COLLEGE TEAM WIN PREDICTIONS

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EXECUTIVE SUMMARY

Problem

- What are the factors of a NCAA football team's statistics that affected the amount of wins the team had in the 2023 season.

Data Source

- ESPN College Football 2023 Team Stats

Measures

- Variables, P-Values, Correlations

Methods

- Multi-Linear Regression Model

Conclusions

- Number of Games Won, Offensive Points/Game, and Defensive Points/Game were the most significant in predicting a teams number of wins

PROBLEM STATEMENT

This study aims to identify and analyze the statistical metrics that significantly influence the number of victories achieved by college football teams.

- Which statistical metrics most significantly influence the number of victories achieved by a college football team?

- Can we predict the amount of wins a college football will have?

DATA

- Dataset:
  - ESPN 2023 College Football Stats
    - Variables used: Number of team wins, Games played, Defensive PTS/G, Offensive PTS/G, Offensive Passing YDS/G, Defensive Passing YDS/G, Defensive Rushing YDS/G, Offensive Rushing YDS/G and Conference
  - Limitations
    - Varying games played
    - Strength of schedule is not factored in
    - Only showing the 2023 data

METHODOLOGY: DATA PREPARATION

- Sorted data into 11 categories
- Dummy variables for different conferences

	A	B	C	D	E	F	G	H	I	J	K	L	M
1		DV	IV - NUM	IV - NUM	IV - NUM	IV - NUM	IV - NUM	IV - NUM	IV - NUM	IV - CAT	IV - CAT	IV - CAT	
2	TEAM	# of Team Wins	Games Played	ffensive PTS/	Defnsive PTS/G	Offensive Passing YDS/G	ensive Passing YD	sive Rushing	se Rushing Y	D_ACC	D_Big12	D_Sec	Confrence
3	Ohio State	11	13	30.5	11.2	269.1	145.9	119.5	138.8	0	0	0	Big 10
4	Penn State	10	13	36.2	13.5	215	172.1	75.5	185.2	0	0	0	Big 10
5	Illinois	5	12	24.5	29.4	264.6	228.1	150.2	126.4	0	0	0	Big 10
6	Maryland	8	13	29.7	22.5	278.9	208.6	125.5	108.4	0	0	0	Big 10
7	Michigan	15	15	35.9	10.4	213.7	157	90	169.1	0	0	0	Big 10
8	Wisconsin	7	13	23.5	20.2	220.1	208.8	134.9	161.2	0	0	0	Big 10
9	Purdue	4	12	23.9	30.4	211.2	241.5	140.6	168.8	0	0	0	Big 10
10	Indiana	3	12	22.2	29.9	212.8	237.8	156.3	120.9	0	0	0	Big 10
11	Nebraska	5	12	18	18.3	135.9	210.6	92.9	176.8	0	0	0	Big 10
12	Rutgers	7	13	23.2	21.2	137.5	176.3	137.2	168.7	0	0	0	Big 10
13	Northwestern	8	13	22.1	22.5	202	182.9	157.8	101.9	0	0	0	Big 10
14	Minnesota	6	13	20.9	26.7	143.4	219.3	149.1	157.5	0	0	0	Big 10
15	Michigan St.	4	12	15.9	28.3	199.8	237.8	151.8	89.5	0	0	0	Big 10
16	Iowa	10	14	15.4	14.8	118.6	170.7	111.8	116.8	0	0	0	Big 10
17	LSU	10	13	45.5	28	338.9	255.6	160.7	204.5	0	0	1	SEC
18	Georgia	13	14	40.1	15.6	305.3	175.4	113.6	191.2	0	0	1	SEC
19	Ole Miss	11	13	35.1	22.5	285.6	229.5	153.1	176.5	0	0	1	SEC
20	Tennessee	9	13	31.8	20.3	243.2	221.5	113.7	204.8	0	0	1	SEC
21	Missouri	11	13	32.5	20.8	262.3	213.2	122.7	172.8	0	0	1	SEC
22	Florida	5	12	28.4	27.6	259.3	226.7	155.6	149.5	0	0	1	SEC
23	Texas A&M	7	13	33.3	22.1	270.8	207.4	108.8	136.2	0	0	1	SEC
24	Alabama	12	14	34	19	220.4	191.1	124.9	172.6	0	0	1	SEC
25	South Carolina	5	12	26	26.3	278	246.3	149.5	85.1	0	0	1	SEC
26	Auburn	6	13	26.2	22.6	162.2	202.2	155	189	0	0	1	SEC
27	Kentucky	7	13	29.1	25.8	211.6	240.5	113.1	127.7	0	0	1	SEC
28	Mississippi St.	5	12	21.8	26.6	181.8	204.7	145.9	146.8	0	0	1	SEC
29	Arkansas	4	12	26.6	27.9	187.5	202.8	154.4	139	0	0	1	SEC
30	Vanderbilt	2	12	22.8	36.2	223.7	279.6	175.3	95.3	0	0	1	SEC
31	Texas	12	14	35.8	18.9	289.1	254.4	82.4	188.4	0	1	0	Big 12
32	Iowa St.	7	13	26.2	22.8	245	228.9	134.2	119.9	0	1	0	Big 12
33	Kansas St.	9	13	37.1	21	241.2	225.1	147.5	204.1	0	1	0	Big 12
34	Kansas	9	13	34.9	26.5	240.1	216.7	161.5	206	0	1	0	Big 12
35	West Virginia	9	13	31.5	26.2	205.7	237.4	143.4	228.9	0	1	0	Big 12
36	Texas Tech	7	13	27.4	26	223.8	229.2	160.4	162.8	0	1	0	Big 12

REMOVING HIGH P-VALUES TO REFINE

- Ran regression tests and removed p-values values greater than our alpha (.05):
  - SEC Conference
  - Offensive Passing Yds/G
  - ACC Conference
  - Big12 Conference
  - Defensive Passing Yds/G
  - Defensive Rushing Yds/G
  - Offensive Rushing Yds/G

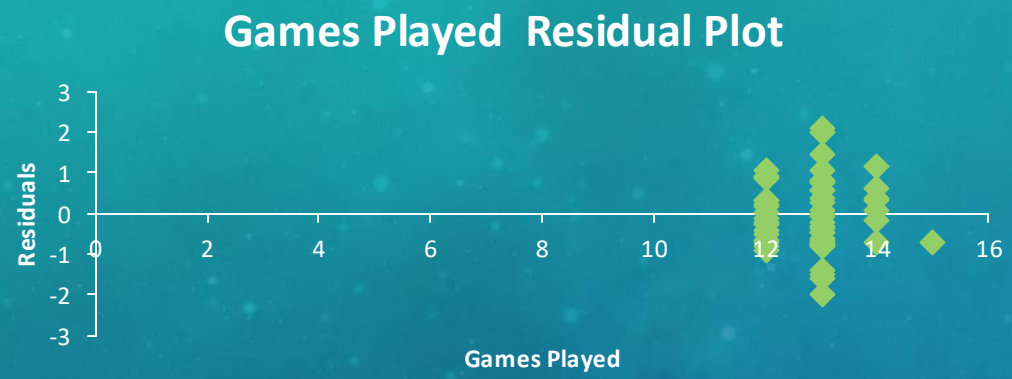
	Coefficients	*Standard Error*	*t Stat*	*P-value*	*Lower 95%*	*Upper 95%*	*Lower 95.0%*	*Upper 95.0%*
Intercept	-21.714721	3.98716237	-5.4461593	0.00	-29.745279	-13.684164	-29.745279	-13.684164
Games Playe	2.17059716	0.28202235	7.69654308	0.00	1.60257499	2.73861933	1.60257499	2.73861933
Offensive Pas	0.00175531	0.00543041	0.32323599	0.75	-0.0091821	0.01269272	-0.0091821	0.01269272
Offense Rush	-0.0033789	0.00530587	-0.636821	0.53	-0.0140655	0.00730768	-0.0140655	0.00730768
Offensive PTS	0.14453216	0.05382997	2.68497572	0.01	0.03611304	0.25295128	0.03611304	0.25295128
Defensive Pa	0.00918245	0.00797983	1.15070808	0.26	-0.0068897	0.02525465	-0.0068897	0.02525465
Defensive Ru	0.01086415	0.00776796	1.39858461	0.17	-0.0047813	0.02650963	-0.0047813	0.02650963
Defnsive PTS/	-0.2556464	0.06462505	-3.9558412	0.00	-0.385808	-0.1254849	-0.385808	-0.1254849
D_Sec	-0.0776405	0.41016244	-0.1892922	0.85	-0.9037501	0.74846902	-0.9037501	0.74846902
D_Big12	-0.2732606	0.45385205	-0.6020918	0.55	-1.1873655	0.64084436	-1.1873655	0.64084436
D_ACC	-0.1680324	0.38358963	-0.4380525	0.66	-0.9406216	0.60455677	-0.9406216	0.60455677

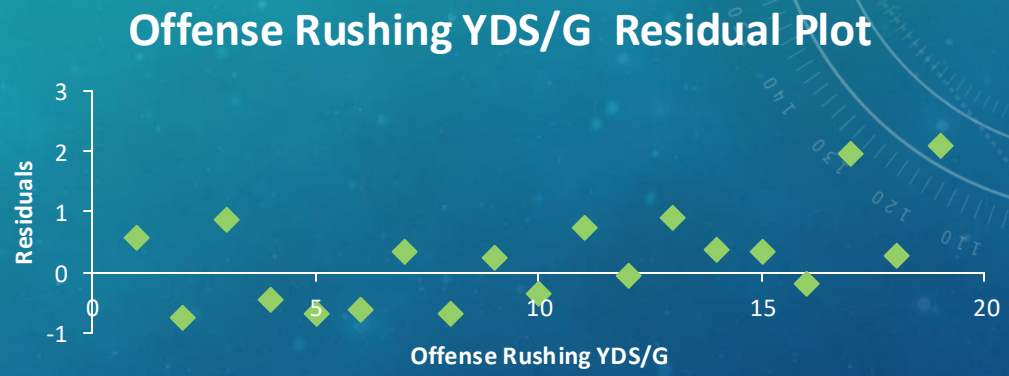
Regression Statistics	
Multiple R	0.96236948
R Square	0.92615502
Adjusted R Sc	0.90974503
Standard Erro	0.89873433
Observations	56

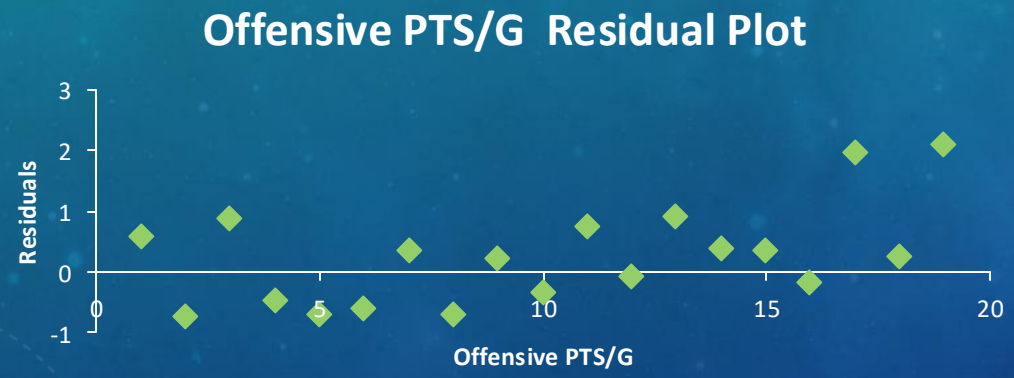
CORRELATION MATRIX

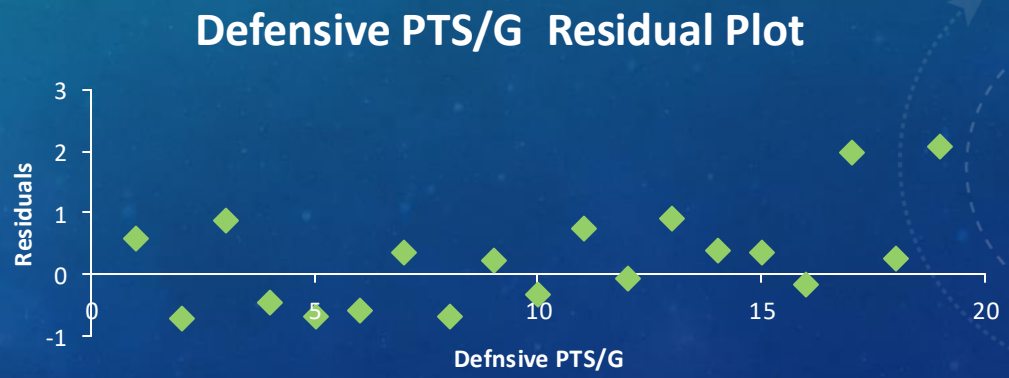
	Games Played	*sive Passing Y*	*Offense Rushing YDS/G*	*Offensive PTS/G*	*ensive Passing YD*	*Defensive Rushing YDS/G*	*Defnsive PTS/G*	*D_Sec*	*D_Big12*	*D_ACC*	*D_Big10*
Games Played	1										
Offensive Passing YDS/G	0.078181696	1									
Offense Rushing YDS/G	0.390528812	0.081543	1								
Offensive PTS/G	0.515658273	0.70005924	0.571018591	1							
Defensive Passing YDS/G	-0.413929223	0.33581003	-0.155469424	-0.040251406	1						
Defensive Rushing YDS/G	-0.444260186	0.04521217	-0.05711105	-0.216895508	0.352443699	1					
Defnsive PTS/G	-0.685274253	0.08260879	-0.24793243	-0.333695721	0.706256138	0.764044064	1				
D_Sec	-0.044093814	0.18462039	-0.030843478	0.246305219	0.083129872	-0.083576357	0.011304699	1			
D_Big12	-0.044093814	0.27676681	0.188764344	0.164860294	0.413483582	0.267572813	0.244296463	-0.333333333	1		
D_ACC	0.07348969	-0.1149647	0.100220099	-0.057799625	-0.147886708	0.118263044	0.054990655	-0.333333333	-0.333333333	1	
D_Big10	0.014697938	-0.3464225	-0.258140966	-0.353365888	-0.348726747	-0.302259499	-0.310591817	-0.333333333	-0.333333333	-0.3333333	1

RESIDUAL PLOTS









PARSIMONIOUS MODEL (FINAL MODEL)

- Predicted Number of Games Won = -20.40 + 2.16(A) + 0.15(B) - 0.17(C)

- A = Number of Games Played
- B = Offensive Points / Game
- C = Defensive Points / Game

SUMMARY OUTPUT

Regression Statistics	
Multiple R	0.95885254
R Square	0.91939819
Adjusted R Sc	0.91474808
Standard Erro	0.87346969
Observations	56

ANOVA

	df	*SS*	*MS*	*F*	*Significance F*
Regression	3	452.540922	150.846974	197.715596	2.0585E-28
Residual	52	39.6733632	0.76294929		
Total	55	492.214286			

	Coefficients	*Standard Error*	*t Stat*	*P-value*	*Lower 95%*	*Upper 95%*	*Lower 95.0%*	*Upper 95.0%*
Intercept	-20.403168	3.55322393	-5.7421565	0.00	-27.533233	-13.273102	-27.533233	-13.273102
Games Playe	2.15933903	0.2515136	8.58537689	0.00	1.65464007	2.66403798	1.65464007	2.66403798
Offensive PTS	0.1500726	0.02170822	6.91317019	0.00	0.10651188	0.19363333	0.10651188	0.19363333
Defnsive PTS	-0.1747387	0.02980053	-5.8636097	0.00	-0.2345378	-0.1149395	-0.2345378	-0.1149395

CONCLUSION AND APPLICATION

Which Variables were included in the Final Model and have an impact on the number of games won?	Which Variable had the most impact on the number of games won in the final model?	Which variable had the least impact on the number of games won in the final model?
• Number of Games Played • Offensive Points/Game • Defensive Points/Game	• The number of games a team has played has the most impact on the number on wins they have.	• A team's number of offensive points/game has the least impact on the number of wins they have.

WORKS CITED

- Dataset:
  - https://iowa-my.sharepoint.com/:x:/g/personal/samteets_uiowa_edu/ERoSspWio-RIjP7c_udL7gYBYyIeXHFrdlNC4zFsapuDqQ?e=UZW7ox

- Source of Data:
  - https://www.espn.com/college-football/stats/team/_/season/2023