:          0            0            0            0            0
9:          0            0            0            0            0
10:         0            0            0            0            0

```

```
[1] "\nProcessing Off Grades"
```

```
-----
DATASET: Off Grades | YARDLINE: 1-10
-----
```

```

[1] "Analyzing yardline 1-10"
[1] "Looking for yardline column: yardline_1_10"
[1] "Rows after yardline filter: 988"
[1] "Found all required variables"
[1] "NA counts in key variables:"

```

```

                                conversion
                                0
      p_player_26_punting_grades_grades_punter_12w
                                0
k_player_25_field_goals_grades_grades_fgep_kicker_12w
                                0

[1] "Rows after removing NAs: 988"
[1] "Columns after removing constant variables: 325"
[1] "All key variables still present: TRUE"
[1] "Running LPM model"
[1] "LPM model coefficients for tracked variables:"
      Estimate Std. Error   t value   Pr(>|t|)
-0.04181613  0.01789620 -2.33659182  0.01975690
      Estimate Std. Error   t value   Pr(>|t|)
0.02181543  0.01811376  1.20435665  0.22888087

[1] "Control variables present:"
[1] "Game situation: TRUE"
[1] "Environmental: FALSE"
[1] "Coach: FALSE"
[1] "Team stats: FALSE"
[1] "Player vars: TRUE"
[1] "Team FE: TRUE"
[1] "Coach FE: FALSE"
[1] "Running Probit model"
[1] "Too many variables, limiting to 98.8"

[1] "Running Logit model"

```

RESULTS SUMMARY:

Sample size: 988

LPM t-values: Punter Grades (12w) = -3.019 Kicker FG Grades (12w) = 1.663

Probit z-values: Punter Grades (12w) = -1.566 Kicker FG Grades (12w) = 2.26

Logit z-values: Punter Grades (12w) = -1.475 Kicker FG Grades (12w) = 2.159

```

-----
DATASET: Off Grades | YARDLINE: 11-20
-----

```

```

[1] "Analyzing yardline 11-20"
[1] "Looking for yardline column: yardline_11_20"
[1] "Rows after yardline filter: 3023"
[1] "Found all required variables"
[1] "NA counts in key variables:"

                                conversion
                                0
      p_player_26_punting_grades_grades_punter_12w
                                0
k_player_25_field_goals_grades_grades_fgep_kicker_12w
                                0

[1] "Rows after removing NAs: 3023"
[1] "Columns after removing constant variables: 328"
[1] "All key variables still present: TRUE"

```

```

[1] "Running LPM model"
[1] "LPM model coefficients for tracked variables:"
      Estimate   Std. Error    t value   Pr(>|t|)
-0.005875928  0.010438555 -0.562906287  0.573545506
      Estimate   Std. Error    t value   Pr(>|t|)
-0.007528970  0.009886783 -0.761518627  0.446413964
[1] "Control variables present:"
[1] "Game situation: TRUE"
[1] "Environmental: FALSE"
[1] "Coach: FALSE"
[1] "Team stats: FALSE"
[1] "Player vars: TRUE"
[1] "Team FE: TRUE"
[1] "Coach FE: FALSE"
[1] "Running Probit model"
[1] "Too many variables, limiting to 302.3"
[1] "Running Logit model"

```

RESULTS SUMMARY:

Sample size: 3023

LPM t-values: Punter Grades (12w) = -0.574 Kicker FG Grades (12w) = -0.771

Probit z-values: Punter Grades (12w) = -0.424 Kicker FG Grades (12w) = -0.818

Logit z-values: Punter Grades (12w) = -0.558 Kicker FG Grades (12w) = -0.69

```

-----
DATASET: Off Grades | YARDLINE: 21-30
-----

```

```

[1] "Analyzing yardline 21-30"
[1] "Looking for yardline column: yardline_21_30"
[1] "Rows after yardline filter: 6865"
[1] "Found all required variables"
[1] "NA counts in key variables:"

                                conversion
                                0
      p_player_26_punting_grades_grades_punter_12w
                                0
k_player_25_field_goals_grades_grades_fgep_kicker_12w
                                0

[1] "Rows after removing NAs: 6865"
[1] "Columns after removing constant variables: 328"
[1] "All key variables still present: TRUE"
[1] "Running LPM model"
[1] "LPM model coefficients for tracked variables:"
      Estimate   Std. Error    t value   Pr(>|t|)
-0.01205373  0.00727184 -1.65759020  0.09744818
      Estimate   Std. Error    t value   Pr(>|t|)
0.004274212  0.006669880  0.640822846  0.521660248
[1] "Control variables present:"
[1] "Game situation: TRUE"
[1] "Environmental: FALSE"
[1] "Coach: FALSE"
[1] "Team stats: FALSE"
[1] "Player vars: TRUE"
[1] "Team FE: TRUE"

```



```
[1] "Coach FE: FALSE"
[1] "Running Probit model"
[1] "Running Logit model"
```

RESULTS SUMMARY:

Sample size: 6865

LPM t-values: Punter Grades (12w) = -1.71 Kicker FG Grades (12w) = 0.653

Probit z-values: Punter Grades (12w) = -1.679 Kicker FG Grades (12w) = 0.705

Logit z-values: Punter Grades (12w) = -1.763 Kicker FG Grades (12w) = 0.709

```
-----
DATASET: Off Grades | YARDLINE: 31-40
-----
```

```
[1] "Analyzing yardline 31-40"
[1] "Looking for yardline column: yardline_31_40"
[1] "Rows after yardline filter: 6924"
[1] "Found all required variables"
[1] "NA counts in key variables:"
```

```

                                conversion
                                0
      p_player_26_punting_grades_grades_punter_12w
                                0
k_player_25_field_goals_grades_grades_fgep_kicker_12w
                                0
```

```
[1] "Rows after removing NAs: 6924"
[1] "Columns after removing constant variables: 328"
[1] "All key variables still present: TRUE"
[1] "Running LPM model"
[1] "LPM model coefficients for tracked variables:"
```

```

      Estimate   Std. Error    t value    Pr(>|t|)
-0.0251913498  0.0066969294 -3.7616269155  0.0001702739
      Estimate   Std. Error    t value    Pr(>|t|)
0.021801545    0.006959993    3.132408919  0.001741372
```

```
[1] "Control variables present:"
[1] "Game situation: TRUE"
[1] "Environmental: FALSE"
[1] "Coach: FALSE"
[1] "Team stats: FALSE"
[1] "Player vars: TRUE"
[1] "Team FE: TRUE"
[1] "Coach FE: FALSE"
[1] "Running Probit model"
[1] "Running Logit model"
```

RESULTS SUMMARY:

Sample size: 6924

LPM t-values: Punter Grades (12w) = -4.245 Kicker FG Grades (12w) = 3.21

Probit z-values: Punter Grades (12w) = -4.138 Kicker FG Grades (12w) = 3.119

Logit z-values: Punter Grades (12w) = -4.087 Kicker FG Grades (12w) = 3.146

```
-----
DATASET: Off Grades | YARDLINE: 41-50
-----
```

```
[1] "Analyzing yardline 41-50"
```

```

[1] "Looking for yardline column: yardline_41_50"
[1] "Rows after yardline filter: 5805"
[1] "Found all required variables"
[1] "NA counts in key variables:"

                                conversion
                                0
      p_player_26_punting_grades_grades_punter_12w
                                0
k_player_25_field_goals_grades_grades_fgep_kicker_12w
                                0

[1] "Rows after removing NAs: 5805"
[1] "Columns after removing constant variables: 328"
[1] "All key variables still present: TRUE"
[1] "Running LPM model"
[1] "LPM model coefficients for tracked variables:"
      Estimate   Std. Error     t value   Pr(>|t|)
-0.007971130  0.007557209 -1.054771679  0.291576278
      Estimate   Std. Error     t value   Pr(>|t|)
0.013017199  0.007313203  1.779958768  0.075138127
[1] "Control variables present:"
[1] "Game situation: TRUE"
[1] "Environmental: FALSE"
[1] "Coach: FALSE"
[1] "Team stats: FALSE"
[1] "Player vars: TRUE"
[1] "Team FE: TRUE"
[1] "Coach FE: FALSE"
[1] "Running Probit model"
[1] "Running Logit model"

```

RESULTS SUMMARY:

Sample size: 5805

LPM t-values: Punter Grades (12w) = -1.126 Kicker FG Grades (12w) = 1.845

Probit z-values: Punter Grades (12w) = -1.291 Kicker FG Grades (12w) = 1.858

Logit z-values: Punter Grades (12w) = -1.142 Kicker FG Grades (12w) = 1.852

 DATASET: Off Grades | YARDLINE: 51-60

```

[1] "Analyzing yardline 51-60"
[1] "Looking for yardline column: yardline_51_60"
[1] "Rows after yardline filter: 4945"
[1] "Found all required variables"
[1] "NA counts in key variables:"

                                conversion
                                0
      p_player_26_punting_grades_grades_punter_12w
                                0
k_player_25_field_goals_grades_grades_fgep_kicker_12w
                                0

[1] "Rows after removing NAs: 4945"
[1] "Columns after removing constant variables: 328"
[1] "All key variables still present: TRUE"
[1] "Running LPM model"

```

```

[1] "LPM model coefficients for tracked variables:"
      Estimate   Std. Error    t value   Pr(>|t|)
-0.014615618  0.008142332 -1.795016192  0.072716488
      Estimate   Std. Error    t value   Pr(>|t|)
0.021659475  0.008239220  2.628825982  0.008596403
[1] "Control variables present:"
[1] "Game situation: TRUE"
[1] "Environmental: FALSE"
[1] "Coach: FALSE"
[1] "Team stats: FALSE"
[1] "Player vars: TRUE"
[1] "Team FE: TRUE"
[1] "Coach FE: FALSE"
[1] "Running Probit model"
[1] "Running Logit model"

```

RESULTS SUMMARY:

Sample size: 4945

LPM t-values: Punter Grades (12w) = -1.913 Kicker FG Grades (12w) = 2.795

Probit z-values: Punter Grades (12w) = -1.775 Kicker FG Grades (12w) = 2.667

Logit z-values: Punter Grades (12w) = -1.726 Kicker FG Grades (12w) = 2.629

 DATASET: Off Grades | YARDLINE: 61-70

```

[1] "Analyzing yardline 61-70"
[1] "Looking for yardline column: yardline_61_70"
[1] "Rows after yardline filter: 4271"
[1] "Found all required variables"
[1] "NA counts in key variables:"

                                conversion
                                0
      p_player_26_punting_grades_grades_punter_12w
                                0
k_player_25_field_goals_grades_grades_fgep_kicker_12w
                                0

[1] "Rows after removing NAs: 4271"
[1] "Columns after removing constant variables: 328"
[1] "All key variables still present: TRUE"
[1] "Running LPM model"
[1] "LPM model coefficients for tracked variables:"
      Estimate   Std. Error    t value   Pr(>|t|)
-0.0007130585  0.0079408727 -0.0897959807  0.9284539018
      Estimate   Std. Error    t value   Pr(>|t|)
0.013711752  0.008837157  1.551602197  0.120837672
[1] "Control variables present:"
[1] "Game situation: TRUE"
[1] "Environmental: FALSE"
[1] "Coach: FALSE"
[1] "Team stats: FALSE"
[1] "Player vars: TRUE"
[1] "Team FE: TRUE"
[1] "Coach FE: FALSE"
[1] "Running Probit model"

```

```
[1] "Running Logit model"
```

RESULTS SUMMARY:

Sample size: 4271

LPM t-values: Punter Grades (12w) = -0.091 Kicker FG Grades (12w) = 1.638

Probit z-values: Punter Grades (12w) = -0.155 Kicker FG Grades (12w) = 1.569

Logit z-values: Punter Grades (12w) = -0.13 Kicker FG Grades (12w) = 1.635

```
-----  
DATASET: Off Grades | YARDLINE: 71-80  
-----
```

```
[1] "Analyzing yardline 71-80"
```

```
[1] "Looking for yardline column: yardline_71_80"
```

```
[1] "Rows after yardline filter: 3897"
```

```
[1] "Found all required variables"
```

```
[1] "NA counts in key variables:"
```

	conversion
	0
p_player_26_punting_grades_grades_punter_12w	0
k_player_25_field_goals_grades_grades_fg_kicker_12w	0

```
[1] "Rows after removing NAs: 3897"
```

```
[1] "Columns after removing constant variables: 328"
```

```
[1] "All key variables still present: TRUE"
```

```
[1] "Running LPM model"
```

```
[1] "LPM model coefficients for tracked variables:"
```

Estimate	Std. Error	t value	Pr(> t)
-0.00166422	0.00826936	-0.20125133	0.84051352
Estimate	Std. Error	t value	Pr(> t)
0.003697677	0.008976339	0.411935941	0.680411108

```
[1] "Control variables present:"
```

```
[1] "Game situation: TRUE"
```

```
[1] "Environmental: FALSE"
```

```
[1] "Coach: FALSE"
```

```
[1] "Team stats: FALSE"
```

```
[1] "Player vars: TRUE"
```

```
[1] "Team FE: TRUE"
```

```
[1] "Coach FE: FALSE"
```

```
[1] "Running Probit model"
```

```
[1] "Running Logit model"
```

RESULTS SUMMARY:

Sample size: 3897

LPM t-values: Punter Grades (12w) = -0.206 Kicker FG Grades (12w) = 0.42

Probit z-values: Punter Grades (12w) = -0.11 Kicker FG Grades (12w) = 0.28

Logit z-values: Punter Grades (12w) = -0.192 Kicker FG Grades (12w) = 0.388

```
-----  
DATASET: Off Grades | YARDLINE: 81-90  
-----
```

```
[1] "Analyzing yardline 81-90"
```

```
[1] "Looking for yardline column: yardline_81_90"
```

```
[1] "Rows after yardline filter: 3478"
```

```

[1] "Found all required variables"
[1] "NA counts in key variables:"

                                conversion
                                0
      p_player_26_punting_grades_grades_punter_12w
                                0
k_player_25_field_goals_grades_grades_fgep_kicker_12w
                                0

[1] "Rows after removing NAs: 3478"
[1] "Columns after removing constant variables: 328"
[1] "All key variables still present: TRUE"
[1] "Running LPM model"
[1] "LPM model coefficients for tracked variables:"
      Estimate   Std. Error     t value   Pr(>|t|)
0.0008103256 0.0088188668 0.0918854566 0.9267948874
      Estimate   Std. Error     t value   Pr(>|t|)
0.006097545 0.009835046 0.619981307 0.535314924
[1] "Control variables present:"
[1] "Game situation: TRUE"
[1] "Environmental: FALSE"
[1] "Coach: FALSE"
[1] "Team stats: FALSE"
[1] "Player vars: TRUE"
[1] "Team FE: TRUE"
[1] "Coach FE: FALSE"
[1] "Running Probit model"
[1] "Running Logit model"

```

RESULTS SUMMARY:

Sample size: 3478

LPM t-values: Punter Grades (12w) = 0.101 Kicker FG Grades (12w) = 0.647

Probit z-values: Punter Grades (12w) = 0.222 Kicker FG Grades (12w) = 0.477

Logit z-values: Punter Grades (12w) = 0.164 Kicker FG Grades (12w) = 0.53

 DATASET: Off Grades | YARDLINE: 91-100

```

[1] "Analyzing yardline 91-100"
[1] "Looking for yardline column: yardline_91_100"
[1] "Rows after yardline filter: 3080"
[1] "Found all required variables"
[1] "NA counts in key variables:"

                                conversion
                                0
      p_player_26_punting_grades_grades_punter_12w
                                0
k_player_25_field_goals_grades_grades_fgep_kicker_12w
                                0

[1] "Rows after removing NAs: 3080"
[1] "Columns after removing constant variables: 328"
[1] "All key variables still present: TRUE"
[1] "Running LPM model"
[1] "LPM model coefficients for tracked variables:"
      Estimate   Std. Error     t value   Pr(>|t|)

```

```

0.003444835 0.010063453 0.342311387 0.732142698
      Estimate Std. Error      t value    Pr(>|t|)
0.004677752 0.010667219 0.438516561 0.661046276
[1] "Control variables present:"
[1] "Game situation: TRUE"
[1] "Environmental: FALSE"
[1] "Coach: FALSE"
[1] "Team stats: FALSE"
[1] "Player vars: TRUE"
[1] "Team FE: TRUE"
[1] "Coach FE: FALSE"
[1] "Running Probit model"
[1] "Too many variables, limiting to 308"
[1] "Running Logit model"

```

RESULTS SUMMARY:

Sample size: 3080

LPM t-values: Punter Grades (12w) = 0.366 Kicker FG Grades (12w) = 0.488

Probit z-values: Punter Grades (12w) = 0.248 Kicker FG Grades (12w) = 0.415

Logit z-values: Punter Grades (12w) = 0.221 Kicker FG Grades (12w) = 0.485

[1] "\nProcessing Def Grades"

```

-----
DATASET: Def Grades | YARDLINE: 1-10
-----

```

```

[1] "Analyzing yardline 1-10"
[1] "Looking for yardline column: yardline_1_10"
[1] "Rows after yardline filter: 988"
[1] "Found all required variables"
[1] "NA counts in key variables:"

                                conversion
                                0
      p_player_26_punting_grades_grades_punter_12w
                                0
k_player_25_field_goals_grades_grades_fgep_kicker_12w
                                0

[1] "Rows after removing NAs: 988"
[1] "Columns after removing constant variables: 329"
[1] "All key variables still present: TRUE"
[1] "Running LPM model"
[1] "LPM model coefficients for tracked variables:"
      Estimate Std. Error      t value    Pr(>|t|)
-0.03594539 0.01782553 -2.01651211 0.04415101
      Estimate Std. Error      t value    Pr(>|t|)
0.02020449 0.01815660 1.11279010 0.26620372

```

```

[1] "Control variables present:"
[1] "Game situation: TRUE"
[1] "Environmental: FALSE"
[1] "Coach: FALSE"
[1] "Team stats: FALSE"
[1] "Player vars: TRUE"
[1] "Team FE: TRUE"
[1] "Coach FE: FALSE"

```

```
[1] "Running Probit model"
[1] "Too many variables, limiting to 98.8"

[1] "Running Logit model"
```

RESULTS SUMMARY:

Sample size: 988

LPM t-values: Punter Grades (12w) = -2.66 Kicker FG Grades (12w) = 1.555

Probit z-values: Punter Grades (12w) = -1.4 Kicker FG Grades (12w) = 1.834

Logit z-values: Punter Grades (12w) = -1.385 Kicker FG Grades (12w) = 1.82

```
-----
DATASET: Def Grades | YARDLINE: 11-20
-----
```

```
[1] "Analyzing yardline 11-20"
[1] "Looking for yardline column: yardline_11_20"
[1] "Rows after yardline filter: 3023"
[1] "Found all required variables"
[1] "NA counts in key variables:"
```

	conversion
p_player_26_punting_grades_grades_punter_12w	0
k_player_25_field_goals_grades_grades_fgep_kicker_12w	0

```
[1] "Rows after removing NAs: 3023"
[1] "Columns after removing constant variables: 332"
[1] "All key variables still present: TRUE"
[1] "Running LPM model"
[1] "LPM model coefficients for tracked variables:"
      Estimate   Std. Error    t value   Pr(>|t|)
-0.002139651  0.010371944 -0.206292150  0.836578310
      Estimate   Std. Error    t value   Pr(>|t|)
-0.009469808  0.009816599 -0.964673024  0.334795259
[1] "Control variables present:"
[1] "Game situation: TRUE"
[1] "Environmental: FALSE"
[1] "Coach: FALSE"
[1] "Team stats: FALSE"
[1] "Player vars: TRUE"
[1] "Team FE: TRUE"
[1] "Coach FE: FALSE"
[1] "Running Probit model"
[1] "Too many variables, limiting to 302.3"
[1] "Running Logit model"
```

RESULTS SUMMARY:

Sample size: 3023

LPM t-values: Punter Grades (12w) = -0.207 Kicker FG Grades (12w) = -0.964

Probit z-values: Punter Grades (12w) = -0.087 Kicker FG Grades (12w) = -1.208

Logit z-values: Punter Grades (12w) = -0.21 Kicker FG Grades (12w) = -1.126

DATASET: Def Grades | YARDLINE: 21-30

```
-----
[1] "Analyzing yardline 21-30"
[1] "Looking for yardline column: yardline_21_30"
[1] "Rows after yardline filter: 6865"
[1] "Found all required variables"
[1] "NA counts in key variables:"

                                conversion
                                0
      p_player_26_punting_grades_grades_punter_12w
                                0
k_player_25_field_goals_grades_grades_fgep_kicker_12w
                                0

[1] "Rows after removing NAs: 6865"
[1] "Columns after removing constant variables: 332"
[1] "All key variables still present: TRUE"
[1] "Running LPM model"
[1] "LPM model coefficients for tracked variables:"
      Estimate   Std. Error    t value   Pr(>|t|)
-0.012491617  0.007292012 -1.713054999  0.086749861
      Estimate   Std. Error    t value   Pr(>|t|)
0.004279358  0.006683542  0.640283012  0.522011075
[1] "Control variables present:"
[1] "Game situation: TRUE"
[1] "Environmental: FALSE"
[1] "Coach: FALSE"
[1] "Team stats: FALSE"
[1] "Player vars: TRUE"
[1] "Team FE: TRUE"
[1] "Coach FE: FALSE"
[1] "Running Probit model"
[1] "Running Logit model"
```

RESULTS SUMMARY:

Sample size: 6865

LPM t-values: Punter Grades (12w) = -1.763 Kicker FG Grades (12w) = 0.654

Probit z-values: Punter Grades (12w) = -1.728 Kicker FG Grades (12w) = 0.661

Logit z-values: Punter Grades (12w) = -1.821 Kicker FG Grades (12w) = 0.655

DATASET: Def Grades | YARDLINE: 31-40

```
[1] "Analyzing yardline 31-40"
[1] "Looking for yardline column: yardline_31_40"
[1] "Rows after yardline filter: 6924"
[1] "Found all required variables"
[1] "NA counts in key variables:"

                                conversion
                                0
      p_player_26_punting_grades_grades_punter_12w
                                0
k_player_25_field_goals_grades_grades_fgep_kicker_12w
                                0

[1] "Rows after removing NAs: 6924"
```



```

[1] "Columns after removing constant variables: 332"
[1] "All key variables still present: TRUE"
[1] "Running LPM model"
[1] "LPM model coefficients for tracked variables:"
      Estimate   Std. Error    t value    Pr(>|t|)
-0.0252408292  0.0067248163 -3.7533856913  0.0001759616
      Estimate   Std. Error    t value    Pr(>|t|)
0.021674172  0.006973489  3.108081680  0.001891075
[1] "Control variables present:"
[1] "Game situation: TRUE"
[1] "Environmental: FALSE"
[1] "Coach: FALSE"
[1] "Team stats: FALSE"
[1] "Player vars: TRUE"
[1] "Team FE: TRUE"
[1] "Coach FE: FALSE"
[1] "Running Probit model"
[1] "Running Logit model"

```

RESULTS SUMMARY:

Sample size: 6924

LPM t-values: Punter Grades (12w) = -4.263 Kicker FG Grades (12w) = 3.204

Probit z-values: Punter Grades (12w) = -4.146 Kicker FG Grades (12w) = 3.147

Logit z-values: Punter Grades (12w) = -4.096 Kicker FG Grades (12w) = 3.199

```

-----
DATASET: Def Grades | YARDLINE: 41-50
-----

```

```

[1] "Analyzing yardline 41-50"
[1] "Looking for yardline column: yardline_41_50"
[1] "Rows after yardline filter: 5805"
[1] "Found all required variables"
[1] "NA counts in key variables:"

                                conversion
                                0
      p_player_26_punting_grades_grades_punter_12w
                                0
k_player_25_field_goals_grades_grades_fgep_kicker_12w
                                0

[1] "Rows after removing NAs: 5805"
[1] "Columns after removing constant variables: 332"
[1] "All key variables still present: TRUE"
[1] "Running LPM model"
[1] "LPM model coefficients for tracked variables:"
      Estimate   Std. Error    t value    Pr(>|t|)
-0.008169581  0.007569731 -1.079243184  0.280526884
      Estimate   Std. Error    t value    Pr(>|t|)
0.013532246  0.007308193  1.851654143  0.064129318
[1] "Control variables present:"
[1] "Game situation: TRUE"
[1] "Environmental: FALSE"
[1] "Coach: FALSE"
[1] "Team stats: FALSE"
[1] "Player vars: TRUE"

```

```

[1] "Team FE: TRUE"
[1] "Coach FE: FALSE"
[1] "Running Probit model"
[1] "Running Logit model"

```

RESULTS SUMMARY:

Sample size: 5805

LPM t-values: Punter Grades (12w) = -1.146 Kicker FG Grades (12w) = 1.913

Probit z-values: Punter Grades (12w) = -1.296 Kicker FG Grades (12w) = 1.966

Logit z-values: Punter Grades (12w) = -1.149 Kicker FG Grades (12w) = 1.963

```

-----
DATASET: Def Grades | YARDLINE: 51-60
-----

```

```

[1] "Analyzing yardline 51-60"
[1] "Looking for yardline column: yardline_51_60"
[1] "Rows after yardline filter: 4945"
[1] "Found all required variables"
[1] "NA counts in key variables:"

```

	conversion
p_player_26_punting_grades_grades_punter_12w	0
k_player_25_field_goals_grades_grades_fgep_kicker_12w	0

```

[1] "Rows after removing NAs: 4945"
[1] "Columns after removing constant variables: 332"
[1] "All key variables still present: TRUE"
[1] "Running LPM model"
[1] "LPM model coefficients for tracked variables:"

```

Estimate	Std. Error	t value	Pr(> t)
-0.01340127	0.00814137	-1.64607120	0.09981721
0.021009954	0.008247847	2.547325813	0.010887378

```

[1] "Control variables present:"
[1] "Game situation: TRUE"
[1] "Environmental: FALSE"
[1] "Coach: FALSE"
[1] "Team stats: FALSE"
[1] "Player vars: TRUE"
[1] "Team FE: TRUE"
[1] "Coach FE: FALSE"
[1] "Running Probit model"
[1] "Running Logit model"

```

RESULTS SUMMARY:

Sample size: 4945

LPM t-values: Punter Grades (12w) = -1.764 Kicker FG Grades (12w) = 2.705

Probit z-values: Punter Grades (12w) = -1.637 Kicker FG Grades (12w) = 2.613

Logit z-values: Punter Grades (12w) = -1.562 Kicker FG Grades (12w) = 2.553

```

-----
DATASET: Def Grades | YARDLINE: 61-70
-----

```

```

[1] "Analyzing yardline 61-70"
[1] "Looking for yardline column: yardline_61_70"
[1] "Rows after yardline filter: 4271"
[1] "Found all required variables"
[1] "NA counts in key variables:"

                                conversion
                                0
      p_player_26_punting_grades_grades_punter_12w
                                0
k_player_25_field_goals_grades_grades_fgep_kicker_12w
                                0

[1] "Rows after removing NAs: 4271"
[1] "Columns after removing constant variables: 332"
[1] "All key variables still present: TRUE"
[1] "Running LPM model"
[1] "LPM model coefficients for tracked variables:"
      Estimate Std. Error   t value   Pr(>|t|)
0.000015687 0.007962971 0.001969994 0.998428273
      Estimate Std. Error   t value   Pr(>|t|)
0.013630774 0.008856632 1.539047054 0.123873111
[1] "Control variables present:"
[1] "Game situation: TRUE"
[1] "Environmental: FALSE"
[1] "Coach: FALSE"
[1] "Team stats: FALSE"
[1] "Player vars: TRUE"
[1] "Team FE: TRUE"
[1] "Coach FE: FALSE"
[1] "Running Probit model"
[1] "Running Logit model"

```

RESULTS SUMMARY:

Sample size: 4271

LPM t-values: Punter Grades (12w) = 0.002 Kicker FG Grades (12w) = 1.615

Probit z-values: Punter Grades (12w) = -0.118 Kicker FG Grades (12w) = 1.546

Logit z-values: Punter Grades (12w) = -0.063 Kicker FG Grades (12w) = 1.639

 DATASET: Def Grades | YARDLINE: 71-80

```

[1] "Analyzing yardline 71-80"
[1] "Looking for yardline column: yardline_71_80"
[1] "Rows after yardline filter: 3897"
[1] "Found all required variables"
[1] "NA counts in key variables:"

                                conversion
                                0
      p_player_26_punting_grades_grades_punter_12w
                                0
k_player_25_field_goals_grades_grades_fgep_kicker_12w
                                0

[1] "Rows after removing NAs: 3897"
[1] "Columns after removing constant variables: 332"
[1] "All key variables still present: TRUE"

```

```

[1] "Running LPM model"
[1] "LPM model coefficients for tracked variables:"
      Estimate   Std. Error    t value   Pr(>|t|)
-0.0007473528  0.0082640118 -0.0904346296  0.9279469180
      Estimate   Std. Error    t value   Pr(>|t|)
-0.001043151   0.009015166 -0.115710688   0.907888351
[1] "Control variables present:"
[1] "Game situation: TRUE"
[1] "Environmental: FALSE"
[1] "Coach: FALSE"
[1] "Team stats: FALSE"
[1] "Player vars: TRUE"
[1] "Team FE: TRUE"
[1] "Coach FE: FALSE"
[1] "Running Probit model"
[1] "Running Logit model"

```

RESULTS SUMMARY:

Sample size: 3897

LPM t-values: Punter Grades (12w) = -0.093 Kicker FG Grades (12w) = -0.119

Probit z-values: Punter Grades (12w) = -0.073 Kicker FG Grades (12w) = -0.222

Logit z-values: Punter Grades (12w) = -0.132 Kicker FG Grades (12w) = -0.134

 DATASET: Def Grades | YARDLINE: 81-90

```

[1] "Analyzing yardline 81-90"
[1] "Looking for yardline column: yardline_81_90"
[1] "Rows after yardline filter: 3478"
[1] "Found all required variables"
[1] "NA counts in key variables:"

                                conversion
                                0
      p_player_26_punting_grades_grades_punter_12w
                                0
k_player_25_field_goals_grades_grades_fgep_kicker_12w
                                0

[1] "Rows after removing NAs: 3478"
[1] "Columns after removing constant variables: 332"
[1] "All key variables still present: TRUE"
[1] "Running LPM model"
[1] "LPM model coefficients for tracked variables:"
      Estimate   Std. Error    t value   Pr(>|t|)
0.001897067  0.008803823  0.215482170  0.829405375
      Estimate   Std. Error    t value   Pr(>|t|)
0.006384697  0.009852367  0.648036821  0.517008411
[1] "Control variables present:"
[1] "Game situation: TRUE"
[1] "Environmental: FALSE"
[1] "Coach: FALSE"
[1] "Team stats: FALSE"
[1] "Player vars: TRUE"
[1] "Team FE: TRUE"
[1] "Coach FE: FALSE"

```

```
[1] "Running Probit model"
[1] "Running Logit model"
```

RESULTS SUMMARY:

Sample size: 3478

LPM t-values: Punter Grades (12w) = 0.237 Kicker FG Grades (12w) = 0.676

Probit z-values: Punter Grades (12w) = 0.433 Kicker FG Grades (12w) = 0.506

Logit z-values: Punter Grades (12w) = 0.346 Kicker FG Grades (12w) = 0.526

```
-----
DATASET: Def Grades | YARDLINE: 91-100
-----
```

```
[1] "Analyzing yardline 91-100"
[1] "Looking for yardline column: yardline_91_100"
[1] "Rows after yardline filter: 3080"
[1] "Found all required variables"
[1] "NA counts in key variables:"
```

```

                                conversion
                                0
      p_player_26_punting_grades_grades_punter_12w
                                0
k_player_25_field_goals_grades_grades_fgep_kicker_12w
                                0
```

```
[1] "Rows after removing NAs: 3080"
[1] "Columns after removing constant variables: 332"
[1] "All key variables still present: TRUE"
[1] "Running LPM model"
[1] "LPM model coefficients for tracked variables:"
```

```

      Estimate Std. Error   t value   Pr(>|t|)
0.005390822 0.010054613 0.536154081 0.591895446
      Estimate Std. Error   t value   Pr(>|t|)
0.004838432 0.010685897 0.452786708 0.650738067
```

```
[1] "Control variables present:"
[1] "Game situation: TRUE"
[1] "Environmental: FALSE"
[1] "Coach: FALSE"
[1] "Team stats: FALSE"
[1] "Player vars: TRUE"
[1] "Team FE: TRUE"
[1] "Coach FE: FALSE"
[1] "Running Probit model"
[1] "Too many variables, limiting to 308"
[1] "Running Logit model"
```

RESULTS SUMMARY:

Sample size: 3080

LPM t-values: Punter Grades (12w) = 0.577 Kicker FG Grades (12w) = 0.51

Probit z-values: Punter Grades (12w) = 0.546 Kicker FG Grades (12w) = 0.096

Logit z-values: Punter Grades (12w) = 0.507 Kicker FG Grades (12w) = 0.148

```
[1] "Control info for Off Grades"
$game_situation
[1] TRUE
```

```

$environmental
[1] FALSE

$coach
[1] FALSE

$team_stats
[1] FALSE

$player_vars
[1] TRUE

$team_fe
[1] TRUE

$coach_fe
[1] FALSE

$player_presence
[1] TRUE

[1] "Control info for Def Grades"
$game_situation
[1] TRUE

$environmental
[1] FALSE

$coach
[1] FALSE

$team_stats
[1] FALSE

$player_vars
[1] TRUE

$team_fe
[1] TRUE

$coach_fe
[1] FALSE

$player_presence
[1] TRUE

```

Analysis Results

Offensive Grades

Defensive Grades

Table 1: Results for Off Grades

Variable	1-10	11-20	21-30	31-40	41-50	51-60	61-
LPM Model							
LPM Model							
Punter Grades (12w)	-3.019***	-0.574	-1.710*	-4.245***	-1.126	-1.913*	-0.0
Kicker FG Grades (12w)	1.663*	-0.771	0.653	3.210***	1.845*	2.795***	1.63
Probit Model							
Probit Model							
Punter Grades (12w)	-1.566.	-0.424	-1.679*	-4.138***	-1.291	-1.775*	-0.1
Kicker FG Grades (12w)	2.260**	-0.818	0.705	3.119***	1.858*	2.667***	1.56
Logit Model							
Logit Model							
Punter Grades (12w)	-1.475.	-0.558	-1.763*	-4.087***	-1.142	-1.726*	-0.1
Kicker FG Grades (12w)	2.159**	-0.690	0.709	3.146***	1.852*	2.629***	1.63
Controls							
Controls							
Game Situation	Game Situation	Game Situation	Game Situation	Game Situation	Game Situation	Game Situation	Game Si
Environmental	Yes	Yes	Yes	Yes	Yes	Yes	Ye
Coach Variables	No	No	No	No	No	No	No
Team Stats	No	No	No	No	No	No	No
Player Variables	No	No	No	No	No	No	No
Player Presence	Yes	Yes	Yes	Yes	Yes	Yes	Ye
Season/Team FE	Yes	Yes	Yes	Yes	Yes	Yes	Ye
Coach FE	Yes	Yes	Yes	Yes	Yes	Yes	Ye
Sample Size	No	No	No	No	No	No	No
	988	3,023	6,865	6,924	5,805	4,945	4,2
<i>Note:</i> Values shown are t-statistics from respective model regressions with conversion as the dependent variable Significance codes: *** p<0.01							

Table 2: Results for Def Grades

Variable	1-10	11-20	21-30	31-40	41-50	51-60	61-
LPM Model							
LPM Model							
Punter Grades (12w)	-2.660***	-0.207	-1.763*	-4.263***	-1.146	-1.764*	0.0
Kicker FG Grades (12w)	1.555.	-0.964	0.654	3.204***	1.913*	2.705***	1.63
Probit Model							
Probit Model							
Punter Grades (12w)	-1.400	-0.087	-1.728*	-4.146***	-1.296	-1.637.	-0.1
Kicker FG Grades (12w)	1.834*	-1.208	0.661	3.147***	1.966**	2.613***	1.54
Logit Model							
Logit Model							
Punter Grades (12w)	-1.385	-0.210	-1.821*	-4.096***	-1.149	-1.562.	-0.0
Kicker FG Grades (12w)	1.820*	-1.126	0.655	3.199***	1.963**	2.553**	1.63
Controls							
Controls							
Game Situation	Game Situation	Game Situation	Game Situation	Game Situation	Game Situation	Game Situation	Game Si
Environmental	Yes	Yes	Yes	Yes	Yes	Yes	Ye
Coach Variables	No	No	No	No	No	No	No
Team Stats	No	No	No	No	No	No	No
Player Variables	No	No	No	No	No	No	No
Player Presence	Yes	Yes	Yes	Yes	Yes	Yes	Ye
Season/Team FE	Yes	Yes	Yes	Yes	Yes	Yes	Ye
Coach FE	Yes	Yes	Yes	Yes	Yes	Yes	Ye
Sample Size	No	No	No	No	No	No	No
	988	3,023	6,865	6,924	5,805	4,945	4,2
<i>Note:</i> Values shown are t-statistics from respective model regressions with conversion as the dependent variable Significance codes: *** p<0.01							