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Thomas Crouch
Clemson University, trcrouc@clemson.edu

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THE EFFECT OF TELEVISION EXPOSURE ON COLLEGE FOOTBALL RECRUITING: AN ANALYSIS OF THE SOUTHEASTERN AND ATLANTIC COAST CONFERENCES FROM 1970 TO 2010

A Thesis
Presented to
the Graduate School of
Clemson University

In Partial Fulfillment
of the Requirements for the Degree
Master of Arts
Economics

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by
Thomas Roy Crouch
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Accepted by:
Dr. Raymond Sauer, Committee Chair
Dr. Michael Maloney
Dr. Scott Baier

ABSTRACT

A study was done to determine the effect of television exposure on the geographic distribution of recruits in the Southeastern and Atlantic Coast conferences from 1970 to 2010. Roster data was compiled for 23 teams, and this data was used to generate distances between every recruit's hometown and the school he would attend. Then, a conditional logit estimation was used to determine the effect of distance on a recruit's choice of schools over time. Also included were variables describing each school's academic and football quality and variables describing a recruit's choice of school by where it was located in relation to his hometown. The results showed are clear diminishing distance effect over time and also showed preference for recruits to go to instate schools above schools in neighboring states.

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SECTION I

INTRODUCTION

Every Saturday in the fall, it is nearly impossible to turn on the television without seeing a college football game or at least a reference to one. Almost every television network carries at least one game every Saturday, and in some cases, also on Thursday. Games are now telecast on the internet, and there are even daily shows about the sport. Then, of course, there is the bowl season, in which 30 games ranging in relevance are broadcast for millions to see. College football has grown in recent years to become one of America's most popular sports. Thousands flock to stadiums across the country to watch their favorite teams play. Several schools routinely have 100,000 people in attendance for up to eight home games per year. Between tickets, travel, concessions, and apparel, fans together spend millions of dollars each year supporting their team. Of course, college football did not always have such a prominent place on the American sporting landscape. Until the 1920's, college football was little more than a spectacle. After World War II, with the introduction of television, college football became a very popular sport, even though television rights were strictly controlled by the National Collegiate Athletic Association (NCAA).

However, after a 1984 Supreme Court decision gave schools and conferences the ability to negotiate their own television rights, the sport of college football exploded in this country.[1] As a result of openly-competitive television contracts, many more games were carried on television. All of the sudden, teams could be seen on television from week to week. Even if someone could not watch their team's game that week, they could see the highlights on the newly-formed Entertainment and Sports Programming Network

(ESPN).[2] Every conference negotiated a deal with a television network in which the network would pay the conference a certain amount of money for the ability to televise that conference's games. One school, Notre Dame, even negotiated their own contract to have every one of their home games nationally televised.

However, arguably the industry leader in television contract revenue has been the Southeastern Conference. Made up of twelve schools in nine southern states, the SEC has been the pacesetter in the market for television revenue. A likely cause of SEC's strong strategic position is the historic football prowess of its teams. Another possible cause is that professional sports are relatively new to the South and therefore relatively less popular. For whichever reason, the SEC signed a national contract in the 1990's with CBS that was the envy of most of the country. The contract with CBS, which broadcast at least one SEC game nationally every Saturday, made the SEC and its member teams a national brand. People from California and Texas could watch the Florida Gators and Georgia Bulldogs play as much as their home teams. Then, in 2009, the SEC signed the richest television contract in college football history with ESPN and CBS, worth $3 billion over 15 years. The details of the contract are somewhat complicated, but even Mr. College Football, Tony Barnhart of the Atlanta Journal-Constitution, believes the SEC deal far exceeds any television contract available for a college football conference.[3] This means that each SEC school will receive at least $17 million per year for the next 15 years. Additionally, this means that SEC schools will have several games per week on national television.

For schools, the implications of such large television revenues make it imperative to form competitive teams. One way schools compete is by trying to recruit the best

athletes to their respective campuses. Recruiting is the process by which high school football players decide which college to attend. The process begins early in a player's high school career by receiving mail and telephone calls from interested coaches. Then, the player will decide to unofficially or officially visit several campuses (the distinction between unofficial and official visits will be discussed later in the paper). Finally, the coaches will decide whether to offer a player a scholarship, and the process culminates when the players sign letters-of-intent, stating they will attend a certain university. Of course, with growth of college football over the last 25 years, recruiting coverage has grown significantly as well. Websites, such as Rivals.com, rate and follow recruits for the benefit of fans. The time when players sign letters-of-intent has turned into National Signing Day, in which ESPN and other networks televise many players' decisions.

With the heightened importance of recruiting, many have tried to gain insight into the main factors of a recruit's decision. This will be analyzed in greater detail in the next section, but two factors that are often discussed are distance and exposure. In this paper, distance means the distance in miles from a recruit's hometown to the school which he attends. Typically, recruits, and people in general, seem to have a preference for attending colleges close to home. The other factor is exposure, which means recruits prefer playing for teams which receive media attention, including televised games. There are a few possible reasons for this. First, recruits believe that increased television exposure may lead to a higher probability of being drafted into the National Football League. By attending a school with little media exposure, recruits may feel that NFL teams will overlook their talents. The second possibility is that recruits might not value the media attention, but rather, they know much more about a school having been able to

watch that school's team play in high school. In other words, recruits care less about the media attention they receive and more about what they have learned from being able to watch a team play.

If this second reason is true, then the 1984 Supreme Court decision that allowed schools and conferences to negotiate their own television contracts should have an effect on recruiting. In other words, schools should be able to draw recruits from a wider geographic area after 1984 because more recruits will see their respective games. However, as previously noted, another of the most important factors in a recruit's choice is the distance that school is away from their hometown. For schools to gain from the increase they have in television exposure, the distance effect, traditionally strong in recruiting, must become less important.

The purpose of this paper is to determine if increased television exposure could moderate the influence of distance in a recruit's choice of colleges. In order to do this, roster data was collected from the SEC and the Atlantic Coast Conference, a conference which partially shares the Southern region with the SEC. Historically, the ACC had a television contract with ESPN, but most of its games were televised by Jefferson Pilot/Raycom, a regional sports network. Like the SEC, the ACC recently signed a deal with ESPN for $1.86 billion over 12 years, which includes basketball coverage as well as football.[4] Although the new ACC contract is large, the ACC has received less national television exposure than the SEC within the last 25 years. However, both conferences have been relatively stable over time: the SEC was formed in 1932 and the ACC was formed in 1953.[5] Both still have most of their original members. The experiment will be to examine the effects of openly-competitive television contracts in these two

conferences. The hypothesis is that openly-competitive television contracts have resulted in schools being able to attract recruits from a wider geographic area due to the increase in television exposure after 1985. Of course, the alternative hypothesis is that schools have not increased their recruiting base. This would be true if schools recruit the same areas over time and the increase in television exposure does not change their recruiting areas or recruits' knowledge of schools. Even though open competition for television rights did not begin until 1984, data was included from 1970 to present in order to capture any trends present within either conference before and after the change in television exposure.

There are several implications to this experiment. First, if it is in fact true that increased television exposure has allowed any conference to attract recruits from a wider geographic area, then it is possible that increased television exposure could threaten the competitive balance of the sport, especially given the value of the landmark television contract the SEC recently signed. Indeed, it does seem as though the SEC has already taken advantage of its increased exposure having won every National Championship from 2006 to present. Additionally, given the recent speculation about conferences expanding to increase television revenue, it will be curious to see what the consequences of expansion are for recruiting. Finally, at the very least, this could shed new light on the impact of geography on recruiting.

The next section will be a review of previous literature. Section III will describe the data and methodology used in the experiment. Section IV will test the hypothesis that television exposure has diminished the role of distance in recruiting using a conditional logit estimation model. Section V will provide concluding remarks.

SECTION II

REVIEW OF PREVIOUS LITERATURE

The sport of college football has been analyzed numerous times in the literature. The NCAA is the governing body of college football, and it has come under much scrutiny for acting as a cartel. Cartel theory states that often organizations form to solve some externality problem, and, once formed, find it advantageous to set prices or produce an inefficient output to raise profits. According to Fleisher, Goff, and Tollison (see Fleisher, Goff, and Tollison 1992), the NCAA was originally started to create rules for the safety of college football players, as hundreds died in the early years of the sport. Prior to the 1950's, the NCAA's main functions were to provide a common set of rules for play and keep records. However, consistent with cartel theory, the NCAA found they could use this organizational framework to benefit its members. Specifically, they could limit the number of games played and the pay to players, creating higher revenues for their members. Throughout the 1950's, the NCAA used their cartel power for this reason. For example, in 1949, the NCAA passed the "Sanity Code," which limited the number of scholarships available at each school and created rules for recruiting. These rules for recruiting have evolved into what is used today to regulate NCAA schools. In 1952, the NCAA granted itself enforcement power over its members. In other words, the organization had the ability to punish members who violated the rules of the cartel. The enforcement power of the NCAA is a public representation of what every successful cartel maintains privately. The enforcement power of the NCAA started slowly with a public warning to Notre Dame and a two year probation penalty to Arizona State, but, within the last 30 years, the enforcement power of the NCAA has increased substantially,

evidenced by the schedule boycott, or “death penalty”, given to Southern Methodist University in 1987-1988. Other rules set by the NCAA include minimum grade point average requirements, regulated television exposure, and the creation of Division 1-AA, among others.

Historically, the NCAA has been an interesting case to study because it is one of a few openly accepted cartels operating in the United States. Of course, cartels are illegal in the United States, but the NCAA has so far been subject to lenient antitrust prosecution because of several reasons. First, it is the players who are most adversely affected by the cartel power of the NCAA. The players, especially high-achieving college football players, are given a scholarship that worth much less than their marginal revenue product (see Brown). However, these players are not likely to take action against the NCAA because they are only eligible for four years and often use college sports to get to professional sports. Second, the public views the NCAA as standing up for amateur athletics, so, in their eyes, the NCAA regulations are essential to keep the idea of amateurism alive in sports. Finally, the NCAA claims that their regulations are necessary in order to promote the competitive balance of the NCAA sports.

This final reason can be disputed because, as with any cartel, some regulations might benefit certain members at the expense of others. There will be a time when certain schools try to use the NCAA to adversely affect the competitive balance of the sport, which is called rent seeking. It is the interest group theory that states that when an organization has redistributive power, coalitions will form in order to gain these wealth transfers. One notable example of the interest group theory in college football occurred when the University of Oklahoma and the University of Georgia sued the NCAA over the

ability to negotiate their own television rights. A coalition of schools joined together for their interest even though the majority of schools preferred regulation. Of course, in this case, the interest group formed in order to deregulate the industry, a phenomenon that similarly occurred in the airline industry with the dissolution of Civil Aeronautics Board.[6] The NCAA case went to the Supreme Court, which decided in 1984 to allow schools and conferences to negotiate their own television contracts.

Eckard (see Eckard 1998) tests whether the enforcement power of the NCAA resulted from rent seeking behavior. Eckard uses various measures to determine the effect of enforcement power on competitive balance in college football. If competitive balance is adversely affected after the introduction of enforcement power, then enforcement power exists due to cartel enforcement behavior by the NCAA. If competitive balance is enhanced after the introduction of enforcement power, then enforcement power exists for the NCAA's stated reason of creating an equal playing field for its members. Eckard starts by stating the goal of a cartel is to stabilize the market shares of the various participants. In college football, Eckard assumes market share is measured by won-loss record. Therefore, if the cartel view is taken, then teams should have more stable won-loss records over time. Eckard even goes on to say that competitive balance should have naturally increased after World War II because more young men were attending college than in previous years.

In his empirical test, Eckard uses the Herfindahl-Hirschman Index to measure the competitive balance of college football. HHI, a commonly used measure of market concentration within an industry, is the sum of squared market shares of firms. For instance, if two firms each have 50% market share, then the HHI for that industry is

5,000. A high HHI means a highly-concentrated or less competitive industry, and a low HHI means a more competitive industry. Instead of market shares, Eckard uses final Associated Press poll slots to compute the HHI for college football. In ten years of a Top 10 poll, there are 100 slots to be filled by some number of teams, which is used to determine the HHI for college football. In order to test his hypothesis of the enforcement power effect on competitive balance, Eckard divides the analysis into years before and after 1952. The five years after 1952 are omitted to serve as an adjustment period. From 1957 to 1984, the HHI increases significantly. Additionally, fewer total teams are included in the AP poll after 1952, and there is less entry and reentry into the poll after 1952. All of these results seem to confirm that the competitive balance of college football decreased after the advent of the enforcement power, which agrees with the cartel view of the NCAA.

However, Eckard does make one consideration which is important for this paper. The NCAA argued that the advent of television would reward certain schools at the expense of others. This would explain the decrease in competitive balance after 1952, which is about the same time games started being televised. Therefore, Eckard computes the HHI and entry and reentry into AP polls before and after 1984, when open competition for television rights began. His results suggest that competitive balance actually increased after 1984, meaning that the advent of television could not be used to explain the decrease in competitive balance after 1952. Without the presence of television as a valid explanation of the decrease in competitive balance in college football, it is clear that the enforcement power created in 1952 has decreased the competitive balance of the sport and is likely a result of the NCAA cartel behavior.

In another paper focused on the NCAA as a cartel, Depken and Wilson (see Depken and Wilson 2001) look at several institutional changes within the NCAA and their effect on the competitive balance of college football. Depken and Wilson begin their paper by explaining the Structure-Conduct-Performance approach used in industrial economics. SCP relates the number of firms in an industry to the conduct (or price) and the efficiency (or profits) of that industry. Like the Eckard paper, typical economic measures are unrealistic in the production of college football, so the authors develop different measures to determine competitive balance. Depken and Wilson also use an HHI measure, except their measure converts wins, losses, and ties to a point system, like in professional hockey and soccer. A win is 2 points, a tie is 1 point, and a loss is 0 points. This measure accounts for the changes in the number of games played every year and for the number of teams in the industry, both of which have increased over time. To measure market concentration and therefore competitive balance, Depken and Wilson simply calculate the HHI of points. However, since college football is unlike other industries, traditional HHI figures will be different. In response, Depken and Wilson calculate an ideal market concentration, which is 10,000/N, where N is the number of teams. The ideal HHI represents a perfect competitive balance. Depken and Wilson then take the actual HHI for each year and subtract the ideal HHI from it, obtaining the difference between the actual and the ideal, which they call the dHHI. The dHHI is the dependent variable. The independent variables in their regression are the institutional changes in the NCAA throughout the 20th century. These changes are: the creation of the NCAA in 1906, the Sanity Code which limited scholarships in 1949, the previously mentioned enforcement power gained in 1952, the adoption of a minimum grade point

average in 1965, the creation of Division 1-AA to separate major and minor college football schools in 1981, and the creation of the Bowl Championship Series in 1996. The data on wins and losses was converted into points for the years 1888-2001. With dHHI as the dependent variable, the coefficients on the Sanity Code variable, the enforcement power variable, the minimum GPA variable, and the Division 1-AA variable are all positive and significant. Therefore, each of these changes increased the market concentration of the college football industry and had a negative impact on competitive balance. Depken and Wilson, like Eckard, can conclude that the NCAA, through these regulations, is engaging in cartel behavior.

However, Depken and Wilson include a time variable which suggests that while these regulations have decreased competitive balance, college football is becoming more competitive over time. Depken and Wilson believe this is due to either a reduction in information costs in finding and recruiting football talent or a reduction in transportation costs allows players to go to schools further away from home. They leave this topic, the recruitment of players, open for further investigation. The institutional changes discussed in both Eckard and Depken and Wilson created the environment in which recruiting currently takes place. There are rules about contacting and paying players. For example, schools can only pay for one visit to the campus per player. This visit is called an "official visit," and each player can only take five official visits. Every other visit must be funded by the recruit and is called an "unofficial visit." Additionally, there are extensive rules about what is included in a scholarship for a player. As previously mentioned, the awarding of scholarships acts to limit the pay of the main input into the production of college football. Since the schools cannot pay players their marginal revenue product,

they compete by providing in-kind transfers. Athletic dorms, tutors, practice facilities, and team clothing all serve as in-kind transfers to allow the best college football programs to compete within the framework of the NCAA. The cartel behavior of the NCAA created these rules and the system of in-kind transfers, which in turn created modern college football recruiting.

Several papers exist to discuss the economics behind college football recruiting. Langelett (see Langelett 2003) discusses the relationship between recruiting and team performance in college football. Langelett uses AP polls and team recruiting rankings compiled by experts to explore a relationship recruiting and performance. Of course, he finds the causation to be bidirectional, meaning good recruiting rankings in one year lead to good AP poll rankings in the next year and vice versa. Interestingly, Langelett finds that team performance during a recruit's junior year of high school has the greatest effect on the eventual recruiting rankings.

Another paper (see DuMond et al. 2008) examines all the factors that affect a recruit's decision on which school to attend. The authors describe recruiting as a two-sided matching problem; the school chooses a player and the player chooses a school. They then develop an empirical model that includes all the school-specific and player-specific information both sides use to make decisions. The authors use a probit model to match a recruit to a particular school. This probit model would predict where the players would attend based on these factors. Some of these factors are the school's winning percentage, the likelihood of playing time for the recruit, media exposure for the recruit, probability of graduating, probability of being drafted into the National Football League, and the academic ranking of the school. The authors test three models. The first model

includes all the school-specific and player-specific factors. Ranking in the AP poll and winning percentage, as shown in Langelett (2003), are seen to be important factors in a recruit's choice. Also, coaching turnover has a negative effect on recruiting, and membership in a Bowl Championship Series conference has a positive effect on recruiting. The second model adds the unique characteristics between each player and each school, mainly the distance between the school and the player's hometown. As expected, distance was an important factor in a recruit's choice, but the distance effect moderates itself after a certain point. Once the recruit lived certain distance away from his choices, distance was less important. For example, if a recruit lived in Arizona and was choosing between the University of Florida and Florida State University, the physical distance between the schools and his hometown was less important. The data was from 2002-2004, and in each year, the average distance between player and school choice was over 400 miles. Finally, the third model uses only variables which were significant in the other models. This third model correctly predicted the college choices of 71% of the nation's best 100 high school football players. Given that each player averaged four scholarship offers, randomly guessing would have given the authors a 25% chance of accurately picking one player's choice. Additionally, in several of the mistaken predictions, the player simply went to the school closest to home. The distance effect was found to be the greatest in the South and least in the West. It is clear from DuMond et al. that distance is still a very important factor in a recruit's choice, even though information costs for coaches and transportation costs for players have decreased over time.

SECTION III

DATA AND METHODOLOGY

The data used in this paper was collected from various sports information departments and libraries from schools in the Southeastern Conference and the Atlantic Coast Conference.[7] Specifically, football rosters were obtained from all the schools currently in each conference, except the University of Miami, which did not respond to requests for data. However, it is believed that the exclusion of Miami will not bias the results of this paper. It is well-known that Miami generally recruits the city of Miami with few exceptions. Miami would not necessarily show the same geographic changes over time as the other schools because it is so close to the area it recruits. Rosters were collected from every five years, 1970 to present, from the other 23 schools in the sample. Table 1 details the historical membership of each conference, as Georgia Tech, South Carolina, Arkansas, Virginia Tech, Florida State, and Boston College were not in their current conferences for different time periods. The reason to only include every fifth year is to avoid having multiple entries of the same player. For example, if a player is a freshman in 1970, then, even with a redshirt year, the player's final season of eligibility would be the 1974 season. A redshirt year means the player is allowed to practice with team but not play in games. Unless the player receives special permission from the NCAA, he cannot appear on the 1975 roster. The only time this is not true in the sample is with the final year of the period, 2010. Several schools did not have 2010 rosters available at the time of this paper, so 2009 rosters were substituted in place.[8] Still, there is minimal replication of players because only in the above case of a freshman redshirting in 2005 is it possible for a player to appear in the 2005 and the 2009 rosters.

Once these rosters were received, for each team, the year, player name, and hometown were extracted from each roster. For each school, the latitude and longitude coordinates for that school's city were added to the roster data. For example, for every Boston College player, the coordinates for Chestnut Hill, Massachusetts, were included with that player's hometown and year. Then, the completed roster file was merged with a United States Census file which included the latitude and longitude coordinates for every city in the United States. The players' hometowns were matched to the cities in the United States Census file, giving each hometown an appropriate set of latitude and longitude coordinates. At this point, each player was assigned two sets of coordinates: one for their hometown and one for their school town. Using the Great Circle Distance formula, one can find distances in miles by using latitude and longitude coordinates, so the formula was applied to every player (see Appendix). A distance was generated for every player in sample. International players and players whose hometowns were not listed in the United States Census file were excluded from the sample. In total, 1,500 players had to be excluded, but there were still 17,988 total players in the sample. The excluded players had no common characteristics or backgrounds except that they were obviously from another country or their hometown was not listed in the United States Census file. Finally, the Great Circle Distance formula was used to compute distances from players' hometowns to the other ACC and SEC schools that they did not choose to attend. After this calculation, the distance was known from each player's hometown to every school in the ACC and SEC.

Once this data was compiled, summary statistics were created to give an idea of the trends over time. In Table 2(a), average distance per player for both conferences

together can be seen. The striking result from Table 2(a) is that from 1985 to 1990, the time for adjustment to openly-competitive television contracts, average distance increases by 34 miles. The adjustment period is necessary because television contracts were not immediately created and it took players a few years of watching teams more often on television for the effect to take place. This is not a large numerical increase, but one must consider that in prior years the average distances were remarkably stagnant.

The next calculation looks at the trends over time for each conference separately. As Table 2(b) shows, the average distance increases between 1985 and 1990 by about 30 miles for each conference, like in Table 2(a). There is, however, very little relative difference between the average distance for the ACC and SEC, meaning that, in this calculation, the SEC teams seem not to use their relative advantage in television exposure to draw recruits from a wider geographic area.

A third calculation looked at the effect of quality of a football team on average distance. This tested the Alchian and Allen theorem, in which the best recruits would go to schools further away because they were the high demanders. For this, the ACC and SEC teams were grouped into three categories based on final Associated Press poll performance: Top 7, Middle 8, and Bottom 8.[9] The determination for a team's placement in a category was the total number of AP poll Top 10 and Top 20 finishes from 1965 to present. Additional weight was given for a Top 10 finish over a Top 20 finish. These particular years were included because it is believed that AP poll finish five years prior to the current year has an effect on the current year's recruiting. Interestingly, the Top 7 group had the shortest average distance at 224.28 miles. Average distance grew for the next two groups to 251.88 for the Middle 8 and 282.64 for the Bottom 8. This result

shows that the best teams draw players from relatively closer hometowns than poorer teams. One possible explanation is that the best teams are already located closer to the best high school football talent.

Next, dummy variables were added to denote if a recruit went to a school instate, went to school in a border state, or went neither to a school that was instate nor in a border state. The names for these dummy variables were instate, border, and import, respectively. Table 3 shows the percentage of recruits over the last 40 years that can be described as instate players, border players, or import players. The purpose of this paper is to determine the effect of television exposure on recruiting, so the expected effect is that the percentage of instate players would decrease and the percentage of import players would increase over time. However, there should be a marked increase after the previously mentioned 1984 Supreme Court decision. Allowing for an adjustment period, one should expect to see change the instate and import variables in 1990. Looking at the table, the effect of openly-competitive television rights appears to be exactly what is expected. Prior to 1990, the percentage of instate players is above 53% for every year except 1975. For the years 1990 to 2010, the percentage of instate players is never above 50%. As expected, the import variable is above 22% only once before 1990. For the years 1990 to 2010, the import variable jumps significantly and is never below 26%. This means that the percentage of recruits choosing schools out-of-state that do not share a border has increased, relative to instate and border state choices, with the expansion of television in college football.

Then, the years were separated into three periods: a pre-open television contract era (1970-1980), an adjustment period (1985-1990), and a post-open television contract

era (1990-2010). The percentages of instate players, border players, and import players were again computed, and the results can be found on Table 4. When separated into periods, the results are basically the same as before. The instate variable decreases from 52% to 48%, and the import variable increases from 22% to 29%.

Finally, the same calculation was done with only the permanent ACC and SEC states in order to see any trends present in the schools that have been recruiting in a respective conference for the longest period. These states are the ones that have had an ACC or SEC school in their state since the beginning of each conference. Therefore, Massachusetts and Arkansas were dropped from this calculation. The results can be viewed on Table 5. The percentages are similar to when all the schools were included; in the post-open television contract era, the import variable increases and the instate variable decreases.

In the past, it has been assumed that instate schools have a large advantage with recruits, regardless of whether the recruit is physically closer to an out-of-state school. However, it seems that television exposure has dissipated this advantage since 1984. Of course, it would be easy to dismiss the decrease in instate choices as the result of television exposure if the recruits were choosing schools which are physically closer but across states lines. As is evident here, recruits are choosing schools more often in states in which their home states do not share a border. Every set of summary statistics developed so far supports the idea that openly-competitive television rights, which has resulted in many more televised games since 1984, has influenced the decisions of thousands of recruits.

SECTION IV

TESTS

In order to determine the influence of several factors in a recruit's choice of schools, the data was tested using a conditional logit analysis. Conditional logit regression is useful in determining which factors affect a decision between several choices. It is often used in analyses of why people choose to attend a college or embark on a certain career path (see McFadden). The dependent variable is a choice between a number of alternatives, and the independent variables are factors that affect the probability of choosing one alternative.

Here, the logit model for determining the factors that affect a recruit's choice includes distance variables, school football quality variables, and school quality variables. All three factors are believed to play a role in a recruit's decision. The complete logit model is as follows:

$$CHOICE = \beta_1 dist_mile + \beta_2 dist2 + \beta_3 dist_instate + \beta_4 dist_border + \beta_5 instate + \beta_6 border + \beta_7 midfbqual + \beta_8 lowfbqual + \beta_9 midfbqual_dist + \beta_{10} lowfbqual_dist + \beta_{11} private + \beta_{12} aau + \beta_{13} private_dist + \beta_{14} aau_dist + \varepsilon$$

where CHOICE is a dummy variable representing a recruit's decision to attend one school and ε is the error term.

The independent variables are all believed to affect the choice of a recruit to attend a certain school. Dist_mile is the distance in miles between a recruit's hometown and the school he attends. Dist2 is distance squared. This term shows whether the effect of distance is increasing or diminishing. Dist_instate is an interaction term between distance and a dummy variable for whether the recruit chooses a school in his home state.

The reason for this interaction term is to determine if there is any extra distance effect for a recruit who chooses an instate school. For instance, if dist_instate is positive, then it offsets the distance variable, meaning distance is less of a factor for recruits who attend instate schools. Dist_border is an interaction term between distance and a dummy variable for recruits who choose a school in a border state. Instate is the dummy variable for recruits who go to schools instate. Likewise, border is the dummy variable for recruits who go to schools in border states.

The next set of independent variables is the football quality variables. Midfbqual and Lowfbqual are both dummy variables denoting which schools were in the previous Middle 8 and Bottom 8, respectively, based on AP poll performance. The Top 7 group was left out of the model for collinearity purposes. Additionally, both dummy variables were interacted with distance in order to see if membership in a group compounds the effect of distance.

Finally, there is a set of school quality variables included in the model. Private is a dummy variable for whether a school is a privately-funded institution. AAU is a dummy variable for whether a school belongs to the Association of American Universities.[10] Generally, schools that belong to either of these groups are believed to be higher ranking academic institutions than others. Once again, these dummy variables are interacted with distance in order to see the distance effects present within private and AAU schools.

In order to accurately estimate the model, several steps had to be taken. First, since the distance from the recruit to every school was calculated, every choice not chosen by each recruit had to be added. For each player, there were 23 separate

observations: 22 for the schools he did not choose and one for the school he did. Therefore, the number of observations went from 17,988 to 413,724. Next, it was apparent that Massachusetts is an outlier geographically from the rest of the schools, so Boston College was dropped from the set. Several specifications of the model were run without the University of Arkansas in the model so that every state in the model had an ACC or SEC school since the beginning of the conference. However, it was found that dropping Arkansas did not affect the results. Finally, to prevent the outliers of the sample affecting the estimation, recruits from states without an ACC or SEC school were dropped. This was done to prevent a recruit from California or Alaska causing a bias in the results. A set of descriptive statistics can be found in Table 6. These descriptive statistics include the adjustments to the data mentioned above.

The regression results for the conditional logit regression can be found in Table 7. Column 1 contains the coefficients and standard errors for all years in the sample together. The coefficient on distance is -.00564, which means that the marginal effect of another 100 miles between the recruit's hometown and a school is -.0245.[11] This means that another 100 miles of distance between a recruit's hometown and a school decreases the probability he will choose that school by about 2.45%. Additionally, the distance squared term can be used to figure out if the negative distance effect ever approaches zero. In other words, the distance squared term can be used to find out how far away a recruit must be for distance to be irrelevant. By taking the derivative of distance plus distance squared and setting equal to zero, it is found that distance must be over 12,000 miles for it to equal zero. Therefore, for this paper, it will be assumed that the distance effect is always negative.

Of course, these effects are informative, but more valuable are their change over time. Columns 2 and 3 in Table 7 contain the coefficients and standard errors for a pre-1985 period and a post-1990 period, representing the introduction of openly-competitive television contracts. In the pre-1985 period, the coefficient on distance is -.00910, and its marginal effect is -.0395 per 100 miles. In the post-1990 period, however, the coefficient on distance is -.00425, and its marginal effect is -.0184 per 100 miles. The difference between these marginal effects does not seem like much, but they show that distance effect has diminished by about 50% from the pre-1985 period to the post-1990 period. In other words, there is about a 50% difference in the effect of distance on a recruit's choice of schools in the two periods. Looking at the other distance coefficients, it is clear that distance has a decreasing impact on recruits' decisions after 1984. This finding supports the hypothesis that openly-competitive television rights have caused an increase in the geographic area from which SEC and ACC teams draw recruits.

Another result is that in all years recruits are simply less likely to attend private and AAU schools. The coefficients for the whole period on private and aau are negative and significant. Although there is no time trend, it is clear that if a school is private or an AAU school, then a recruit is less likely to attend that school. Additionally, the coefficients on private_dist and aau_dist are both positive. This serves to offset the overall negative distance effect, meaning that these schools are more likely to draw recruits from further distances. A possible reason for this is a matching problem between schools with higher academic standards. They must find quality football players that meet their academic standards, so these schools must draw from a larger area.

Finally, the results are surprising when it comes to comparing the instate variables to the border variables. First, in the pre-1985 period, the coefficient on instate is 1.95430, but it increases to 2.28387 in the post-1990 period. In other words, recruits are more likely to choose instate schools after the introduction of openly-competitive television contracts. Second, the coefficient on the border state dummy decreases from .86034 in the pre-1985 period to .59115 in the post-1990 period. It appears that even though the effect of distance has diminished over time, the preference for instate schools has increased, and the preference for border schools has decreased. Looking at the interaction terms between the instate and border dummy variables and distance, one can see that for the instate variable, there is no added effect to distance. For border states, however, the coefficient is negative, so the effect of distance is compounded by being in a border state. This means that even though being further away makes a school less attractive to a recruit, being a border state makes it even less attractive. One conclusion that can be reached from these results is that when recruits decide to go to an out-of-state school, they are more likely to go to a school in a non-border state.

To focus on this border effect, a second model was estimated with only the instate, border, and distance variables. This time, however, the coefficients were estimated by each year rather than in periods. Hopefully, this method will provide more explanation behind the effects of border states on recruiting. Once again, all recruits who were not from ACC or SEC states were excluded from the model. The results of this model can be seen in Table 8. Once again, the coefficients on distance are negative and decreasing, in absolute value terms, over time. This model, unlike the previous model, shows a steady decrease in the importance of distance in recruiting. The model suggests

that not only has distance become less important since the conferences began negotiating their own television contracts, but also that the trend has continued through the 1990's and into the 2000's. It is evidence that such a trend could continue into the future. Also, the coefficient on the instate dummy variable is increasing steadily over time. The coefficient for the border state dummy variable, however, decreases dramatically between 1990 and 1995, which also suggests that television exposure played a role in the sudden decrease. This shows a significant decrease in the likelihood of a recruit attending school in a border state after the increase in television exposure of schools. Also, over all years, the coefficient on dist_instate is either positive or not significant, meaning that being an instate school did not compound the distance effect. Once again, the interaction between the border state dummy and distance increases the effect of distance in years in which the the result is significant.

SECTION V

CONCLUDING REMARKS

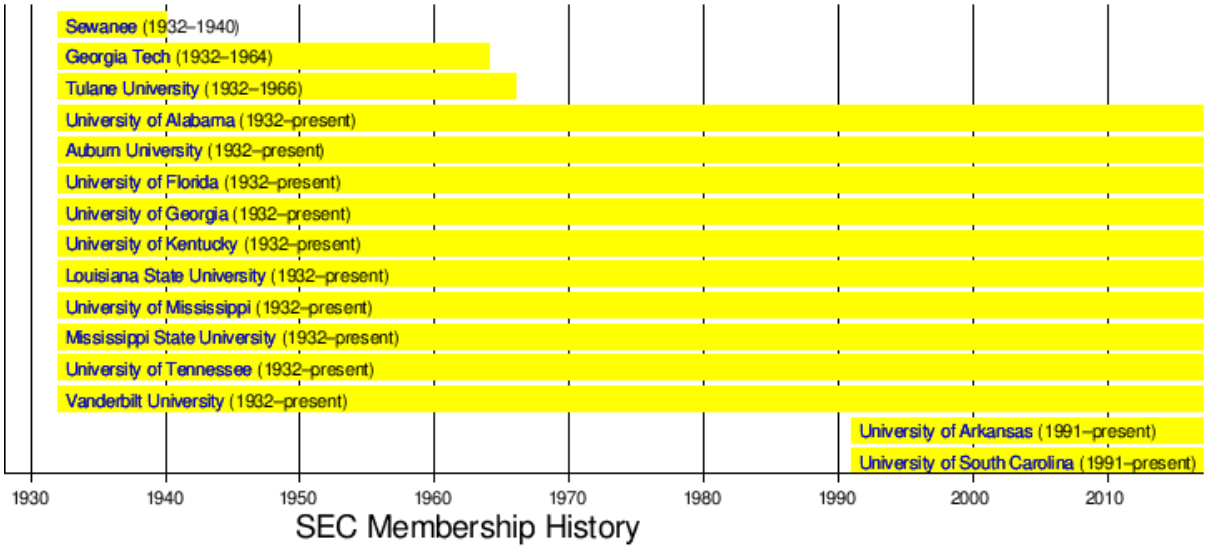
Both models estimated with conditional logit regression have shown conclusively that the impact of distance on recruiting decisions has decreased over time. This decrease seems to be tied to the expansion of television coverage of college football that began in 1984 after a Supreme Court decision allowed conferences to negotiate their own contracts. Even though the SEC has achieved more exposure since this decision, the results of this paper do not confirm that the SEC has attracted recruits from a wider geographic area relative to the ACC. An implication of these results is that as conferences expand and games are shown in more diverse geographic areas, the absolute value of the distance effect is expected to continue to decrease over time.

One surprising result that could lead to further study is the effect of border states on recruiting. It was shown in both models that as years passed, the likelihood of recruits to play for schools whose states directly border the recruits' home states decreased. When interacted with distance, the effect of being a border state increased the impact of distance. In other words, the effect added to the distance effect already present. It is unknown why, when distance is becoming less important for recruits over time, the likelihood of attending a border state's school is decreasing.

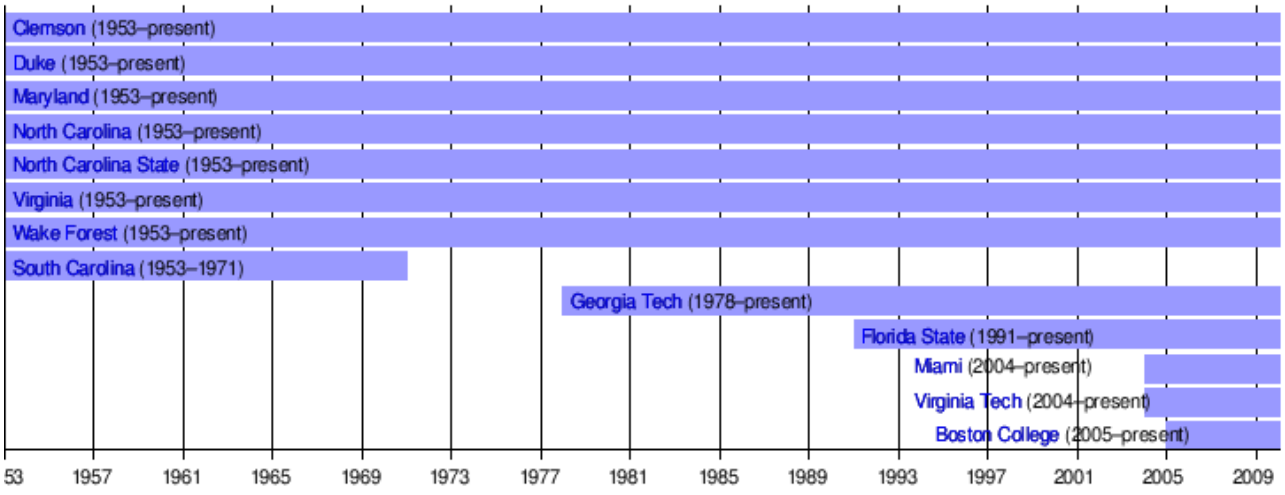
Table 1

Historical Conference Members

SEC(a)



ACC(b)



Source: ACC and SEC websites[12]

Table 2

Average distance per recruit over time in miles

Both conferences (a)

Year	Average Distance
1970	205. 990
1975	229.082
1980	224.350
1985	227.910
1990	261.581
1995	283.433
2000	272.525
2005	282.889
2009/10	278.121
N= 17,988	

N=number of observations

ACC and SEC separately (b)

ACC Average Distance	Year	SEC Average Distance
227.736	1970	188.773
246.495	1975	215.952
220.027	1980	227.943
226.456	1985	229.100
266.707	1990	257.264
320.911	1995	255.059
305.885	2000	247.729
321.142	2005	251.653
283.330	2009/10	273.955
N= 17,988		

Table 3

Percentages of instate players, border players, and import players over time

Year	Instate	Border	Import
1970	54.35	24.65	21.00
1975	49.40	25.65	24.95
1980	53.00	24.67	22.33
1985	54.30	23.49	22.21
1990	48.76	24.08	27.16
1995	47.71	21.37	30.92
2000	49.86	21.39	28.75
2005	48.69	22.78	28.54
2009/10	48.37	23.26	28.38
N= 17,988			

Table 4

Percentages of instate players, border players, and import players in time periods

Period	Instate	Border	Import
1970-1980	52.19	25.00	22.81
1985-1990	51.50	23.79	24.71
1995-2010	48.67	22.21	29.11
N= 17,988			

Table 5

Percentages of instate players, border players, and import players in time periods without Arkansas and Massachusetts

Period	Instate	Border	Import
1970-1980	52.57	24.18	23.25
1985-1990	52.12	23.38	24.49
1995-2010	49.91	21.79	28.30
N= 16,434			

Table 6

Descriptive Statistics

Variable	Mean	Std. Dev.	Minimum	Maximum
choice	0.045	0.208	0	1
dist_mile	408.294	222.522	0	1111.164
dist2	216220.1	211546.6	0	12344686
dist_instate	10.797	42.63	0	434.897
dist_border	89.572	150.953	0	916.759
instate	0.093	0.29	0	1
border	0.333	0.49	0	1
topfbqual	0.318	0.465	0	1
midfbqual	0.318	0.465	0	1
lowfbqual	0.364	0.481	0	1
topfbqual_dist	118.69	206.652	0	1070.382
midfbqual_dist	141.175	249.966	0	1111.164
lowfbqual_dist	148.43	234.486	0	1005.507
private	0.182	0.386	0	1
aau	0.318	0.466	0	1
private_dist	73.052	178.778	0	925.225
aau_dist	135.982	238.369	0	1111.164

N= 315,612

Table 7

Effect of Distance on Player-School Choice Over Time

Independent Variable	Overall	Pre-1985	Post-1990
dist_mile	-.00564* (.00048)	-.00910* (.00095)	-.00425* (.00066)
dist2	2.26e-06* (4.52e-07)	5.17e-05* (9.01e-07)	9.44e-07 (6.24e-07)
dist_instate	-.00075 (.00040)	.00216* (.00079)	-.00188* (.00055)
dist_border	-.00142* (.00028)	-.00080 (.00057)	-.00105* (.00037)
instate	2.29539* (.11259)	1.95430* (.21843)	2.28387* (.15760)
border	.84488* (.09643)	.86034* (.18948)	.59115* (.13343)
midfbqual	.64587* (.04238)	.46131* (.08182)	.63528* (.06002)
lowfbqual	.59224* (.04425)	.22220* (.08382)	.55623* (.06303)
midfbqual_dist	-.00055* (.00016)	-.00082* (.00034)	-.00035 (.00021)
lowfbqual_dist	-.00023 (.00016)	.00047 (.00034)	-.00035 (.00022)
private	-.47433* (.04144)	-.36907* (.07958)	-.48375* (.05943)
aau	-.77403* (.03355)	-.88514* (.06517)	-.66922* (.04770)
private_dist	.00123* (.00014)	.00061 (.00031)	.00138* (.00018)
aau_dist	.00130* (.00012)	.00172* (.00026)	.00107* (.00015)

Estimated using conditional logit model

N= 315,612

Standard errors in parentheses

* indicates significances at 5% level

Table 8

Effect of Distance on Player-School Choice by Year

Independent Variables	1970	1975	1980	1985	1990	1995	2000	2005	2009/2010
dist_mile	-.01213*	-.00927*	-.00726*	-.00633*	-.00522*	-.00338*	-.00461*	-.00439*	-.00394*
	(.01647)	(.00141)	(.00150)	(.00144)	(.00128)	(.00127)	(.00126)	(.00117)	(.00124)
dist2	8.13e-06*	6.36e-06*	4.15e06*	3.27e-06*	2.86e-06*	9.17e-07	2.15e-06	1.68e-06	1.08e-06
	(1.58e-06)	(1.31e-06)	(1.42e-06)	(1.39e-06)	(1.19e-06)	(1.21e-06)	(1.17e-06)	(1.10e-06)	(1.18e-06)
dist_instate	.00709*	.00335*	.00128	-.00039	7.24e-06	-.00157	-.00134	-.00193	-.00165
	(.00141)	(.00121)	(.00127)	(.00121)	(.00108)	(.00108)	(.00108)	(.00101)	(.00106)
dist_border	.00148	-.00133	-.00065	-.00214*	-.00162*	-.00111	-.00136	-.00089	-.00066
	(.00103)	(.00093)	(.00090)	(.00088)	(.00078)	(.00075)	(.00076)	(.00068)	(.00071)
instate	.96812*	1.5459*	2.09898*	2.41238*	2.21694*	2.26816*	2.24620*	2.0435*	2.04470*
	(.37748)	(.33782)	(.36043)	(.34088)	(.31290)	(.31275)	(.31233)	(.28918)	(.29984)
border	.15696	.78171*	.84544*	1.13952*	.94449*	.56507*	.70891*	.42042	.42000
	(.33050)	(.29801)	(.30795)	(.29390)	(.27087)	(.26571)	(.26678)	(.24461)	(.25338)

Estimated using conditional logit model

N= 315,612

Standard errors in parentheses

* indicates significance at 5% level

APPENDIX

The Great Circle Distance formula is Stata code:

```
gen lat1_red= homelatitude*((22/7)/180)
gen long1_red= homelongitude*((22/7)/180)

gen lat2_red=schooltownlat*((22/7)/180)
gen long2_red=schooltownlong*((22/7)/180)

gen d_phi=lat1_red-lat2_red
gen d_lamda=long1_red-long2_red
gen
sigma1=((sin(d_phi/2))^2)+(cos(lat1_red))*(cos(lat2_red))*((sin(d_lamda/2))^2
)
gen d_sigma_hat=2*asin(sqrt(sigma1))
gen dist_mile=6371.01*0.62137*d_sigma_hat
```

Notes

1. NCAA v. Board of Regents of the University of Oklahoma, U.S. Supreme Court, 468 U.S. 85 (1984) http://supreme.justia.com/us/468/85/case.html
2. The history of ESPN can be found at: http://www.fundinguniverse.com/company-histories/ESPN-Inc-Company-History.html
3. Barnhart, Tony. "SEC headed to a big payday in 2010," Mr. College Football with Tony Barnhart. 5/29/2009. http://blogs.ajc.com/barnhart-college-football/2009/05/29/sec-headed-to-a-big-payday-in-2010/
4. Details of the new ACC football contract can be found on the ACC website: http://www.theacc.com/genrel/070810aaa.html
5. Please refer to Table 1 for a look at each conference's history.
6. Cox, Braden and Fred L. Smith. "Airline Deregulation," Liberty of Economics and Liberty. 2008. http://www.econlib.org/library/Enc/AirlineDeregulation.html
7. Please refer again to Table 1 for a listing of schools who are currently members of the ACC and SEC.
8. The teams with 2009 rosters are: Georgia, Florida, South Carolina, Vanderbilt, Tennessee, Kentucky, Alabama, Auburn, Louisiana State, Mississippi State, Ole Miss, Arkansas, Clemson, Boston College, Duke
   The teams with 2010 rosters are: Florida State, Georgia Tech, Maryland, North Carolina, North Carolina State, Virginia Tech, Virginia, Wake Forest
9. Top 7: Alabama, Florida State, Florida, Tennessee, Georgia, Auburn, Louisiana State
   Middle 8: Arkansas, Virginia Tech, Clemson, North Carolina, Ole Miss, Georgia Tech, Boston College, Maryland
   Bottom 8: North Carolina State, Wake Forest, Duke, Vanderbilt, Virginia, South Carolina, Kentucky, Mississippi State
10. The private schools in the sample are: Duke, Vanderbilt, Boston College, Wake Forest
    The AAU schools in the sample are: Duke, Vanderbilt, Florida, North Carolina, Virginia, Georgia Tech
11. The equation for marginal effects is: $(1/p)*(1-1/p)*\beta$ where p is the number of choices (options in the dependent variable) and β is the coefficient on the independent variable.
12. The SEC website is: http://www.secsports.com/schools/default.aspx
    The ACC website is: http://www.theacc.com/this-is/institutions.html

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