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The Effect of Clock Rule Changes in College Football 2005-2008

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THE EFFECT OF CLOCK RULE CHANGES
IN COLLEGE FOOTBALL
2005-2008

A Thesis
Presented to
the Graduate School of
Clemson University

In Partial Fulfillment
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Master of Arts
Economics

by
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ABSTRACT

Rules can be seen everywhere in our lives. Rules also govern the sports we play. This paper will examine the effects of recent clock rule changes in college football, specifically 2005-2008. These rules seem to have served their purpose, but in doing so, they have created an unfortunate by-product that acts as a negative externality on the competitiveness of the game.

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CHAPTER ONE

INTRODUCTION

When something isn't right within the game, a rule is changed, assuming there are some consensus as to the problem and an agreement as to "the cure". This has been happening recently in the college football world concerning the quality of the game itself. Some parties in the college football world were unhappy about absolute game length and as a consequence some elements of the game suffer (in the case of this paper described as the average number of plays in a game, length of the game, pace, etc.). I intend to analyze, over the past four years, how these rule changes have affected not only the length of the game, but the average number of plays, the pace of the game, and how these rules changes have created a by-product that favor certain teams.

Rules governing actions can be seen everywhere. Rules also structure sports we play. Whether it's a backyard game of football or the Super Bowl, there are rules in place. For the most part, these rules are in place for a reason. Some rules themselves are questionable, at best. In 2008, near the end of the BYU-Washington game, Washington's quarterback, Jake Locker, scored with 2 seconds left in the game to put his team within one point. His teammates ran to him and he threw his arms in the air with the ball still in his hands, the ball came out over his head, and a 15 yard penalty was assessed for excessive celebration. Washington then had to kick a 35 yard extra point to tie the game. BYU blocked the kick and held on to win 28-27. The rule imposed on this play seemingly cost Washington a change to win the game in overtime by making them kick a

much longer point after. More importantly, it altered the strategical choices present to the Washington head coach. Instead of going for a two-point conversion and the win, he was forced to kick a point after and try to get to overtime. His kicker had to kick the ball at a lower angle, thus increasing the chances of the kick being blocked.

This rule was put in place in an effort to promote sportsmanship and to deter excessive celebration. Almost any opinion would tell you that the events that took place up until the penalty were anything but excessive and unsportsmanlike. This is an example of a recent rule change altering a coach's decision; this paper will examine a few rule changes that have served the goals of the Rules Committee and college football, but have unfortunately created a by-product that changes the strategical approach to the game.

CHAPTER TWO

BACKGROUND OF THE RULE CHANGES AND THE RULES COMMITTEE

The NCAA seems to be a bit slower to make changes than its professional sports counterparts; this may be due to the significantly larger and more diverse nature of its constituency. The NCAA Rules Committee is made up of 13 members whose duties include communicating with the football community on rules issues during the season, comparing and contrasting new rule ideas with colleagues in their respective conferences, communicating the rule changing process with the football community, and evaluating playing rules annually to ensure balance and fair play (Football Rules Committee Duties). This 13 member committee has to include six Division I members, three Division II, three Division III, and a nonvoting secretary rules editor (Table 1 &2). There are also two quotas; the committee must be made up of 25 percent administrators as well as 50 percent coaches (NCAA.org). Also, for a rule to pass, a 2/3 majority must be met.

When one looks at the overall game length in 2005, it becomes evident as to why these waves of regulatory changes took place. Game lengths were reaching on average three hours and twenty minutes, some extending as far as four hours in length. Detailed below are some of the rules changes that have occurred over the past three years in college football. In 2006 the rules committee made two major changes to try and shorten the game. The first comes into effect on kickoffs; the clock will be started when the foot touches the ball, not when the receiving team touches it. Prior to 2006, if the ball was kicked out of bounds, the receiving team would possess the ball with no time run off the

clock. Now, if the ball is kicked out of bounds the receiving team possesses the ball with however much time it took for the ball to land run off the clock. The second rule comes into play after a first down. The clock will now be started on the ready to play signal, given by the referee. Previously, the clock started on the snap of the ball. The Rules Committee estimated that the latter rule would shave almost five minutes off of the elapsed game length (NCAA.org).

The second rule change in 2006, starting the clock on the referee's signal after a first down, was repealed for the 2007 season. The repealing of the rule came about because many coaches complained that the rule sacrificed the number of plays in a game, consequently the Rules Committee "pulled the plug" on the rule, though only temporarily as will be discussed in the following sections (NCAA.org).

In 2008 the play clock is now set at 40 seconds and will start immediately after the ball becomes dead on the previous play. This replaces the old 25 second play clock that was started on the referee's ready to play signal, which effectively removed the variability of the elapsed time between end of play and the referee's signal. However, in circumstances where the officials stop the game clock for administrative and other reasons the play clock will be set to 25 seconds and started on the referee's signal. This 25 second play clock occurs on a penalty administration, a charged team timeout, a media timeout, an injury timeout, a measurement, a change of possession, following a kick, following a score, the start of each period, the start of a team's series in an extra period, an instant replay review, and other administrative stoppage. Additionally the 15 second play clock, which followed TV timeouts, was eliminated (NCAA.org).

Another change regarding the clock stoppage deals with the ball carrier running or fumbling the ball out of bounds. Under the old rule, the clock was stopped until the ball was snapped, but now the clock will start on the referee's signal when the ball is ready to play. The exception to this rule occurs during last two minutes of each half in which the clock will stop as soon as the ball is snapped.

CHAPTER THREE

WHY CHANGE THE RULES?

In the case of college football, rules are put in place to assure fair play, player safety or the overall quality of the product (the game) itself. The last motivator, “quality”, has frequently been equated with two elements; pace of play and offense or scoring. We have seen changes in other sports to promote these “quality” dimensions, such as in basketball with the advent of the three point shot, the shot clock, and prohibition of man-to-man defense (pro). In baseball the addition of the designated hitter and lowering of the pitching mound were both designed to promote scoring. In professional football we have seen significant tightening of the pass interference rules and dramatically increased protections for the quarterback, both designed to promote the more exciting, faster-paced, passing game. It is intuitive that a more exciting game, or product, will be worth more economically in the marketplace. Television contracts are a large and increasing source of revenue. Big-time college football has all the elements of a big business and is competing for these entertainment dollars. It is therefore not surprising that many of the NCAA rule changes from year to year are equally designed to promote a more exciting product. While NCAA football may have started late and clearly did not “get it right” the first time, I believe the Rules Committee has finally achieved its objectives and enabled a faster-paced, more television friendly product.

According to the Rules Committee the overall purpose of the new rules for the 2008 season is to standardize the pace of play across conferences and officiating crews.

Rogers Redding, SEC coordinator of officials and the NCAA's next secretary-rules editor, said "The concern was from one conference to the next, there was enough variation in the length of time it took the referee to make the ball ready for play" (NCAA.org). Michael Clark, Chair of the Rules Committee and head coach at Bridgewater College, said "These changes are part of the continuing efforts to maintain a reasonable length of games and create a consistent pace of play at all levels" (NCAA.org).

The Rules Committee tried to find a middle ground between the coach's complaints and shortening the games without sacrificing the number of plays in a game. The coach's complaints arose because the rule changes in 2006 were affecting the number of plays in a game, which would possibly affect the outcome of the game (possibly favoring the underdog). The Rules Committee tried to make up for the lost number of plays by implementing the 40 second play clock to which Michael Clark commented, "I hope the third time we got it right" (NCAA.org). The tone of the quote seems to suggest that he sides with the coaches when it comes to the issue of lost plays. He goes on to say, "We wanted to find something the TV people are looking for without taking away plays from the game. The hope is we got it right." (NCAA.org). This statement suggests that television and the revenues brought forth by television broadcast rights have a large influence on their decisions.

The motivation behind these rules changes can come from a wide array of areas. It could come from trying to shorten TV telecasts in order to keep viewers interested watching from home, it could also come from fans watching the football game live and sitting in the stands for over three hours may be too long for some, or it might come from

coaches trying to shorten the game to give their possible “underdog” team a better chance to win. The fewer plays in the game, the fewer chances the “better” team has to show that they are in fact the superior team. Overall, 2008 is the third consecutive year that the rules committee has changed rules dealing with the clock. For 2008 the rules committee hopes to find that middle ground between 2006 and 2007 when dealing with both the length of the game and the number of plays.

I recently made contact with the staff liaison for the 2006-2007 rules committee, Ty Halpin. I asked Ty what were the committee’s intentions of these rule changes, and he affirmed previous statements. The Committee was concerned with game times approaching 4 hours in some cases. They felt that this was not in the best interest of the game and players. I also asked him if the committee was pleased with the results so far, and he essentially said that the committee is pleased with the overall impact so far.

CHAPTER FOUR

DATA

The data I used comes from the NCAA statistical archives, which keeps a large amount of statistics on college football games; their statistics range from toughest schedules, to single game highs, to attendance, to trend reports, and almost everything in between (Trend Reports). I would have preferred to have data from at least 2003-2004 to try and establish somewhat of a trend leading into the analysis, but unfortunately the statistics I looked at are a bit incomplete.

I focus on game length and the pace of the game. To create a variable for pace of the game I just divide the total number of plays in the game by minutes per game. A typical figure for the pace of the game is somewhere between $\frac{1}{2}$ a play per minute and $\frac{3}{4}$ of a play per minute. Game length is simply the overall number of minutes it took to complete the game; this seems to range from 150 minutes to 245 minutes, with a few outliers beyond those numbers. To illustrate whether or not the rules committee accomplished their goals of appeasing coaches, television, fans, etc. I will use the average number of plays in a game for each team in each year as well as the overall length it took to complete each game.

I also collected data from ESPN.com as well as Jeff Sagarin's website for my third method of analysis (Jeff Sagarin) (Conference Standings). The data I collected from these resources are variables that describe the outcome of a season; wins, conference finish, as well as Jeff Sagarin's power rankings. Jeff Sagarin is an accomplished sports

analyst who works for USA today. He has come up with equations that determine power rankings for almost any sport; college basketball, MLB, NBA, NASCAR, formula one racing, and even the PGA tour. His equation for college football is used in the BCS rankings. Those BCS rankings determine what teams will play for BCS bowl games. His equation for college football includes variables such as strength of schedule, record vs. top-10 and top-30 teams, as well as wins and losses. These three variables will all be dependent variables later in the analysis.

CHAPTER FIVE

DID THE COMMITTEE ACCOMPLISH ITS GOALS?

The first approach I take in analyzing the data consists of using simple averages to see what the numbers show, and those numbers do indicate an impact. In all conferences the game of the length decreased drastically from 2005 to 2006. When you look at the averages and variances for all conferences in 2005, it seems obvious as to why the Rules Committee started this wave of regulation pertaining to the game clock and play clock. The average game is around three hours and twenty minutes with a variance of nine minutes each way. Assuming a normal distribution, that means that 65% of the games will take somewhere from three hours and ten minutes to complete and three hours and twenty minutes to complete. It also means that 95% of the games will finish between three hours and three hours and forty minutes. A forty minute spread is too large, the predictability of game length is almost impossible.

Now, I'll take a look at the three years, or three waves of regulation. For 2007, the season after the 2006 rule was appealed the length of the games increases by an average of sixteen minutes (Table 3, Figure 1). This is what was expected, maybe not by that much, but it was expected. The biggest differences come from the Big 12, Conference USA, the independent schools, the Sun-Belt, and the Western Atlantic conferences, all of which were over the average jump. Interestingly enough, only one of those conferences is a BCS conference. This is interesting because BCS schools are almost always the teams featured on primetime television, intuitively meaning longer

games, but the data does not suggest that these teams did not experience the biggest jump in length of the game. In 2006, all but one BCS conference is above the average game length. In 2007, it becomes more of a mix, BCS and non-BCS schools are not separated by the average, they are mixed together. In 2008 we see a much tighter spread, as well as a similar mix to 2007 (Table 3).

The ACC's game length (Table 3) experiences a unique change when compared to the rest of the conferences, they are above the overall average in 2006, then well below the average in 2007, and right on the average in 2008. They experience a spike in variance in 2007 and then a large dip in 2008. The Big 12 conference seems to always stay above the average length of the game by at least 4 minutes in each year, its variation in length is increasing throughout the analysis. The Big East is generally about 3 minutes above the game length, its variance experiences a spike of more than 5 minutes in 2007, its variance then returns near to the variance seen in 2006. The Big 10 is generally 2-3 minutes below the overall average. The Big 10's variance is interesting, it spikes by over a minute in 2007 and in 2008 it drops by more than two and a half minutes. Conference USA is within one minute of the average each year, its variance jumps in 2007, decreases in 2008 but not by much. The Mid-American conference is at least five minutes below the average each year, with a very similar standard deviation of around five minutes throughout the analysis. The Mountain West conference is generally 6-8 minutes below the overall average, its variance actually drops in 2007, and increases in 2008 to a figure similar to 2006. The Pac-10's game length is larger than the overall average for 2006 and 2007, but its game length is equal to the overall average in 2008, its variance experiences

a similar situation to the Mountain West, a decrease in 2007 and a jump in 2008 to a variance comparable to 2006. The SEC remains around two minutes above the overall average; they also have experienced a big drop in the variance of their game length's in 2008. The Sun Belt conference stays in between 2-4 minutes below the average with a spike in variance in 2007 and a large drop in 2008. The WAC is slightly below average in 2006, and then climbs above the average in 2007 and stays above it in 2008. Its variance stays around the same value throughout the analysis, a rather higher one than the rest of the conferences. Overall when looking at game length across conferences in the analysis we see that the conference either stayed above the average game length or below throughout the years of analysis. We really don't see the same trends happening with variance, it looks like the changes in variation are unique to each conference, some experience the same, and others experience drastic changes. One trend that does happen in a few conferences is the spike in 2007 followed by a significant drop in 2008. Interestingly enough, the conferences that this occurs happen to be the ACC, the Big East, the Big 10, the SEC, and the Sun Belt, four of the prominent conferences seen on television throughout the weekend.

Looking at the average number of plays in a game (Table 5), it seems like the coaches had a legitimate complaint, saying that the rule in place for 2006 sacrificed the number of plays in a game. This becomes evident especially when one compares the difference in plays per game from 2005-2006. It is a drop of over 13 plays per game. In 2005, the coaches got used to having about an extra possession per game, and in 2006, that possession was taken away. A similar observation is seen in the increase in plays per

game between the years 2006 and 2007. The average difference in plays was almost 16 plays a game. If that number is divided between both teams it comes out to be almost a possession per team. That lost possession could be the deciding factor in who wins or loses a game. The biggest jump in plays per game came from the Big 12, Conference USA, Pac-10, Southeastern, and Sun-Belt conferences (Table 4, Figure 2). Another drop occurs from 2007 to 2008, about 10 plays per game. This difference is the smallest jump throughout the analysis. But the variance in this year across all conferences is the largest. This increase in variance could be explained by differences in coaching/game-play strategy. The differences in the pace of play and plays per game is noticeable between a team that plays a traditional type of offense (run first, pass second) and a team that runs a spread offense (a more hurry-up style).

When dealing with plays per game, the ACC in all years is below the average by around 3 ½ plays per game, it experiences a spike in the variance of number of plays in 2007, and a significant drop in 2008 to a figure below 2006. The Big 12 is generally above the total number of plays in a game, with a steady variance. This isn't surprising when it comes to being above the average number of plays in a game; most of the Big 12 teams run a spread/hurry up offense, one that promotes more plays and more scoring. The Big East is generally below the average with a change in variance a little similar to the ACC's, an increase in 2007, followed by a dip in 2008. An interesting item of observation is the Big East's variance of number of plays in 2005; it is the smallest number throughout the analysis, 2.479. The Big 10 also hovers slightly above the average from 2006-2008, and it's about five plays above the average in 2005, and

experiences a similar change in variance to the ACC and the Big East. Conference USA is generally above the average, its variance actually increases in each year of the analysis. The Mid-American also hovers slightly above the average with a variance that increases throughout 2006-2008; in 2005 it is about three plays above the overall average. The Mountain West is within one play of the average from 2006-2008 and about 3 ½ plays above the average in 2005; after 2005, it too experiences an increasing variance throughout time. In 2005 the Pac-10 is around 4 plays above the average, in 2006 and 2007 it is around two plays above the average and then converges with the average in 2008. Its variance actually dips in 2007 and increases greatly in 2008. The SEC total number of plays about 3-6 plays less throughout the analysis. Its variance jumps in 2007, and then decreases by just a little in 2008. The Sun Belt is well below the average in 2005, below the average slightly in 2006, slightly above it in 2007, and about two plays above it in 2008. Its variance also increases throughout time. The WAC is above the average in 2005-2006 and slightly below the average in the following years. It, like the Pac-10 experiences a dip in its variance in 2007 and a large jump in 2008. The conference behavior stays about the same throughout the analysis; it's either above by the same amount or below by the same amount. We see two different stories when we look at the variance though, a conference variance increases throughout time, or they experience a jump in 2007 followed by a drop in 2008. Interestingly enough, the conferences that have an increasing variance throughout the period of analysis are Conference USA, the Mid-American, the Mountain West, the Sun Belt, and the WAC.

All of which are non-BCS schools, so if the committee's goal was to standardize the pace of play, it doesn't seem to have worked for these non-BCS conferences.

In 2008 the average game length across conferences fell by about 11 1/2 minutes, which is less than the loss imposed on the rule changes for 2006 by four minutes (Table 2). Almost every conference had at least ten minutes taken off the length of their games due to the new rules. These differences, however, are still less than the differences between 2006 and 2007, so the Rules Committee seems to have reached a middle ground when it comes to the length of the games.

In 2008 the average number of plays fell by almost ten. This once again is less than the loss between 2005 and 2006, and the increase between 2006 and 2007 (Table 3, Figure 3). Instead of losing what was about one possession per team, teams are losing about four and a half plays a game. Based on the Rules Committee seems to have also reached a consensus when dealing with the number of plays in a game. They shortened the game without losing the same amount of plays in a game compared with 2006 and 2007. Whether or not this compromise satisfies the unhappy coaches is another question altogether. The numbers indicate an impact, but how effective were they? This can be answered using the second approach.

The second approach (Table 6) to the data is actually more telling of whether or not the rules committee achieved their objectives going into the 2008 season. I calculated the pace of the game (plays per minute) for each team and each conference (Plays per minute for each conference can be found in Table 4). My baseline year is 2005 for both minutes per game as well as plays per minute. I chose this year as the baseline because it

was the year prior to the first wave of regulation. I compare the rule changes as they affect plays per minute and minutes per game for 2005 and 2006, for 2005 and 2007, and again for 2005 and 2008. For the 2005 and 2006 comparison there was a 7.1% decrease in the length of the game as well as a decrease of 2.6% in plays per minute. For the 2005 and 2007 comparison there was an increase in minutes per game of .4%. This figure is close to the length of game the college football world experienced in 2005, and intuitively not a length that they like. Play per minute also increased, by 1.4% when compared to 2005. This result they do enjoy, this puts a faster paced game out on the field, and one, as previously discussed, is worth more in the market place. For the 2005 and 2008 comparison we see game length decrease by 4.8%, and the pace is almost the same, a small increase of .1%. So, throughout the three years of regulatory changes, it looks like when the Rules Committee achieved one of their objectives failed to achieve another. They kept tinkering with the rules and eventually achieved what originally set out to accomplish, a decrease in length while keeping/increasing the pace of the game.

The 40 second clock rule has had a positive effect on the predictability of the length of the game without sacrificing the pace. It has standardized the pace of play and also kept the quality of the game. Game quality comes from how exciting it is to watch, and with a standardized pace of play there is less “dead” time between plays. It is evident from the figures above that less overall game length is accompanied by more plays per minute.

There is also a noticeable change in the variance in this analysis when it comes to minutes per game (Table 3). This happens to be an important statistic when it comes to

TV telecast. TV is in need of a more predictable time for game length. The standard deviation of minutes per game across all conferences in 2005 was almost ten minutes and in 2006 it was 6.77 minutes. The next year that number increased to 7.74 minutes. For 2008 the standard deviation fell back down to the number seen in 2006, for 2008 it was 6.42.

Something interesting to note is the different impact these rules have had on BCS conference teams vs. non-BCS conference teams. In 2005 the teams in BCS conferences averaged about 203 ½ minutes in game length where non-BCS schools averaged around 198 minutes in game length, both had similar standard deviations. In 2006 BCS conference teams averaged around a 190 minute game length where non-BCS average around a 184 minute game length (Table 7). Both had a standard deviation of around 6 minutes. Both experience a jump in game length in 2007; 15 minutes for BCS schools and 16 minutes for non-BCS schools, the variance for both increases by about the same amount (1 ½ minutes). 2008 is where it gets interesting, non-BCS schools lost less time than BCS and their variance decreased by less. If the NCAA truly wanted to create a more standardized game length and pace of play it seems to becoming clear who these rule changes are for. BCS schools are the teams we see every weekend playing on television, and although a game that includes a television telecast would take longer there may be an alternate motive, television.

Television certainly benefits from the new rules; they have a more predictable game length. This leads to a more reliable TV schedule. A game that goes over by thirty minutes has to hurt the TV station when dealing with the programming for the rest of the

day. Dan Wetzel, a writer for Yahoo! Sports, recently wrote an article dealing with the NCAA and how it seems to look the other way with cheating by schools. While cheating is not the issue at hand in this paper, Wetzel's article does report a very telling point, "the SEC's recent television deals with CBS and ESPN are worth reportedly more than \$3 billion combined" (Wetzel). With such a large sum of money involved in TV telecasts, the TV stations expect to secure the most predictable game of length as possible.

CHAPTER SIX

BY-PRODUCT OF THE RULE CHANGES

Although the rules committee accomplished their goals to standardize the game length while keeping an exciting pace of play, these rule changes benefit certain teams. I use the same variables as the previous two analyses, minutes per game and plays per minute as my independent variables.

A priori, I suspect that teams with longer game lengths will experience a more successful season. Over a longer game the better team will be able to show that they are in fact, superior, resulting in a win, which may lead to a higher ranking and conference finish.

This theory starts with an assumption of sound coaching. One could assume that a superior coach would make the correct (play calling) decision. Correct move after correct move leads to a higher rate of success; in the case of college football this would mean an offensive possession resulting in points. A coach attempts, especially in a match up that has a clear favorite and a clear underdog, to maximize the amount of time his team possesses the ball as well as efficient possessions that end in points. Maximization of ball control comes out of a team's strength, and this strength is unique to the players executing out on the field. A dominant offensive line and running back that can gain 3-5 yards a play is a classic example. However, this is not the only way. Recently, we have seen a large number of teams spreading the field, thus spreading out the defense. This coupled with an accurate quarterback and decent receivers is another way to control the

ball and the clock. The coach recruits to his preferred strategy or takes who he can and adjusts accordingly.

No matter the method of execution, the goal of the coach of the “favorite” is the same--control the clock, draw out the game, and show you are the dominant team. The coach of the “underdog” team would attempt the opposite--shorten the game and possibly move at a quicker pace in an attempt to catch the opposing team off guard. I also expect to see, for many of the reasons mentioned above, that teams that move at a slower pace will win more games. The lengthening of a game accompanies a slower pace of play.

My dependent variables are all indicative of the outcome of a season--number of wins, conference finish, and Sagarin power rankings.

$$\text{Wins} = \beta_1 \text{ MPG} + \beta_2 \text{ PPM} + \beta_0 \quad (1)$$

$$\text{Sagarin Rankings} = \beta_3 \text{ MPG} + \beta_4 \text{ PPM} + \beta_{00} \quad (2)$$

$$\text{Conference Finish} = \beta_5 \text{ MPG} + \beta_6 \text{ PPM} + \beta_{000} \quad (3)$$

I ran these regressions separately by year to reflect which rule changes/variables affected the outcome of that year the strongest.

6.1 WINS

In 2006 both MPG and PPM were significant in determining the amount of wins a team accumulated (Table 8, Figure 3). MPG was positive and significant, meaning teams with longer games overall experienced more wins. About ten more minutes per game

equated to one more win. PPM was negative and significant, suggesting teams that played at a slower pace experienced more wins.

In 2007 MPG was the only significant variable, although PPM was very close to being statistically significant (Table 8, Figure 4). Once again, MPG was positive, but it was slightly less significant than in 2006. In this case it would take about 14 more minutes to game length to add one more win.

In 2008 MPG was significant and positive, while PPM was not at all significant (Table 8, Figure 5). In this regression MPG is at its highest significance out of the three. It would only take around 7 more minutes added to game length to add one more win for a team. With the strength of significance shown here, these new rules clearly have an effect on which teams experience more successful seasons--teams with longer games overall.

Through the rule changes we see one variable in all years that affects the number of wins in a season by a team, minutes per game. This may suggest that teams that are always on television tend to win more often, but with every game there is a winner and loser. The intuition behind the previous statement is that telecasts take longer because of television timeouts. Teams in BCS conferences (the ones on television the most often) average longer games in every year of the analysis than teams in Non-BCS conferences (Table 7). Another possibility could be that the longer the game, the more strategy is involved. Over a longer game the superior coach becomes more and more clear. Also, which team has the better players and which team is better conditioned become more

obvious over a longer game. The ability to maintain focus over a longer game is incredibly important because games can be won and lost on a single mental mistake.

The standardization of the pace of the game becomes more evident in the data over time. In 2006 plays per minute was significant in determining a winner. However, it loses its statistical significance over time, and in 2008 we see no significance whatsoever of the pace determining a winner. Taking the grey area out of the referee's spotting the ball seems to have been important for the competitive balance of the game.

6.2 SAGARIN POWER RANKING

In 2006 we see both MPG and PPM affecting Sagarin rankings in a statistically significant manner (Table 9, Figure 6). PPM is positive and strongly significant. The sign changes from previous regression because a "1" Sagarin ranking is the best team in the country, where as a "1" in the win column for the whole season is possibly the worse team in the country. MPG is also strongly significant and negative; the sign changes for the same reason as above. The addition of about 4 minutes to a team's game length moves them closer to the top team in the rankings by one spot.

In 2007 PPM and MPG are again significant (Table 9, Figure 7). PPM increases its significance by an observable amount where MPG significance drops a small amount. It would take an additional 10 minutes added to game length for a team to move up one spot in the rankings.

In 2008 while both are significant, we see a reversal in the strength of significance (Table 9, Figure 8). PPM drops in significance, and MPG increases greatly in

significance. Similar to 2006, it would take an additional 4 minutes added to a team's game length to move them up one spot in the rankings.

With Sagarin power rankings we see many similarities to the previous dependent variable, wins. This is not surprising as wins are a variable in the Sagarin ranking equation. The difference in regression results comes with the pace of the game. We also see PPM significant in every year with this dependent variable. Better teams seem to slow down the game and assert their dominance over the weaker team. Better teams are more efficient when it comes to play calling and yards gained. Intuitively, they would be able to maintain possession longer. Another interesting item to note is the strength of the significance of the regression results. The strength of MPG in 2008 has increased with both variables so far. It seems that the current rules favor the teams that draw games out even more than the previous years of the analysis.

6.3 CONFERENCE FINISH

2008 is the only year where one of these variables affects a team's finish in its conference (Table 10). MPG is significant and negative. Like the Sagarin ranking, a negative figure is good, because the conference champion has a "1" conference finish, where the last place team has a number next to it equal to the total number of teams in that conference. The addition of about 8 minutes to a team's game length moved the team up one spot in their conference.

To see results in the previous two dependent variables and not see results with conference finish is not surprising. Conference standings can be unique when compared with the other two dependent variables. For example, team A can win all 7 of its

conference games, thus winning the conference (assuming no other team wins all of their conference games), but if it lost all of its out of conference games, this would mean 5 loses (standard season in college football is twelve games). This team would finish first in conference standings, but it would be considered “a middle of the pack” team when it comes to its Sagarin ranking. Meanwhile team B won all but one of its conference games and all of its non-conference games, giving them a record of 11 wins and 1 loss. Team B would have a higher Sagarin ranking and obviously more wins, but team A would have a higher conference finish. This is an extreme example, but one that could happen. Often we see this happen to a lesser degree. Also, the range of the Sagarin ranking and conference finish is a great deal different. The maximum value for Sagarin ranking in this analysis is around 150, while the maximum value for conference finish is 12.

CHAPTER SEVEN

TRENDS & SIMULATIONS

A little sorting tells a great deal about who is in favor of these rule changes. The top 20 teams sorted by most minutes per game in all years' shows that almost all come from BCS conferences. In 2006, 95% represent BCS conferences; in 2007 and 2008 75% are from BCS conferences (Table 11). There are also many recurring names on this list, Boston College, Florida State, Georgia Tech, Hawaii, Kansas, Kentucky, LSU, Louisville, Michigan State, Nebraska, North Carolina State, Notre Dame, Oklahoma, Oregon, Rice, Texas, Texas Tech, and South Florida all appear at least 2 out of the three years. This is in part because team strategy and play calling does not change significantly from year to year. It could also mean that these coaches were smart enough to adapt to the rules and to recruit and to call plays accordingly. These teams' records reflect the latter, and most contend for conference titles and even national championships year after year.

A straightforward simulation program informs us a great deal on the effects of the rule changes, and the effects on wins by a favorite. The simulation program was written and executed in Stata 10, and it is between two hypothetical teams, one which has an expectation of scoring 70% as much as the other. Or, in this program the favorite has an expectation of scoring 70% as much as the underdog. A quick look at scoring data in games of favorites vs. underdogs reveals that this is a fair estimate. One thousand games are played between the two teams in two simulations. Simulation A has 120 plays in a

game, while simulation B has 140 plays in a game (a similar jump from 2006-2007 and 2007-2008). The summary results are listed in Table 12.

In simulation A (120 plays in the game) the favorite won 565 out of the 1000 games, and the underdog won 381 of the games. There was a draw in 54 of the games. With a shorter game the simulation program reveals that the favorite will only win about 56% of the games. This figure is nearly comparable to a coin flip.

In simulation B (140 plays in a game) the favorite won 622 of the games, the underdog won 332 of the games, and there was a draw in 47 of the games. Adding twenty plays to the game length increases the favorites win percentage by nearly 6%. Although this increase looks small, it changes the probability of the underdog winning from a figure closely comparable to a coin flip to just about a 1/3 chance of victory. We see a discernable difference between the results in the two simulations. With more plays in a game the favorite is going to win about 6% more frequently.

The moral of the story is simply that the impact of these rule changes was not neutral with respect to outcomes on the playing field. My results suggest a “capture theory” of college football rulemaking procedures.

CHAPTER EIGHT

CONCLUSION

The Rules Committee was concerned with game lengths reaching four hours, so naturally they changed the rules to shorten the game and to create an exciting pace of play. It seems that they accomplished these goals but in doing so they created a negative externality on the competitive nature of the game. These rule changes gave a few teams a distinct advantage. The teams that have longer game length's tend to win more often, they are ranked higher, and recently, they finish higher in their conferences. These elements all point to championships, whether it is a conference championship or a national championship. Although, the better team tends to prevail in all years of the analysis, it is the strength of the significance that is important to note. The fluctuation in strength reflects the fluctuations in the rule changes. The most recent rule change has the strongest correlation between game lengths and wins. So, these rule changes favor better teams. Another piece of evidence that supports this claim is the simulation results. And although the simulation results stem from a relatively simple written program, the results should not be dismissed. Longer games favor the better teams. The jump in plays per game in 2007 led to a distinct advantage for the superior team, and although the subsequent rule changes have cut down on the number of plays, the figure still remains elevated. It is also possible that these favored teams reacted appropriately to their environment. This is a possibility because of the recurrence of teams year in and year out

with a high game length as well as presence in BCS bowls and National Championship games.

Further research and analysis can be done on this topic. For instance, points per possession could be accounted for; this may control for which team is better. Also, data collection for previous years and years after could be included; it was not in this analysis because it is not currently available.

In an attempt to see exactly who voted for the rule change, I contacted the NCAA as well as the Chronicle for Higher Education for voting records on the rule changes, and they have not returned any emails or phone calls for a few months. This would have been interesting to add into the data and see if the teams that voted for the rule changes benefited most in the outcome variables.

APPENDICES

Figure 1.

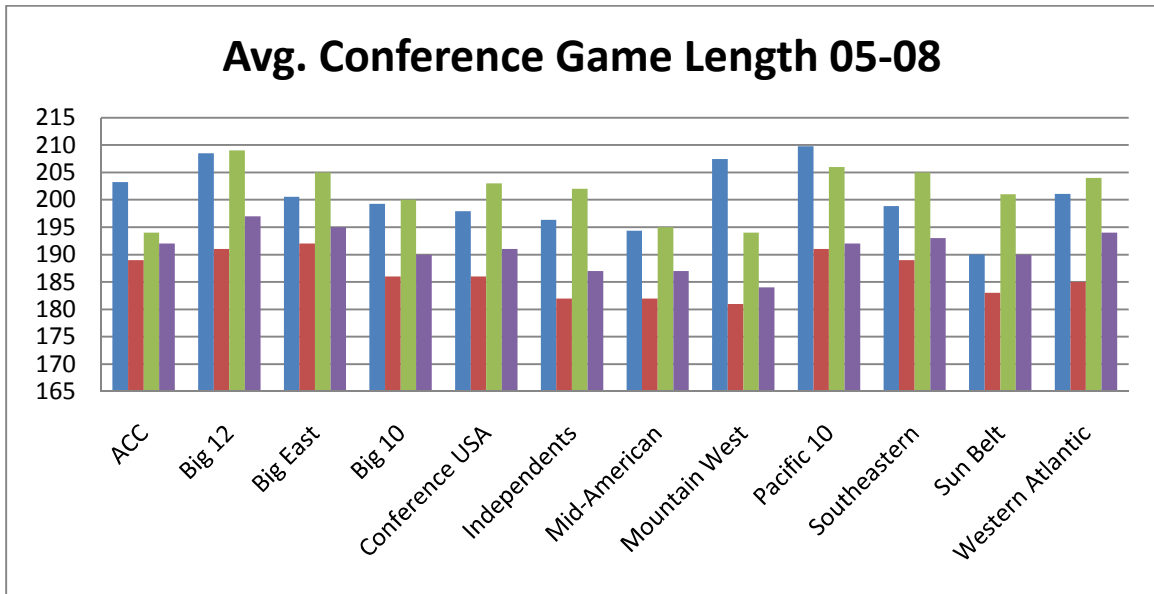


Figure 2.

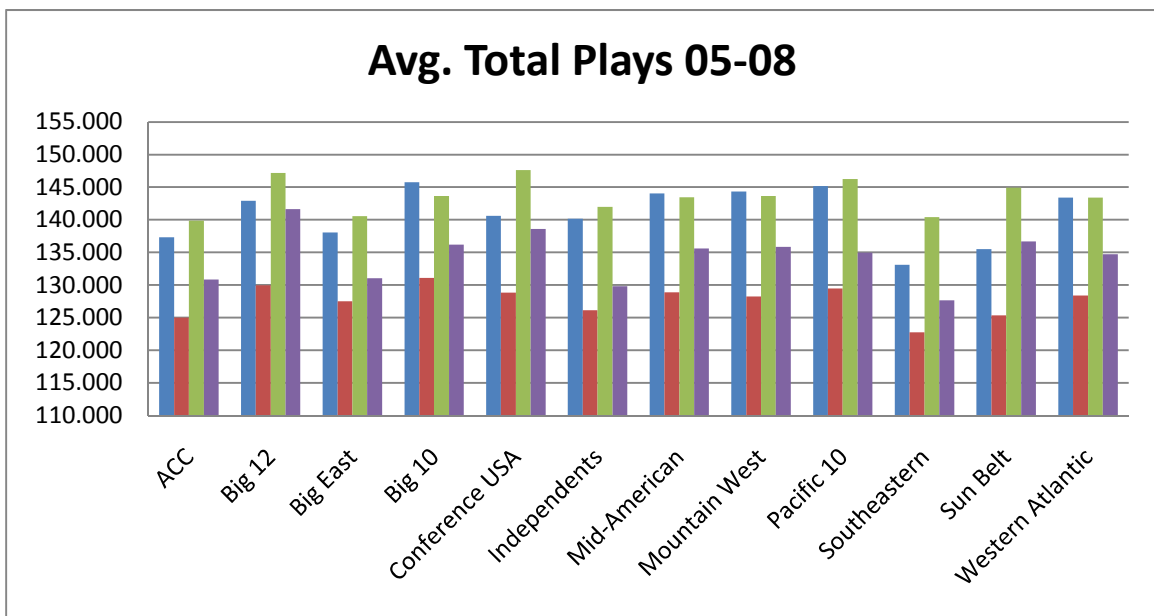


Figure 3.

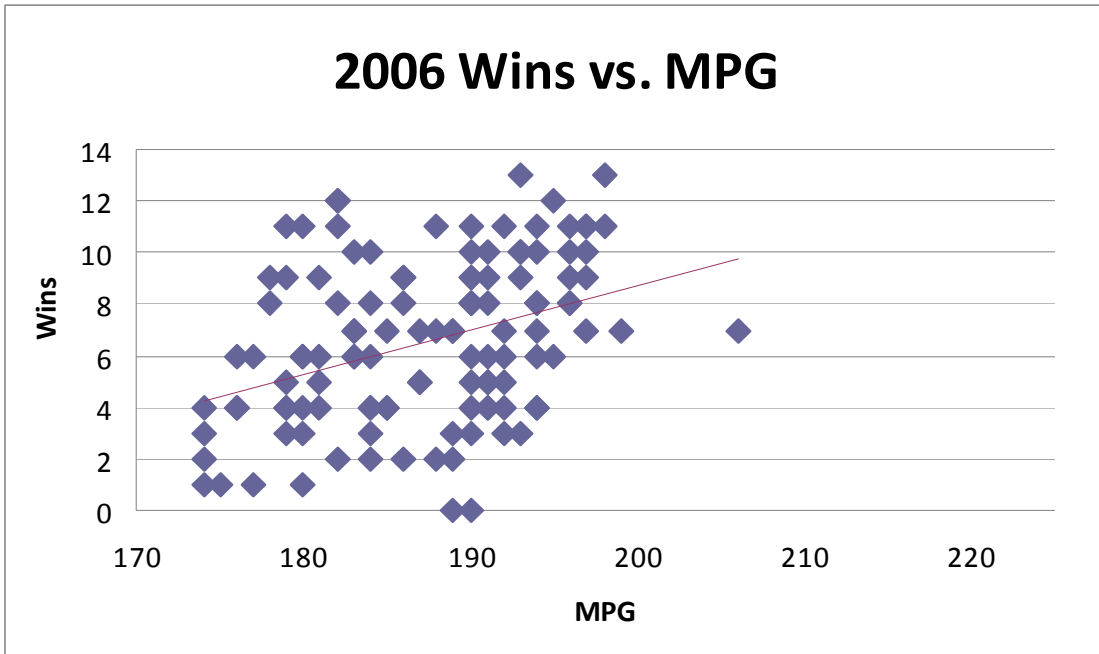


Figure 4.

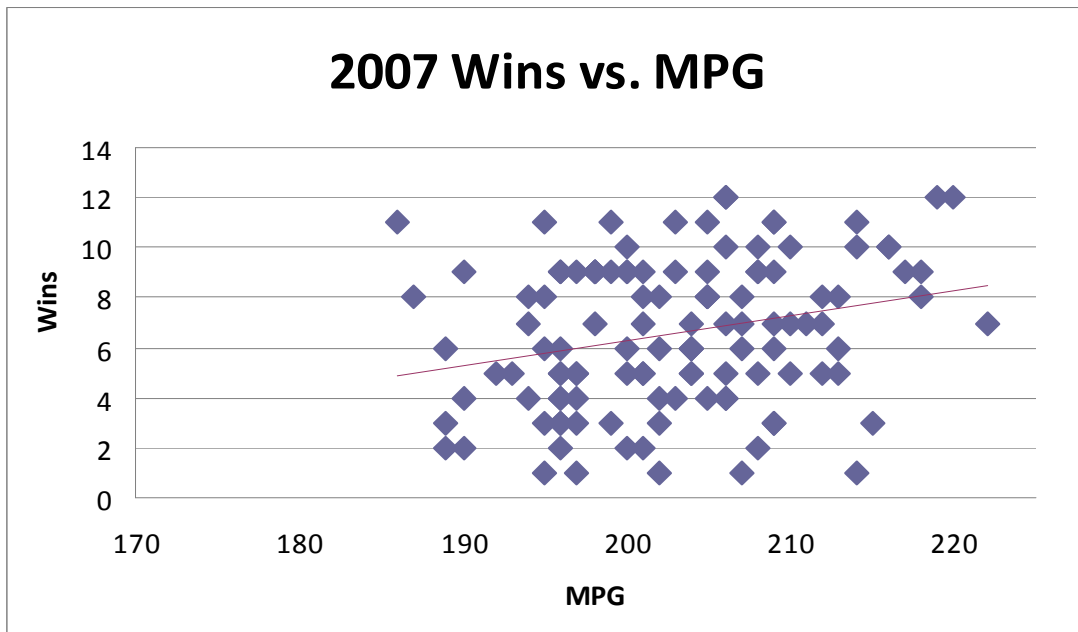


Figure 5.

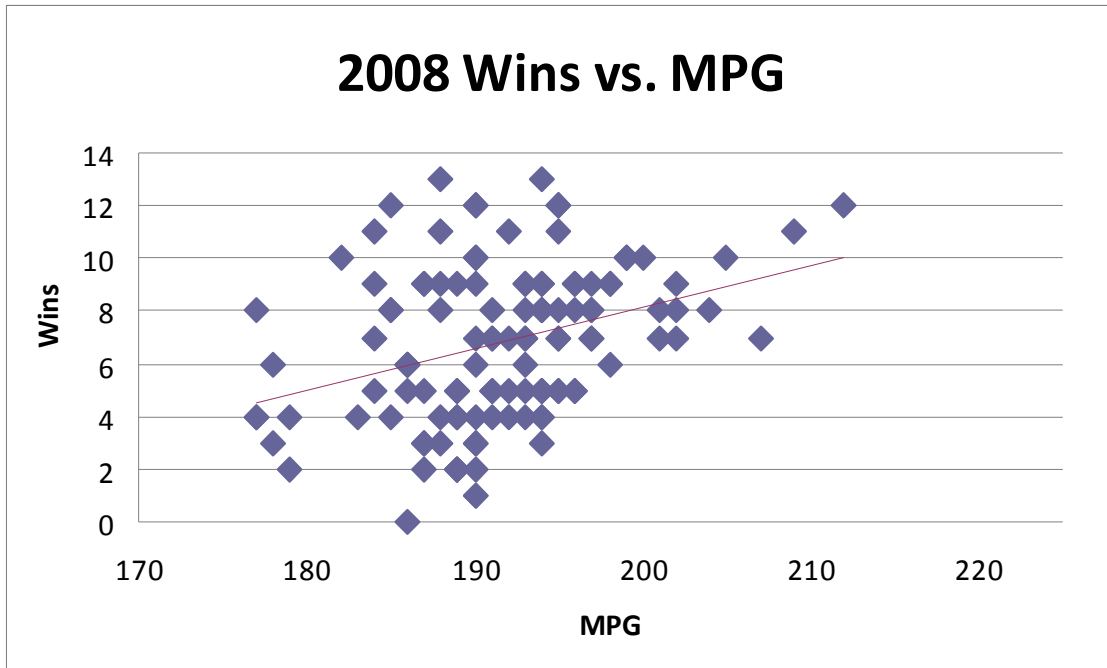


Figure 6.

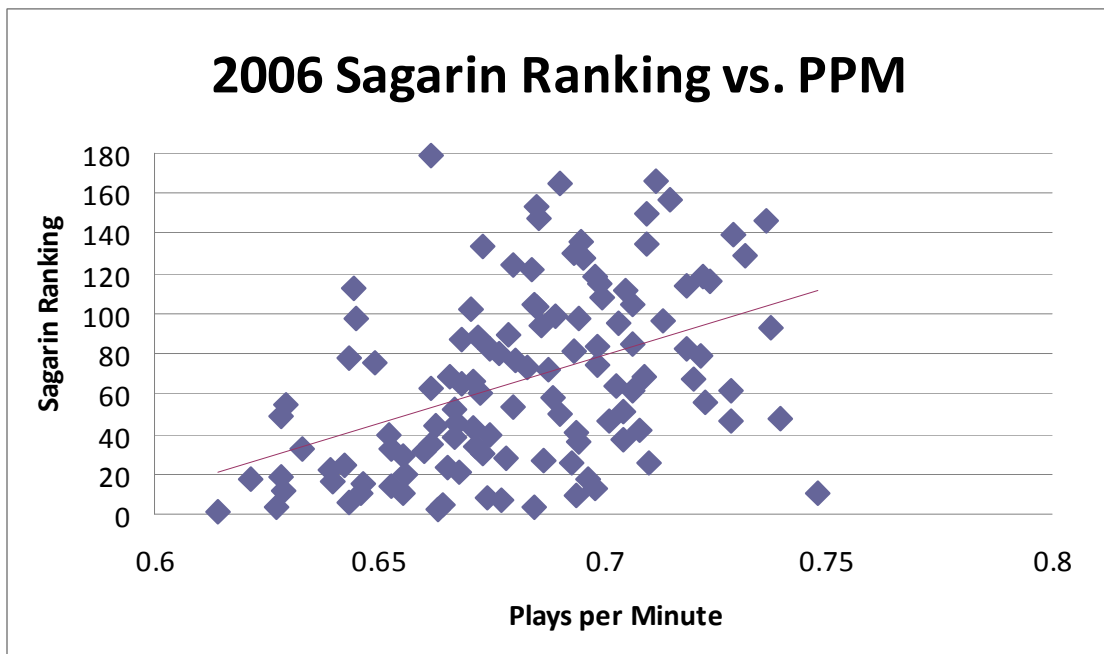


Figure 7.

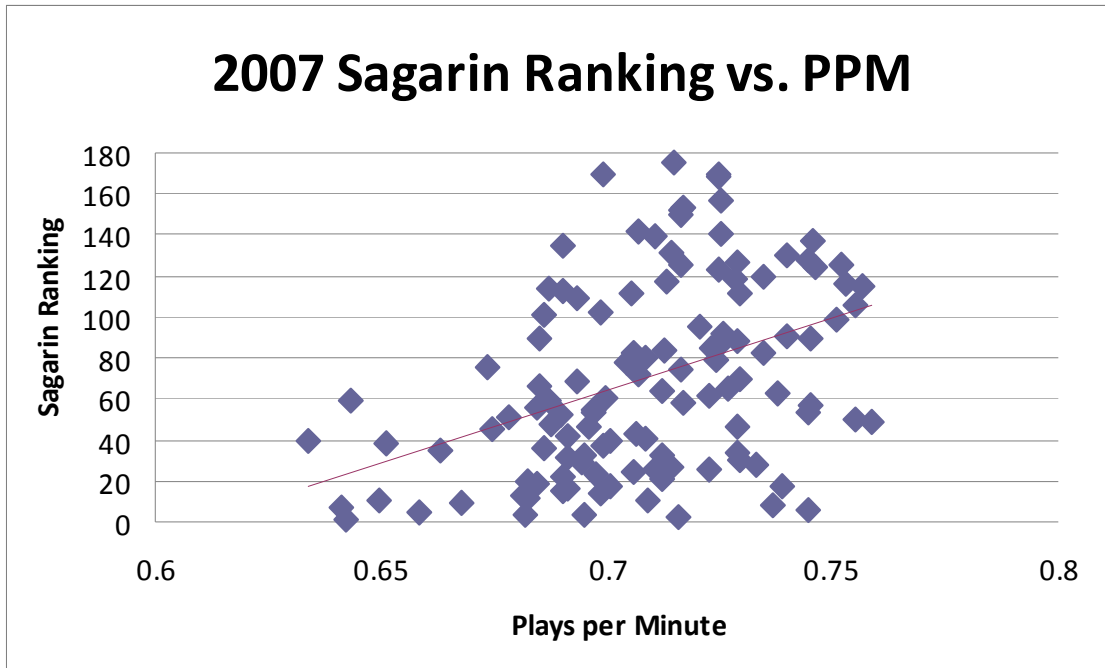


Figure 8.

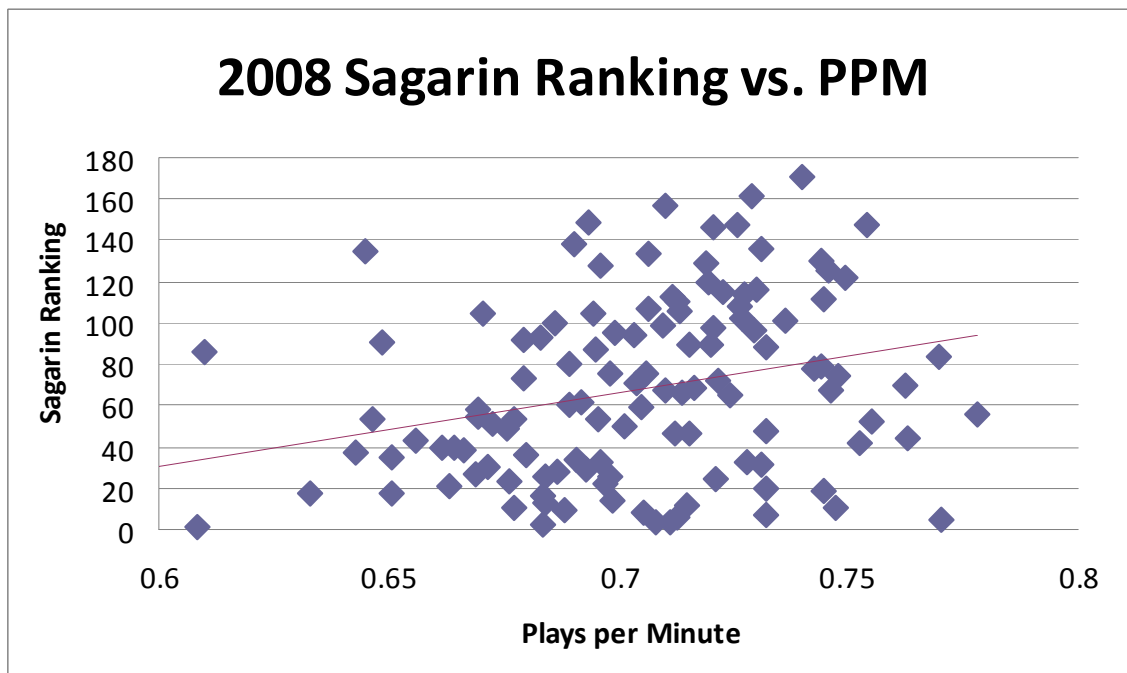


TABLE 1: 2006-2007 NCAA Football Rules Committee		
Name	College/Conference	Position
John Adams	Western Athletic Conference	Secretary Rules Editor
Frank Carr	Earlham College	
Michael Clark	Bridgewater College	Chair
Gil Cloud	Upper Iowa University	
Keith Gill	University of Oklahoma	
Eric Hamilton	The College of New Jersey	
Danny Hope	Eastern Kentucky University	
Bill Moos	University of Oregon	
Buddy Pough III	South Carolina State University	
Rocky Rees	Shippensburg University of Pennsylvania	
Kenneth Sparks	Carson-Newman College	
Ky Snyder	University of San Diego	
Tommy Tuberville	Auburn University	

TABLE 2: 2007-2008 NCAA Football Rules Committee		
Name	College/Conference	Position
John Adams	Western Athletic Conference	Secretary Rules Editor
Rogers Redding	Southeastern Conference	Secretary Rules Editor
Mike Bellotti	University of Oregon	
Frank Carr	Earlham College	
Michael Clark	Bridgewater College	Chair
Gil Cloud	Upper Iowa University	
Eric Hamilton	The College of New Jersey	
Danny Hope	Eastern Kentucky University	
Todd Knight	Ouachita Baptist University	
Buddy Pough III	South Carolina State University	
Ron Prince	Kansas State University	
Rocky Rees	Shippensburg University of Pennsylvania	
Ky Snyder	University of San Diego	

TABLE 3: MPG				
	2005	2006	2007	2008
ACC	203.263	189	194	192
	10.475	6.37	8.43	4.72
Big 12	208.522	191	209	197
	5.927	4.08	5.32	6.78
Big East	200.553	192	205	195
	8.868	3.11	8.68	4.50
Big 10	199.269	186	200	190
	6.019	5.79	6.97	4.24
Conference USA	197.897	186	203	191
	6.962	4.40	7.89	6.90
Independents	196.326	182	202	187
	12.234	9.39	5.97	8.14
Mid-American	194.383	182	195	187
	7.347	5.90	5.10	5.45
Mountain West	207.416	181	194	184
	6.576	6.06	4.24	5.95
Pacific 10	209.796	191	206	192
	8.862	7.01	2.05	6.15
Southeastern	198.827	189	205	193
	8.862	6.02	8.52	4.07
Sun Belt	190.005	183	201	190
	6.100	5.24	7.07	3.54
Western Atlantic	201.096	185	204	194
	6.302	7.52	7.84	7.57
Overall Avg.	200.933	187	203	192
Overall Std. Dev.	9.103	6.77	7.74	6.42

TABLE 4: Plays per minute				
	2005	2006	2007	2008
ACC	0.677 0.034	0.661 0.022	0.721 0.027	0.682 0.026
Big 12	0.686 0.027	0.680 0.025	0.704 0.024	0.719 0.021
Big East	0.689 0.032	0.664 0.017	0.686 0.014	0.672 0.018
Big 10	0.732 0.032	0.705 0.022	0.718 0.016	0.717 0.025
Conference USA	0.711 0.025	0.693 0.030	0.727 0.010	0.726 0.021
Independents	0.715 0.022	0.693 0.026	0.703 0.016	0.694 0.022
Mid-American	0.741 0.025	0.708 0.020	0.736 0.023	0.725 0.019
Mountain West	0.696 0.017	0.708 0.012	0.740 0.014	0.738 0.033
Pacific 10	0.692 0.022	0.678 0.018	0.710 0.018	0.703 0.021
Southeastern	0.670 0.022	0.649 0.024	0.685 0.027	0.662 0.034
Sun Belt	0.714 0.016	0.685 0.014	0.721 0.021	0.719 0.155
Western Atlantic	0.714 0.027	0.694 0.027	0.703 0.019	0.695 0.039
Overall Avg.	0.7020	0.682	0.709	0.704
Overall Std. Dev.	0.034	0.028	0.026	0.034

TABLE 5: Plays per Game				
	2005	2006	2007	2008
ACC	137.302 4.006	124.983 4.989	139.883 5.497	130.867 3.435
Big 12	142.907 4.383	129.942 4.620	147.188 4.947	141.617 5.122
Big East	138.032 2.479	127.488 3.407	140.581 5.137	131.050 3.403
Big 10	145.752 6.506	131.109 4.261	143.673 6.299	136.182 5.402
Conference USA	140.585 3.800	128.833 4.171	147.608 5.831	138.583 7.128
Independents	140.150 4.292	126.125 4.936	141.988 2.102	129.825 6.777
Mid-American	144.038 5.314	128.867 3.621	143.450 5.097	135.617 5.588
Mountain West	144.331 3.899	128.233 3.265	143.633 3.270	135.833 5.373
Pacific 10	145.164 5.816	129.480 4.053	146.255 3.898	134.950 6.615
Southeastern	133.114 5.816	122.742 3.839	140.425 6.038	127.675 5.681
Sun Belt	135.519 3.484	125.338 3.611	144.925 6.209	136.663 7.406
Western Atlantic	143.411 5.125	128.378 5.110	143.383 4.031	134.733 6.494
Overall Avg.	140.916	127.714	143.704	134.755
Overall Std. Dev.	6.008	4.669	5.585	6.723

TABLE 6: Impact of Rule Changes								
	2005		2006		2007		2008	
Conference	PPM	MPG	PPM	MPG	PPM	MPG	PPM	MPG
ACC	0.677	203	0.66	189	0.72	194	0.68	192
Big 12	0.686	209	0.68	191	0.70	209	0.72	197
Big East	0.689	201	0.66	192	0.69	205	0.67	195
Big 10	0.732	199	0.70	186	0.72	200	0.72	190
Conference USA	0.711	198	0.69	186	0.73	203	0.73	191
Independents	0.715	196	0.69	182	0.70	202	0.69	187
Mid-American	0.741	194	0.71	182	0.74	195	0.73	187
Mountain West	0.696	207	0.71	181	0.74	194	0.74	184
Pacific 10	0.692	210	0.68	191	0.71	206	0.70	192
Southeastern	0.670	199	0.65	189	0.69	205	0.66	193
Sun Belt	0.714	190	0.68	183	0.72	201	0.72	190
Western Atlantic	0.714	201	0.69	185	0.70	204	0.69	194
Overall Average	.70	200.93	0.68	187.33	0.71	202.958	0.70	191.56
Overall Std. Dev.	.03	9.1032	0.03	6.7739	0.03	7.74092	0.05	6.4198
Impact			97.4%	92.9%	101.4%	100.4%	100.1%	95.2%

TABLE 7: BCS vs. Non-BCS Game Length				
	2005	2006	2007	2008
BCS Conference Averages	203.58	190.42	205.42	193.52
BCS Conference Std. Dev.	8.80	5.80	7.19	5.42
Non-BCS Conf Averages	197.63	183.49	199.89	189.13
Non-BCS Conf Std. Dev.	8.52	5.90	7.34	6.78

TABLE 8: Regression Wins vs. MPG PPM			
	2006	2007	2008
MPG β_1	.109* (.048)	.07** (.038)	.17* (.04)
PPM β_2	-25.05* (11.26)	-17.9 (11.03)	7.45 (5.05)
Constant β_0	3.08 (14.8)	5.01 (13.4)	-31.02* (9.16)
*p<.01, **p<.05, ***p<.10			

TABLE 9: Regression Sagarin Power Ranking vs. MPG PPM			
	2006	2007	2008
MPG β_3	-2.447* (.638)	-1.019** (.576)	-2.471* (.599)
PPM β_4	351.211** (149.83)	563.26* (166.09)	223.57** (121.15)
Constant β_{00}	285.98 (197.41)	-122.588 (202.178)	-185.97 (121.51)
*p<.01, **p<.05, ***p<.10			

TABLE 10: Regression Conference Finish vs. MPG PPM			
	2006	2007	2008
MPG β_5	-.037 (.052)	-.021 (.042)	-.132* (.047)
PPM β_6	17.006 (12.174)	11.554 (12.358)	-1.177 (8.642)
Constant β_{000}	1.143 (16.041)	1.812 (15.043)	31.894* (12.399)
*p<.01, **p<.05, ***p<.10			

TABLE 11: Top 20 Teams with Longest Average Game Length		
2006	2007	2008
Oregon	Florida St.	Oklahoma
Florida St.	Hawaii	Texas Tech
Hawaii	LSU	Nevada
Florida	South Fla.	Oregon
Texas	Kentucky	South Fla.
South Fla.	Texas Tech	Florida St.
Southern California	Texas	Houston
West Virginia	Tulsa	Fresno St.
Georgia Tech	Rice	Hawaii
Clemson	Boston College	LSU
Kentucky	Cincinnati	Rice
Oklahoma	Southern Methodist	Georgia
Nebraska	North Carolina St.	Missouri
Notre Dame	Louisville	North Carolina St.
Kansas	Fla. Atlantic	California
Louisville	Georgia Tech	Pittsburgh
Missouri	Nebraska	Notre Dame
Michigan St.	Rutgers	Kansas
Alabama	Indiana	Michigan St.
LSU	Kansas St.	Miami (Fla.)

TABLE 12: Simulation Results					
	Wins by Favorite	Wins by Underdog	Ties	Favorite Points per game	Underdog Points per game
Simulation A	565	381	54	20 (11.15)	17 (10.19)
Simulation B	622	331	47	20 (11.15)	15 (9.62)

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