Home Bias in the NFL Pointspread Market

Matt Cundith
Department of Economics
California State University, Sacramento

December 2006

Is it possible for markets to exhibit inefficiencies that a savvy investor can exploit for profit? Is it further possible to discover market patterns that would, in turn, yield a successful investment strategy? These questions have been examined exhaustively by researchers (see Malkiel (2003) for a survey). Now, however, with the advanced study in financial markets paving the way, the National Football League (NFL) betting market can be further examined. Economists are seeing the value of studying the NFL market because it exhibits classic economic characteristics and does so with a definitive result at the end of the week. Often times, researchers are required to examine stock that is continuously in flux, where on Monday nights, the outcomes of all the games are publicly known and results are immediate.

The NFL betting market is created in Las Vegas by bookmakers who set a point spread. This spread is often mistaken for the bookmakers' prediction of game outcomes but, despite the spread providing some information as to the tendency of game outcomes, it is designed to draw equal bets to both teams playing. A spread can take on any value greater than or equal to 0, however, there have only been 6 games in the last 8 seasons that had a game-time spread greater than 17.5. The spread is set, usually on Tuesday mornings, from which a "line" as shown below, would be created for newspaper publication.

SAN FRANCISCO 49ERS (-4) vs. Arizona Cardinals

In this case, San Francisco is in capitol letters because they are the home team and the (-4) next to them indicates that they are favored. The spread, the number in parentheses next to San Francisco, is a negative number because, in actuality, the favorite is giving the underdog (Arizona Cardinals) points. Because of this, a bet placed on San Francisco is only successful if they beat the Arizona Cardinals by more than 4 points. Conversely, a bet placed on Arizona would be successful if Arizona wins outright or loses by fewer than 4 points. If San Francisco wins by exactly 4 points, it is a "push" and all bets are returned.

The bookmakers' are risk-averse therefore they set the spread so that they aren't taking a position in the outcome of the game. This is done by moving the spread up and down, usually by ½ point increments, so that each bet on the favorite is matched by an opposing bet on the underdog. The bookmakers earn their profit by extracting a commission or "vig" or "vigorish" from each winning bet. This is known as the "11 for 10" rule whereby a successful bet pays $1 to the bookmaker for every $22 bet and won (Gray and Gray, 1997). Because of this, for a betting strategy to be profitable it must correctly predict the outcome of 52.4% of games. This break-even success rate is the measurement of profitability for the strategies tested in this research.

The following section will detail the efficient market hypothesis and its application to the NFL betting Market.

Economic Model

Before examining the presence of efficiency in the NFL betting market, an overview of the efficient market hypothesis (EMH) is in order. The efficient market hypothesis is the theory that all available information is captured in prices and therefore any movement in stock price would be random and unpredictable. Therefore, if a market exhibits prices that are predictable, through patterns in prices or technical analyses, movements would no longer be random and would allow a knowledgeable investor the opportunity for abnormal profits. As it relates to the NFL betting market, if a model, or basic strategy, can be created or observed, based upon past performances and current statistical information, that profitably predicts the outcomes of games, then it can be said that this market exhibits inefficiency.

The general equation for market efficiency, as it relates to the NFL betting market is:

$$P^*_t - E(P^*_t I_t -1) = \varepsilon_t$$

Where:

P^*_t : Actual Game Outcome

$E(P^*_t I_t -1)$: Expected Game Outcome given current information $I_t -1$ (spread)

ε_t : Random Error

$P^*_t - E(P^*_t I_t -1)$: Spread Error

This equation states that any difference between the actual game outcome and the spread should be a random variable. This is consistent with the Random Walk Theory that states any change in prices should be random and unpredictable. The purpose of this research is to disaggregate the information found in $I_t - 1$ so that ε_t is less random.

The next section will provide an encompassing view of the literature for the Efficient Market Hypothesis as well as its applications to the NFL betting market.

Literature Review

Malkiel (2003) defined an efficient market that allows "neither technical analysis, which is the study of past stock prices…nor even fundamental analysis, which is the analysis of financial information…[to] enable an investor to achieve returns greater than those that could be obtained by holding a randomly selected portfolio of individual stocks, at least not with comparable risk" (p. 59). Malkiel (2003) surveys various findings against EMH such as the seasonal and day-of-the-week patterns, the Contrarian Approach, predictions based on overall value parameters in the market and the discrepancies found between large company stock performances versus small companies. Malkiel's (2003) overall conclusion is that despite brief moments of exuberant or irrational behavior, the market as a whole returns to its average and eventually smoothes out inefficiencies.

Malkiel's (2003) study provides a framework from which research of additional markets is able to proceed. It gives researchers an assumption that can be tested in other markets. By establishing various tests and analysis in the Stock Market, as detailed by Malkiel (2003), researchers can apply the concepts and lessons learned to less conventional market. Therefore, researchers are now able to examine data from the NFL and make assessments as to the efficiency in which it operates.

Pankoff (1968) provides the first examination of efficiency in the NFL betting market. He estimated an equation to predict game outcomes and finds that there are no significant patterns in the market that can be exploited through statistical analysis. Pankoff (1968) then examines the spreads or point differentials that are published prior to the game by "superior analysts". Superior analysts are akin to mutual fund managers in the stock market that are supposed to have superior stock selection skills. He concludes that these predictions do contain valuable information but it was hard to incorporate this information into a betting strategy. This finding indicates that a knowledgeable bettor could utilize the superior analysts' predictions to earn abnormal profits, which is contrary to the efficient market hypothesis. Despite this, Pankoff (1968) draws no conclusions of inefficiency but calls for additional analysis and variables to be incorporated.

Like Pankoff (1968), Gray and Gray (1997) apply the efficient market hypothesis to the NFL betting market. Their probit model uses dummy variables to describe information about the home team to test the contention by prior researchers that the Home-underdog bias can be exploited for profits. Their findings are that starting in the early 1980's, the Home-underdog bias has dissipated to where a betting strategy can no longer render profit. Like Pankoff (1968) they don't find a concrete inefficiency but do point to some small amounts of data that render profit. In their model, if a cut-off is applied for marginal probabilities of 57.5 and above, a betting strategy based on this would yield a 56.35 win percentage in sample and 61.11 win percentage out of sample. However no adequate conclusions can be drawn as probit outputs of 57.5 and above represent only about 6.5% of total games.

Vergin and Sosik (1999) use a different approach to that used by Pankoff (1968) and Gray and Gray (1997). They examine the home team advantage from 1981-1996 focusing on the "spotlight" games, which are Monday Night and NFL Playoff games. They test whether or not the home team elevates their play due to familiarity with the stadium, support of the crowd and less travel. Their examination of spotlight games reveals a potentially profitable strategy based on betting on the home team. From 1981 to 1996, Vergin & Sosik (1999) find an overall winning percentage for the home team during spotlight games of 0.592. Moreover, they found a 0.630 winning percentage for home underdogs on Monday nights. Their findings indicate a possible inefficiency in the market in contrast to the findings of Pankoff (1968) and Gray and Gray (1997).

However, like Gray and Gray (1997), Vergin and Sosik (1999) struggle with a limited sample with which success was achieved. Their findings of a 0.592 and 0.630 winning percentage for home teams and home underdogs on Monday Night games only represent 144 games total and 81 when the home team was the underdog. Additionally, Vergin and Sosik (1999) confirm the findings of Gray and Gray (1997) that the home team underdog bias, during the regular season, has been eliminated from the market.

Like Pankoff (1968), Gray and Gray (1997) and Vergin and Sosik (1999), Boulier (2006) also attempt to create a model that disproves the efficiency of the NFL betting market. Boulier et al (2006), however institute one new variable that has just recently seen widespread use. They implemented the power scores for each additional team as an explanatory variable for the point differentials of games. The power scores are ratings, assembled by a number of people and organizations that are derived from complex equations that use detailed data about each team's performance, quality of opponent and relative difficulty of their schedule. The power score can then be used for two purposes; some are used to rank the teams from 1 to 32 after each week of play and others are meant to predict game outcomes.

Some claim that the difference of the power scores of the two teams is supposed to be the expected point differential. Boulier et al (2006) use power scores printed by the New York Times from 1994-2000 for one variable and dummy variables to represent the location of the game and type of field they are on. Their conclusions found no profit opportunities derived from different fields of play. Similarly, the authors found that a strategy that placed a bet on the home team, if its predicted score minus the predicted score of the away team was greater than the spread, to be not significantly different than the break-even success rate of 52.4%. Lastly, like the probit model of Gray and Gray (1997), they established cut-offs where a bet was placed if the predicted score difference of home team and away team was more than three more than the spread. This strategy too proved to be unprofitable. They conclude that the information contained in the power scores do not add to the information in the spread. They find that "no information was found beyond the point spread that would explain the outcome of games" which confirm the findings above for efficiency.

Empirical Methodology

The data used to test the NFL market's efficiency is a cross section of the 1998 through 2005 season, which represents a total of 2005 games (see Data Appendix for a detailed description of the data). This data will allow an analysis of basic betting strategies and the development of a probit model that will attempt to prove or disprove market efficiency. The data was modified to represent outcomes from the perspective of the favorite. In a standard line from Las Vegas, a negative number represents the favorite because, as stated above, they are giving up points to the underdog. In this study, the point spread is changed to represent a positive number for clarity of analysis and examination.

This research advances the current literature in that it incorporates additional, micro level, data of the NFL market. Variables are broken down to represent individual team performance and game characteristics as opposed to simple dummy variables representing a league wide characteristic (home team underdog, etc.). If data can be found in these variables that adds to the data found in the spread, then it is conceivable that a bias exists in the market, which may allow for abnormal profit.

A graphical representation of the game outcomes and spreads is useful in depicting the degree of symmetry in the market. Figure 1 is a histogram of the actual point differential from the perspective of the favorite. A normal distribution around 0 is most common in statistical analysis but for NFL point scores, a distribution around zero would imply that most games would result in a tie, which is highly unlikely (only 1 instance in the last 8 years). As seen in Figure 1, the most frequent game outcome, from the favorite's perspective, is 3 points, which happens in roughly 9.4% of the games. The next two most common game outcomes are -3 and 7, which represent 6.5% and 6.2% of games respectively. This finding is not unexpected because of the point scheme of the NFL (3 points for field goals, 7 points for touchdowns, 2 points for safety (safeties are rare).

Figure 1: Favorite Point Differential

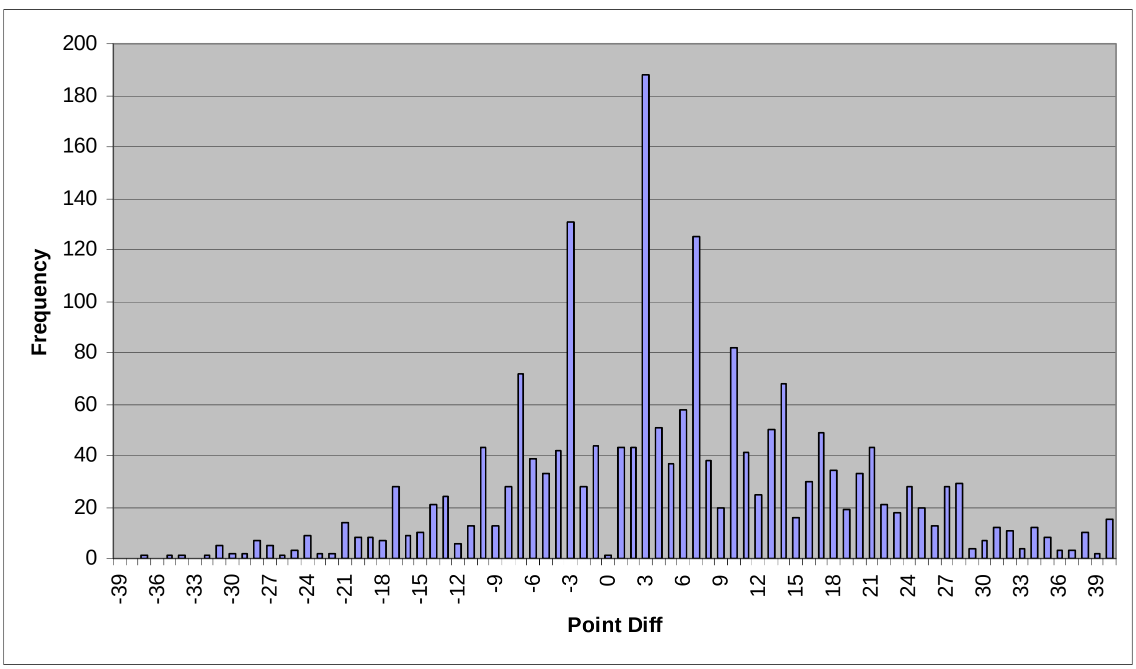
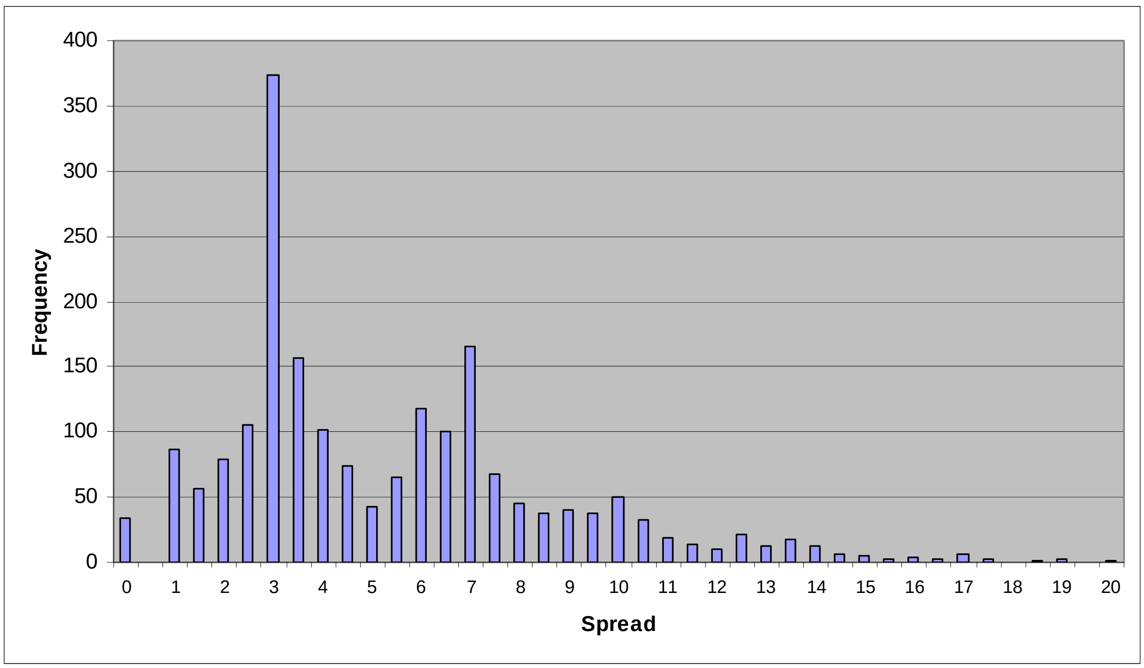


Figure 2 shows the distribution of spreads for all games from 1998 to 2005. An interesting finding, however not shocking, is the fact that the most frequently occurring spread, which is 3, coincides with the most frequent point differential. This is evidence of bookmakers' knowledge of not only bettor sentiment, but also of game outcomes. As noted above, this distribution won't be normal about 0 but is right skewed showing a median of 4.5, which is less than a mean of 5.3. The following section will look at a combination of the spread and the favorite point differential to get a sense of how indicative Las Vegas spreads are of actual game outcomes.

Figure 2: Spread Distribution

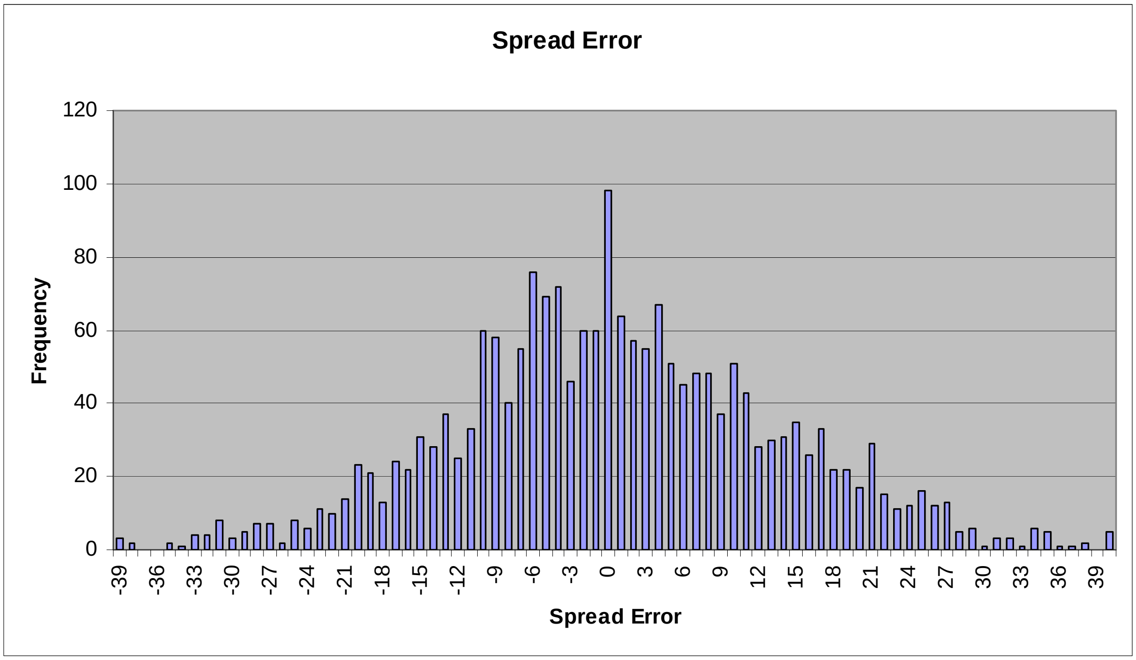


Testing the competence of the spread being a measure of the actual point differential of a game is the jumping off point for the rest of this research. As stated earlier, the spread isn't meant to be a predictor of game outcomes but it does contain the market consensus of the game outcome. First, however, it is prudent to examine a graph of the "Spread Error". The spread error is the difference between the actual game outcome and the spread. For example, if team A is favored by 3 points but loses outright to team B, the underdog, by 7 then the spread error would be the difference between the spread (3) and the game outcome (-7) which is –10. This measure shows the degree of accuracy the market exhibits in predicting the actual game outcome. Figure 3 below shows a normal distribution of the spread error around 0. The spread error will provide the foundation for further analysis into the basic betting strategies of this research. Gray and Gray (1997) find that the presence of basic strategies, such as betting on the home team when they are favored/underdog, have been on average, unprofitable since 1983. The data from 1998 to 2005 confirms and continues this conclusion as depicted by Table 1 below.

Table 1: Basic Statistics	Observations	Success
Games	2005	
Home Team Favored	1340	66.8%
Home Team Covered	1011	50.4%
Favorite Covered	1010	50.4%
Home Favored and Covered	679	50.7%
Home Underdog and Covered	332	49.9%

The home team underdog bias, which had been identified in previous research, proves to be the least successful of all basic strategies.

Figure 3: Point Spread Error



Taking the basic betting strategy a step further, the research will look at a slight variation, which examines the relative outliers in Figure 3 above. The basic strategy analysis in the subsequent section will look at the performance of the favorite following an abnormal outcome. An abnormal outcome, in this case, is deemed to be a game where the spread error is less than -10. This indicates that the favorite drastically underperformed in relation to the stated Las Vegas spread. The purpose of the following analysis it to examine spread setter's reaction to underperforming favorites in the week following an unexpected performance.

Gray and Gray (1997) found evidence that the market overreacted to the most recent performance of teams and discounted their overall season record. This is the basis of the examination of an advanced basic strategy that looks at the favorites performance following an underperforming week. Although the standard deviation of the spread error is +/- 13, for simplicity as well as incorporating more observations, the cut-off is subjectively set at 10 below the mean of 0.38. This allows an examination of 329 instances where the favorite underperformed and had a game (not a bye) the following week.

An assumption needed for furthering this analysis is that the home team receives some advantage in the point spread due to learning factors, travel factors and crowd factors (Vergin et al, 1999). Boulier et al (2006) find that the average point spread for the home team is 2.585 and the average game outcome for the home team is 3.178. This indicates that the home team, on average, will win by 3.178 points and they will also be favored by 2.585 points on average. The findings of Boulier et al (2006) of home team characteristics and those of the Gray and Gray (1997), on recent performance, indicates that a team that is on the road following a week where they were an underperforming favorite should have a spread that is negatively biased.

This would indicate that knowledge of these factors affecting the spread might yield to some inefficiency that could be capitalized upon. Table 2 shows the occurrences and success rates of this selection of games from 1998 to 2005, where an underperforming favorite is on the road the following week. The overall success rate is 55.6%, which is above the required 52.4% break-even rate. A success rate of 55.6% would yield a return of 6.1% on bets placed for these 8 seasons.

Table 2: Advanced Strategy

Year	Obs	% Cover
2005	9	60.0%
2004	17	58.6%
2003	14	58.3%
2002	13	52.0%
2001	17	65.4%
2000	18	69.2%
1999	9	33.3%
1998	8	47.1%
Total	**105**	**55.6%**

Hindering assertive conclusions from this data is the small sample size as well as the 1999 and 1998 seasons. Gray and Gray (1997) used their probit model with marginal probability cut-offs to predict out of sample. As a result of the cut-offs, they were only able to observe 6.42% of the games played from 1976 to 1994. This same problem is found in the current research in that the specified characteristics are only present in 105 or 5.2% of the games played. Additionally, the presence of very low success rates for the 1999 and 1998 seasons indicates that the 2000 to 2005 range might be an anomaly that doesn't hold in the prior years data.

Although the existence of this market wrinkle won't allow for definitive conclusions, at the very least it calls for an examination of previous data. The examination of years past may uncover an inefficiency caused by the co-existence of the home field advantage and the overreaction to recent performances as is found in this small sub-sample.

Regression Model

This section will detail the intended model and variables that will be used to formulate an equation. The data used will be from the 2002 through the 2005 season. The regression model that will be used, as noted above, is the probit model that uses a discrete choice dependent variable that takes on a value of 1 for success or a 0 for failure (in this case a 1 for a favorite covering the spread and 0 for failing to do so). The reason for using the probit model as opposed to ordinary least squares is because of the nature of the dependent variable. Ordinary least squares have a tendency to overemphasize outliers, which tend to skew the outputs. Probit models just recognize success or failure and don't account for the actual point differentials. The probit regression equation will be the following, with the variable definitions found in the Data Appendix:

$$\text{FAVCOV} = b_0 + b_1\text{SPREAD} + b_2\text{HTF} + b_3\text{FAVMGN} - b_4\text{UDMGN} + b_5\text{FRATS} + b_6\text{URATS} + b_7\text{FOYDSDR} - b_8\text{FDYDSDR} + b_9\text{FOPTDR} - b_{10}\text{FDPTDR} - b_{11}\text{FOTODR} + b_{12}\text{FDTODR}$$

The SPREAD, HTF, FRATS, URATS variables are expected to be the most significant and important to the predictability of the model. The SPREAD variable is expected to be the most significant because, as shown in Figure 3, the spread error represents a very normal distribution around 0 indicating a high correlation between the spread and the game outcome. This variable is presumed to be important to the Efficient Market Hypothesis because it represents the clearing price of the NFL market. If variables are found that, in addition to the spread, are better predictors of actual game outcomes, and therefore allow opportunities for abnormal profits, then it can be said that the NFL market is inefficient.

The variable HTF is expected to be positive and significant. The question, however, is does a dummy variable indicating that a home team is favored contain information that isn't already incorporated into the spread. The FRATS and URATS are the favorite and underdog's records against the spread for the entire previous year. These variables are incorporated under the assumption that team characteristics and tendencies have some degree of correlation between years.

Regression Results

The Probit regressions were run in three stages in hopes of isolating significant variables and adding to the explanatory of the spread. Regression A run in Table 2, incorporated the spread and two control variables, a dummy variable indicating whether the home team was favored or not and the week of the season. As Table 2 shows, only the spread was significant at the 90% level with the remaining two variables having no explanatory value. The McFadden R-squared, which indicates the goodness of fit of the model, is below 1% which means that the model, with this set of explanatory variables, explains less than 1% of the variation of the dependent variable.

Following the lack of success of the first regression, additional variables that represented individual team characteristics were included to try to enhance the model. Regression B incorporated 11 variables including the constant as a representation of the past performances of the favorites and the underdogs. This regression didn't contain any variables that were significant and didn't demonstrably improve the explanatory power of the model expressed with a McFadden R-Squared of 0.006. A conclusion drawn from the lack of significance of the explanatory variables was that there was a degree of multicollinerity. From here, another regression was run that incorporated the spread, which in Regression A indicated significance, and the two most significant variables of Regression B.

Including the spread and the two variables that exhibited the most significance in Regression B, although none higher than the 85% level, yielded no additional explanatory power to the model. The spread is still found to be significant at the 90% level, but the other two variables, the favorite's offensive yards per drive and the favorite's offensive turnovers per drive, didn't gain significance. Being that in Regression A and Regression C the spread proved to be significant and the coefficients were -0.028 and -0.026, respectively, the conclusion could be drawn that, ceteris paribus, as the spread goes up, the probability of the favorite covering goes down.

Table 3: Regression Results

Dependent Variable: Favorite Cover (1=Yes, 0=No)

	A	B	C
Constant	0.157 (0.123)	0.288 (0.248)	0.143 (0.087)
Spread (spread)	-0.028* (0.015)		-0.026* (0.016)
Home Team Favored (1=Yes, 0=No) (HTFAV)	-0.023 (0.099)		
Week of Season (WK)	0.000 (0.009)		
Favorite Offensive Points per Drive diff (FOPTDR)		0.164 (0.249)	
Favorite Defensive Points per Drive Allowed diff (FDPTDR)		0.220 (0.232)	
Favorite Offensive Yards per Drive diff (FOYDSDR)		-0.029 (0.021)	-0.008 (0.009)
Favorite Defensive Yards per Drive Allowed diff (FDYDSDR)		-0.008 (0.019)	
Favorite Offensive Turnovers per Drive diff (FOTODR)		-2.023 (1.374)	-1.372 (1.109)
Favorite Defensive Turnovers per Drive Forced diff (FDTODR)		0.385 (1.323)	
Favorite Point per Game Margin (FAVMGN)		0.003 (0.011)	
Underdog Point per Game Margin (UDMGN)		0.005 (0.012)	
Favorite Record Against the Spread		-0.389 (0.321)	
Underdog Record Against the Spread		-0.181 (0.329)	
McFadden R-Squared	0.004	0.006	0.005
Number of Observations	768	768	768

Standard errors are reported in parentheses.
*,**,*** indicates significance at the 90%, 95% and 99% level, respectively.

Conclusions

The NFL betting market has received increased attention over the past decade. Pankoff (1968) first began the research by attempting to estimate an equation to identify inefficiencies and found that none yielded profits above the 52.4% break-even rate. Gray and Gray (1997) built on Pankoff (1968) by utilizing modern probit modeling to estimate the probabilities of favorites covering. Furthermore, they found that basic or naïve strategies had been eliminated from the market starting in the early 1980's. Their probit model found some evidence of inefficiency but the small sample from which these out of sample marginal probabilities were derived made concrete conclusions difficult.

This research has continued upon the findings of Gray and Gray (1997) to provide evidence that naïve strategies aren't profitable. However, an analysis of underperforming favorites in the week following an abnormal outcome does hint to a possible inefficiency in the market. Firm conclusions on this potential market wrinkle will require a larger sample size that examines these phenomena across a wider range of seasons.

The lack of explanatory power of these probit models is consistent with the efficient market hypothesis. Because no significant explanatory variables, aside from the spread, help to enhance the probability of the favorite covering, based on the model it can be concluded that the market has incorporated all past information and tendencies of the individual teams into the spread.

Significant advancements of the literature can be achieved by incorporating more explanatory variables that are disaggregated by teams. This attempt assumed that the prior year's performance would contain significant information that wasn't accounted for in the spread. Although this proved to be already incorporated, a look at variables that reflect most recent performance, defined as momentum investing in financial markets, might help enhance the models. Additional proxies for team capabilities such as a representation of the Head Coach's experience and record as well as variables that are further broken down to represent individual impact players might advance the research. Although this research is unable to reject the null that the NFL betting market exhibits inefficiencies, there are opportunities and variables that have yet to be examined that might identify profitable weaknesses.

Annotated Bibliography

Boulier, B., Stekler, H.O., Amundson, Sarah. (2006) Testing the Efficiency of the National Football League Betting Market. *Applied Economics*, *38*(3), 276-286. Retrieved from InfoTrac on October 5, 2006.

Boulier et al (2006) tested the efficiency of the NFL betting market with power scores printed by the New York Times from 1994-2000 for one variable and dummy variables to represent the field of play. Their conclusions found no profit opportunities derived from different fields of play. Similarly, they found that a strategy that placed a bet on the home team, if its predicted score minus the predicted score of the away team was greater than the spread, to be not significantly different than the break-even success rate of 52.4%.

Gray, P., & Gray, S. (1997). Testing Market Efficiency: Evidence From The NFL Sports Betting Market. *The Journal of Finance*, *42*(4), 1725-1737. Retrieved September 8, 2006 from ABI/INFORM Global (Proquest) Database.

Gray and Gray (1997) use a probit model to derive probabilities of success for NFL teams against the spread. They then establish cut-offs based on the output of the model to try and establish a winning strategy. Further, they examine the existence of basic betting strategies and their profitability over their data series and find that the once documented home team underdog bias has dissipated over time.

Malkiel, B.(2003), The Efficient Market Hypothesis and Its Critics. *Journal of Economic Perspectives*, *17*(Winter, 1), 59-82. Retrieved from JSTOR on October 2, 2006.

Malkiel (2003) provides a survey article of the various pieces of literature published on the Efficient Market Hypothesis. He examines various theories of the past and then provides current data to refute the presence of inefficiency. He allows for the presence of brief periods where investors and thus prices exhibit irrational characteristics but finds that overall they smooth to an efficient median.

Pankoff, L., (1968) Market Efficiency and Football Betting. *Journal of Business*, *41*(2), 203-214. Retrieved from JSTOR on September 20, 2006.

Pankoff (1968) provides the first examination of efficiency in the NFL betting market. He estimates an equation to predict game outcomes and finds that there are no significant patterns in the market that can be exploited through statistical analysis. He then examines the spreads or point differentials that are published prior to the game by superior analysts and concludes that these predictions do contain valuable information but it was hard to incorporate this information into a betting strategy.

Vergin, R., & Sosik, J. (1999). No Place Like Home: An Examination of the Home Filed Advantage in Gambling Strategies in NFL Football. *Journal of Economics and*

Business, *51*, 21-31. Retrieved on September 20, 2006 from ABI/INFORM Global (Proquest) Database.

Vergin and Sosik (1999) examine the home team advantage of NFL games from 1981-1996. Their examination of spotlight, or nationally televised games, reveals a potentially profitable strategy based on betting on the home team. From 1981 to 1996, they find an overall winning percentage for the home team during spotlight games of 0.592. Moreover, they found a 0.630 winning percentage for home underdogs on Monday nights.

Data Appendix

Variable	Primary Source	Secondary Source	Unit of Measure
Favorite Covered (FAVCOV)	N/A	N/A	Actual point differential versus spread (1 is yes, 0 is no)
Spread (SPREAD)	STATS, Inc.	ESPN online	Point value starting at zero
Home team favored (HTF)	N/A	N/A	Derived from the spread and the matchup
Fav ppg scored margin (FPPGSMGN)	N/A	N/A	The difference between fav ppg scored and fav ppg allowed
UD ppg scored margin (UDPPGSMGN)	N/A	N/A	The difference between UD ppg scored and UD ppg allowed
Fav Record against the spread (FRATS)	N/A	N/A	Games covered divided by total games
UD record against the spread (URATS	N/A	N/A	Games covered divided by total games
Fav offense yds/drive diff (FOYDRDIFF)	Football Outsiders		Fav yds/drive gained minus UD yds/drive allowed
Fav defense yds/drive diff (FDYDDIFF)	Football Outsiders		Fav yds/drive allowed minus UD yds/drive gained
Fav offense pts/drive diff (FOPDDIFF)	Football Outsiders		Fav points/drive scored minus UD points/drive allowed
Fav defense pts/drive diff (FDPDDIFF)	Football Outsiders		Fav points/drive allowed minus UD points/drive scored
Fav offense turnovers/drive diff (FOTODIFF)	Football Outsiders		Fav offense turnovers/drive minus UD turnovers/drive forced
Fav defense turnovers/drive diff (FDTODIFF)	Football Outsiders		Fav turnovers/drive forced minus UD turnovers/drive

Primary Source: STATS, Inc.   Secondary Source: ESPN Online

Data (Raw):
Spread: Point spread produced by Las Vegas

Points Scored: Each game's points scored by both teams. Additionally, it designates the home team and away team

Data (Derived):
Favorite Points Per Game Scored Margin: The difference between Favorite Points Per Game Scored and Favorite Points Per Game Allowed. Each point average accounts for statistics at home and on the road.

Underdog Points Per Game Scored Margin: See Favorite Points Per Game Scored Margin.

Favorite Record Against the Spread: Number of games a bet placed on team A would have been successful, regardless of whether they were favored or not, divided by the total number of games.

Underdog Record Against the Spread: See Favorite Record Against the Spread

Primary Source: Football Outsiders

Data (Raw):

Favorite Offense yards/drive Differential: Total offensive yards by favorite for the previous season divided by the total number of offensive drives for the previous season. Then subtract the total defensive yards allowed by the underdog divided by the total number of drives from the previous season

Favorite Defense yards/drive Differential: Total defensive yards allowed by favorite for the previous season divided by the total number of defensive drives for the previous season. Then subtract the total offensive yards gained by the underdog divided by the total number of offensive drives from the previous season

Favorite Offense points/drive Differential: See Favorite Offensive yards/drive Differential

Favorite Defense points/drive Differential: See Favorite Defense yards/drive Differential

Favorite Offense turnovers/drive Differential: See Favorite Offense yards/drive Differential

Favorite Defense turnovers/drive Differential: See Favorite Defense yards/drive Differential