**Graph Comparisons**

1. Total Offense & Scoring Offense vs Total Defense & Scoring Defense

-Comparing these graphs helps see where a team lies in yardage and points on offense and defense

-The Correlation between the variables in these graphs is strong, with the Offense graph having a correlation of 0.876 and the Defense graph having 0.870

-The Standard Error is not very wide either as shown by the shaded sections on the graph, but some teams still stick out

-Teams below the line did better yardage wise but not points wise in both graphs, to extract teams that were below the line I made a new variable ‘Yards per Point’ which was Y/X on the top graph

-The teams with the largest yard per point were Arizona, Vanderbilt, Duke, and Northwestern which are shown as teams farthest below the line of best fit on the Offense graph

-These graphs are a good reference to compare to other graphs using more specific variables to see how it affects a team’s position above/below the line

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1. Total Offense & Total Defense vs Scoring Offense & Scoring Defense

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-The top graph shows you each team’s yardage total on offense and defense, and the graphs are separated by team’s who went .500 or better in conference

-The bottom graph shows you each teams points per game and points per game allowed, and the graphs are separated by teams with a turnover margin of 1 or more

-Comparing these graphs helps you see where each team stacked up on the stat sheet vs the scoreboard

-Separating the graph based on a variable criteria helps us see the correlation between the graph and that variable, for example on the top graph you would expect teams on the right side to be in the lower left corner because they had a losing conference record while on the left side you would expect teams with a winning conference record to be in the top right corner where the best teams are for the X and Y variables on the graph

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1. 21/22’ Recruiting Rank & Transfer Portal Points vs Returning Production & Win Total

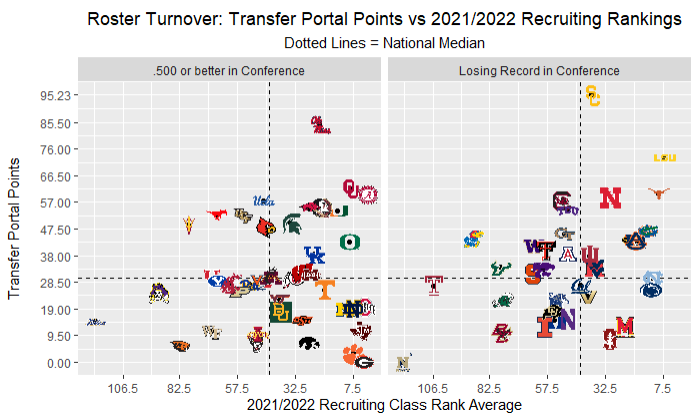
-The top graph shows you each team’s average recruiting class ranking between the 2021 and 2022 recruiting cycles (Rising Freshman & Sophomores) and each team’s Transfer Portal Points as rated by 247 Sports, these graphs are separated by teams who had a .500 or better conference record last season

-The bottom graph shows you each team’s percentage of returning production from last year’s team and the team’s win total out of 12 regular season games last year, these graphs are separated by teams with a top 45 recruiting class ranking for the last two cycles

-Comparing these graphs helps you see all aspects of how each team’s roster changed from last year to this season by looking at how they ranked in young talent (recruiting) and immediate additions in the portal (transfer points)

-I split the top graph by 2021 success to see how much talent was added on to good/bad teams from last season

-I split the bottom graph to show which teams are good in recruiting so teams with a low returning production might be able to replace them with recruiting talent



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1. Returning Production & Transfer Portal Points vs Returning Production & Recruiting Ranks

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-The top graph shows each team’s returning production and transfer portal points, separated by teams in the top 45 of recruiting class rankings

-The bottom graph shows each team’s returning production and their recruiting ranking for 2021 and 2022, separated by teams in the top half (above the median) of transfer portal points

-Comparing these graphs helps you see how much production a team is returning and how they did in recruiting and transfer portal additions

-Separating these graphs by the top 45 in recruiting or top half of transfer points is helpful because it helps you see where teams are good at in terms of roster turnover while grouping them based on another variable that factors in

-It is extremely impressive seeing Alabama have a top recruiting rank and a top 5 transfer rank while also being above average in returning production

-It is concerning for Iowa State seeing them return the least production of any team while being on the bottom half of transfer portal and recruiting rankings

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1. Points Margin & Yardage Margin vs Sack Margin & Turnover Margin

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-The top graph shows two variables created: Yardage Margin (total offense – total defense) and Points Margin (scoring offense – scoring defense) a combination of the Offense and Defense graphs to show how much each team outgained and outscored their opponent on average

-The bottom graph shows each team’s turnover margin and a created variable Sack Margin (team sacks – sacks allowed), the graph is separated by teams with a .500 or better conference record

-Comparing these graphs helps see where teams ranked in overall margin of victory and in game changing plays, a team below the line on of best fit on the top graph likely has a bad turnover margin, explaining why their yardage numbers do not correlate to their points numbers as well as most teams

-A good example is Arizona, who is the biggest outlier on the top graph, and they happen to have the worst turnover margin (-17) in the country, causing them to be so far below the line of best fit

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1. Team Sacks & Run Defense vs Team Sacks & Pass Defense

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-The top graph shows each team’s total number of sacks last season and their rushing yards allowed per game, separated by third down defense

-The bottom graph shows each team’s total number of sacks last season and their passing yards allowed per game, separated by third down defense

-Comparing these graphs helps you see how the combination of sacks and run/pass defense correlates to the top half of third down defenses

-The correlation looks much better on the top graph with run defense, as there is more of an obvious trend and less outliers, although both graphs show that most teams with good sack and pass/run defense numbers do better on third down

-The X-Axis labels are adjusted on these graphs and many other split graphs so that there is no empty space on either side. For example, the bottom graph would be empty space on the left side of the right graph without an adjustment because Michigan State is an outlier in pass defense and without them on the graph (right side), there is no point in the empty space. Having the dotted lines helps you be able to tell the difference in adjustments

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1. Sacks Allowed & Run Offense vs Sacks Allowed & Pass Offense

-The top graph shows each team’s total sacks allowed on offense and their rushing yards per game, separated by third down offense

-The bottom graph shows each team’s total sacks allowed on offense and their passing yards per game, separated by third down offense

-Comparing these graphs helps you see the correlation between sacks allowed and run/pass offense contributing to good third down offenses. This is not as accurate as the defensive one (sacks vs run/pass defense) because some teams might be pass or run heavy

-On the Y-Axis number labels, because fewer sacks allowed is good, I reversed the order of the labels so the teams with the least number of sacks will be at the top. I did this with all defensive stats because the less points/yards given up the better, as well as recruiting because 1 = best rank.

-A good finding is seeing Wisconsin above the 80th percentile in sacks given up and rushing yards on the left side of the top graph. It makes you wonder why they are on the side of worse third down offenses with great numbers, and looking at the bottom graph, their passing offense being well below the 20th percentile gives you a good idea of why they struggle on 3rd down

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1. 3rd Down Offense & 3rd Down Defense vs Redzone Offense & Redzone Defense

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-The top graph shows each team’s 3rd down offense conversion rate and their 3rd down defense conversion rate allowed

-The bottom graph shows each team’s touch down rate in the redzone on offense and touch down rate allowed in the redzone on defense

-Comparing these graphs helps you see which teams’ cash in more on important plays/sequences. These graphs can help explain why some team’s scoring offense/defense performs better/worse than their yards/yards allowed would suggest

-The top graph is important in showing which teams can keep drives alive on offense and can get off the field on defense (force punts), while the bottom graph shows you which teams’ cash in on offensive opportunities when close to the end zone, and which defenses are able to bend but not break

-Teams with more explosive plays on offense might not need to be as efficient in redzone and third down offense, but these statistics are still very important as they can be the difference in games

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1. 3rd Down Offense & Redzone Offense vs Total Offense & Scoring Offense

-The top graph shows each team’s 3rd Down Offense and their Redzone Offense TD conversion rate, separated by the top half of teams in points per game

-The bottom graph shows each team’s total yards per game on offense and their points per game

-Comparing these graphs helps you see how a team’s conversion rates in important plays (3rd down) or important sequences (redzone) affects teams on the Offense graph

-For example, Duke is in the middle of the pack in yards per game on the bottom graph (37th out of 77), but they are near the bottom in points (64th out of 77). When looking at the top graph, you see Duke is far below the 25th percentile for TD Rate in redzone offense, making that one of the determinants for them being such an outlier on the Offense graph on the bottom

-Teams like Oklahoma (1st in redzone offense), and Wake Forest are above the line of best fit on the Offense graph on the bottom. One of the determinants can be seen in the top graph as both teams are in the top right corner, meaning they’re above the median in 3rd down and redzone offense

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1. 3rd Down Defense & Redzone Defense vs Total Defense & Scoring Defense

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-The top graph shows each team’s 3rd Down Defense conversion rate allowed and their redzone defense touch down rate allowed, separated by the top half of scoring defenses

-The bottom graph shows each teams yards per game allowed and points per game allowed

-Comparing these graphs helps see how a defenses conversion rates in important plays (3rd Down) or important sequences (redzone) can affect their position on the Defense graph below

-The correlation is pretty good on the top graph, as teams on the top half of scoring defenses (right side) have way more teams above the median of 3rd down defense and redzone defense (top right corner) than the left side, who has most teams below average in both (bottom left corner)

-A good example here is Syracuse, who despite being above the median in both 3rd down and redzone defense, is on the left side because they are not top half in scoring defense. Looking at the Defense graph on the bottom, you can see Syracuse is well below the line of best fit, indicating their defense was much better in yardage (15th out of 77) than points allowed (46th out of 77)

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1. Passing Offense & 3rd Down Offense vs Rushing Offense & 3rd Down Defense

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-The top graph shows each teams’ 3rd down offense conversion rate and their passing yards per game

-The bottom graph shows each teams’ 3rd down offense conversion rate and their rushing yards per game

-Comparing these graphs helps evaluate whether passing offense or rushing offense is more of an important factor for determining success on 3rd down offense

-Like I previously stated, on offense some teams are run heavy (Navy) while some are pass heavy (Mississippi State) which will cause some outliers

-Regardless of that fact it seems that passing offense is the better metric for evaluating third down offense, as the correlation between passing offense and 3rd down offense (0.52) is much stronger than the correlation between rushing offense and 3rd down offense (0.28). Even without the correlation numbers, the graph and line of best fit make it clear that passing offense is more strongly correlated

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1. Passing Defense & 3rd Down Defense vs Rushing Defense & 3rd Down Defense

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-The top graph shows each teams’ 3rd down defense conversion rate allowed and passing yards allowed per game

-The bottom graph shows each teams’ 3rd down defense conversion rate allowed and rushing yards allowed per game

-Comparing these graphs helps compare whether passing defense or rushing defense is more of an important factor in determining success on 3rd down defense

-Outside of Michigan State (dead last in pass defense) being an outlier, the top graph does show a linear trend. The bottom graph has a less steep slope

-It is hard to tell whether run defense or pass defense is more important for having 3rd down success on defense, but having the graphs side by side is a nice visual tool when evaluating defenses

-Two teams that stick out are Oregon State and Memphis, who are both slightly below average in passing and rushing defense but are in the bottom 5 for 3rd down defense. You would expect these teams to be much higher in the 3rd down metric than some teams on the far left who are much worse defensively yardage wise

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1. Passing Offense & Redzone Offense vs Rushing Offense & Redzone Offense

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-The top graph shows each team’s redzone offense touch down rate and their passing yards per game

-The bottom graph shows each team’s redzone offense touch down rate and their rushing yards per game

-Comparing these graphs helps evaluate whether rushing offense or passing offense is more important in determining success in the red zone on offense

-While there is a slight trend in these graphs, they are not as correlated as 3rd down offense was, but it still is important to see how teams that are good or bad in run/pass offense do in getting touch downs in the redzone

-When doing a filter on teams below average in passing/rushing offense and above average in redzone offense (top left corner of both graphs), there are 19 teams for passing offense and 16 teams for rushing offense

-While passing offense does have three more teams in that section, by looking at the graph you can see most of them are right near the median line while on the bottom graph they are more spread out in the rushing yards category

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1. Passing Defense & Redzone Defense vs Run Defense & Redzone Defense

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-The top graph shows each team’s redzone defense touch down rate allowed and passing yards allowed per game

-The bottom graph shows each team’s redzone defense touch down rate allowed and rushing yards allowed per game

-Comparing these graphs helps evaluate whether pass defense or run defense is more important for having success in redzone defense

-Without looking at the graphs, I would expect run defense to be more correlated because with less open field to work with (being in the redzone), it is harder for teams to pass, so good run defenses should have an advantage. However, when looking at the graphs, the correlation does not look much better with run defense

-Just like the pass/run defense vs 3rd down defense graphs, the pass defense has a much steeper slope, while the run defense graph has more scattered teams across the board

-Georgia sticks out as the standard on defense with these two graphs, being the number 1 ranked team in redzone defense, while also being top 3 in both passing and run defense

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1. Rushing Offense & Time of Possession vs Run Defense & Time of Possession

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-The top graph shows each team’s time of possession per game (shows how many minutes each team controlled the ball for out of 60) and rushing yards per game, separated by third down offense

-The bottom graph shows each team’s time of possession per game (shows how many minutes each team controlled the ball for out of 60) and rushing yards allowed per game, separated by third down defense

-Comparing these graphs helps evaluate whether rushing totals on offense or defense are more important in determining success in time of possession

-Just by taking a quick glance at the graph’s, run defense is the better metric for causation of time of possession, as most teams with a bottom half third down defense are below the median in run defense and time of possession (bottom graph left side)

-Plenty of factors go into time of possession, including turnover margin, 3rd down offense/defense, etc. By looking at these graphs I can say that run defense is one of the more important factors, especially when comparing it to rush offense

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1. Run Defense & Time of Possession vs Third Down Defense & Time of Possession

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-The top graph shows each team’s time of possession per game (shows how many minutes each team controlled the ball for out of 60) and rushing yards allowed per game, separated by 3rd down defense

-The bottom graph shows each team’s time of possession per game (shows how many minutes each team controlled the ball for out of 60) and 3rd down defense conversion rate allowed, separated by rushing defenses

-Comparing these graphs helps evaluate whether 3rd down defense or run defense is more important for determining success in possessing the ball

-These graphs look much more similar than run defense vs run offense and time of possession

-The bottom graph is more correlated on the left, as only one team (ECU) has a time of possession over 30, and it is less spread out. The top graph seems a bit more correlated on the right, with teams closer together

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