THE IMPACT OF SEASON MATURITY ON THE FOOTBALL-BETTING MARKET

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ABSTRACT

Efficiency in the football-betting market was examined on a month-by-month basis over a 19-year period. Prompted by the mispricing of IPOs in the securities market, we anticipated less-efficient pointspreads in the first month of the National Football League's season (September) than in the three succeeding months. While more wins-to-bets ratios for the 28 NFL teams competing during the 1980-98 seasons were nonrandom in September than in October or November, W/B ratios in December were most conspicuously out-of-line. Possible explanations for a mature market behaving immaturely include an environment in which streaks occur as teams either chase post-season rewards or collapse when no longer contending and the substitution of lesser-known players for injured teammates.

INTRODUCTION

The vulnerability of stock prices to systematic trading has long intrigued investors and researchers. *Beating the market* has an inescapable appeal. Even the overwhelming evidence that superior returns are available only to those with *inside information* has not slowed efforts to uncover exploitable trends and biases. One reason for the ongoing inquiry may be the belief that closure is impossible owing to the limitless variety of trading rules. Perhaps another is that past studies, however thorough, lacked an unambiguous cutoff date for measuring results.

Fortunately, the second obstacle to resolving the question of market efficiency can be removed by redefining market opinion as football pointspreads rather than security prices. Recognizing that bettors are no less numerous, knowledgeable, competitive or profit-maximizing than investors, Pankoff (1968) argued that the outcomes of bets on National Football League (NFL) games provided valuable insights into the efficiency of people's average economic judgments. Also subscribing to the investing-betting analogy, Avery and Chevalier (1999) suggested that bets are actually superior to assets for gauging market efficiency since only the former have a well-defined *settling-up point* that facilitates performance evaluation.

Unfortunately, the football-betting market can neither solve nor escape the problem of limitless strategies. Home teams, favorites, *hot* teams, home underdogs, visiting favorites, teams off a loss and dozens of other angles have all served as the basis for attempts to uncover inefficient pointspreads. Where rules were found that produced above-average returns such as *Bet against the favorite if, as the favorite in its previous game, it beat the spread by 10+ points* (Gandar et al., 1988), they were almost always exposed as being sample-specific.

Another characteristic common to previous investigations is that betting strategies bear little or no resemblance to those contemplated by investors. It is clear from Sauer's (1998) exhaustive review of sports-betting studies that writers seem content to simply demonstrate that market consensus is or is not fallible. If "the pointspread betting market is a fruitful place to conduct research about behavioral theories

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that could apply in conventional market settings" (Gandar et al., 1988: 1007), researchers should strive to test strategies that have greater meaning for the markets to which Gandar et al. were alluding. Two exceptions are studies which examined the *neglect effect* (Kochman and Waples, 1998) and the *overreaction hypothesis* (Kochman, 1998).

In the former study, neglected (or overlooked) stocks[p1][p2]—often cited as an anomaly to the *efficient market hypothesis* (EMH)—were represented by college football teams that attracted only minimal, or regional, attention from fans and bettors. The *size effect* which tends to obscure the neglect-return relationship in conventional studies was absent in Kochman and Waples because each college is permitted a uniform number of football scholarships. When the twenty *most neglected teams* (e.g., Rutgers, Tulsa and Memphis) failed to achieve a combined wins-to-bets ratio (W/B) superior to that produced by the twenty *least neglected clubs* (e.g., Notre Dame, Nebraska and Florida State), Kochman and Waples concluded that neglect had no predictive value.

The hypothesis that overreaction by investors creates opportunities for abnormal returns was applied by Kochman to the market for bets on NFL games. Specifically, a series of events was hypothesized in which (1) bettors overestimate the chances that the reigning Super Bowl (SB) champions will beat the pointspread; (2) oddsmakers, in turn, adjust pointspreads upward in games involving the previous year's SB winner in order to balance wagers; and (3) the inflated pointspreads lead to above-average returns from bets on the opponents of the SB winners. A wins-to-bets ratio of nearly 68 percent compelled Kochman to conclude that overreaction in a competitive market is both a real and exploitable phenomenon.

METHODOLOGY

The purpose of this study is to examine the efficiency of the football market from a time-of-the-season, or maturity, perspective. Our hypothesis—namely that pointspreads at the start of the NFL season are less efficient than spreads later in the year—is intended to mimic the proposition that the prices of initial public offerings (IPOs) are inefficient and represent an exception to the EMH. To accomplish our objective, we divided the NFL season into four months (September, October, November and December) and compiled the pointwise records of the 28 NFL teams that competed during the 10 consecutive years ending in December 1998 for each of those months. Two current NFL clubs (Charlotte and Jacksonville) began playing in 1995 and were therefore excluded from this study.

To determine the nonrandomness and profitability of each team's W/B ratio for a particular month, we relied on tests developed by Vergin and Scriabin (1978) and Tryfos et al. (1984), respectively. Vergin and Scriabin (V&S) focused on the probability of a team beating the pointspread ($Z_{V\&S}$) and therefore ignored any transaction expense in their equation. Tryfos et al. were interested in the probability of beating the bookie (Z_{Try}) and incorporated the typical commission of 10 percent in their model.

(1) $$Z_{V\&S} = [W - 0.5(B)] \text{ X } [B(p)(1-p)]^{-1/2}$$

where: W = number of winning bets
B = number of total bets
P = probability of winning a bet (=0.5)

$$(2) \qquad Z_{Try} = \frac{W/B - (1.1)L/B}{\{1/B[(W/B + (1.21)L/B) - (W/B - (1.1)L/B)^2]\}^{1/2}}$$

where: L = number of losing bets

Ranges of 1.0 percent (e.g., 50.1-51 percent) were established for the wins-to-bets ratios achieved by the 28 NFL teams during the 1980-98 period. If, for example, the Atlanta Falcons beat the pointspread in 37 of 76 games played in September, their W/B ratio of 48.7 percent would be recorded in the 48.1-49 percent range. Ranges above 59.0 percent and below 41.1 percent were equated with nonrandom behavior in the V&S sense inasmuch as $Z_{V\&S}$ is significant at $p < 0.10$ where wins represent either more than 59.4 percent or fewer than 40.6 percent of 76 bets—or 19 seasons *times* 4 games per month. Ranges above 61.0 percent were regarded as profitable in the Tryfos et al. sense since Z_{Try} is significant at $p < 0.05$ where wins account for more than 61.5 percent of 76 wagers. The source for Las Vegas pointspreads and final scores was Lawrence (1999).

RESULTS

The pointwise success of NFL teams over the 1980-98 seasons resulted in W/B ranges from a high of 62.1-63 percent to a low of 36.1-37 percent. It is apparent from Table 1 that W/B ratios for the 28 NFL teams clustered around 50 percent and that few deviated by more than 10 percent. Another insight from Table 1 is that W/B ratios are more disperse in the season-beginning and season-ending months of September and December than in the middle months of October and November. The hypothesis that pointspreads are less efficient in the early part of the football year would seem to enjoy some support from our results inasmuch as five of the 28 teams (or roughly 18 percent) produced W/B ratios in September that were nonrandom in the Vergin and Scriabin sense—including one that was profitable per Tryfos et al. By contrast, only one W/B ratio was nonrandom in October while two were nonrandom in November—or approximately 3 ½ and 7 percent, respectively. The unexpected finding from our data was the erratic behavior of W/B ratios in December where eight teams (nearly 30 percent of the total) had nonrandom results—one of which was profitable as well. Confirming December's disperse results is its standard deviation of W/B ratios (7.3 percent) relative to 6.5 percent for September and 5.3 percent for both October and November.

Table 2 identifies the NFL teams with random and profitable W/B ratios. While four teams appear twice (Cincinnati, Denver, Indianapolis and Oakland), it is clear that one or two teams do not explain the nonrandom behavior of wins-to-bets ratios. It is also fair to say that our nonrandom ratios were not dominated either by those above the 58.1-59 percent range or by those below the 41.1-42 percent range. Eight of the 16 nonrandom W/B ratios exceeded 59.0 percent while the other half was less than 41.1 percent.

CONCLUSIONS

We had hoped to find early-season W/B ratios that reflected the kind of mispricing that many market observers connect with IPOs, and to some extent we did. Relative to the pointwise records of NFL teams in October and November, September's W/B ratios did reflect a slightly less-efficient market. Ratio ranges in September spanned 62.1-63 percent to 37.1-38 percent while—with the exception of one W/B ratio—ranges in October and November stretched only from 59.1-60 percent to 41.1-42 percent.

TABLE 1

Wins-to-bets ratios for NFL teams by months (1980-98)

W/B Range	September	October	November	December
62.1-63%*	●			●
61.1-62%*				
60.1-61%**				●●
59.1-60%**	●	●	●	●
58.1-59%		●	●	●
57.1-58%	●	●		●
56.1-57%	●●	●●●		
55.1-56%	●	●	●●	●
54.1-55%	●●●●		●●	●
53.1-54%	●	●	●●●	●
52.1-53%		●●	●●	●
51.1-52%		●	●●●	
50.1-51%	●●	●	●●	●●
49.1-50%	●●	●●●	●●●●	●●●●●
48.1-49%	●	●	●●●	●
47.1-48%		●●		●
46.1-47%	●	●●		●●
45.1-46%	●●	●●●		●
44.1-45%		●	●	
43.1-44%	●●●	●●	●●	●
42.1-43%		●		●
41.1-42%	●	●	●●	●
40.1-41%**	●			
39.1-40%**				●●
38.1-39%**	●			
37.1-38%**	●			●
36.1-37%**			●	●
$\sigma_{W/B\ ratios}$	6.5%	5.3%	5.3%	7.3%

●represents a single NFL team
* profitable at $p < 0.05$
**nonrandom at $p < 0.10$

TABLE 2
NFL teams with nonrandom* and profitable** W/B ratios (1980-98)

September	October	November	December
Cincinnati**	Oakland*	Cincinnati*	Denver**
Denver**		Indianapolis**	Kansas City*
Indianapolis*			NY Giants*
Miami*			NY Jets**
New England*			Oakland*
			St. Louis*
			San Fran.**
			Seattle*

September also produced five nonrandom W/B ratios vis-a-vis three for October and November combined. The curious month is December when a mature market in which participants (both oddsmakers and bettors) should fully know competing clubs was plagued by the greatest incidence of nonrandom W/B ratios. Instead of extending or improving the efficiency in October and November, December emerged as less mature than September. That eight of 28 W/B ratios were nonrandom and one was profitable in December suggests that important information existed or developed which was not discounted by the pointspread. W/B ratios in December covered the entire spectrum of ranges in Table 1.

In sum, it is gratifying to discover that efficiency in the football market appears related to time-of-the-season—albeit in a curvilinear manner. While it is disappointing that the betting-investing analogy fails to offer any insights into how a mature market can behave immaturely, explanations are still possible. What might be occurring in a season's final few weeks is the *streaking teams phenomenon*—the tendency of some teams to run *hot* or *cold*. Although researchers such as Camerer (1989) and Brown and Sauer (1993) have studied the phenomenon and found no predictive value, no one has limited it to a segment of a season. Intuitively, streaks would be more likely to occur at the end of a sports year as certain clubs have extra motivation to play well and make the playoffs while other teams lose motivation as they fall out of contention. The incentive to succeed may be one of those variables which pointspreads fail to capture. Another explanation for our season-ending anomaly could be that cumulative physical exertion and injuries result in the substitution of better-known players by lesser-known ones. The changes create a new market in which participants are more likely to commit mistakes. Of course, a third explanation for the somewhat counterintuitive results is that they are simply specific to our sample and should be added to the long list of short-lived anomalies to the EMH.

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