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Learning, price formation and the early season bias in the NBA

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Abstract

We test the NBA betting market for efficiency and find that totals lines are significantly biased early each season, yet sides lines do not show a similar bias. While market participants generally force line movements in the correct direction from open to close, they do not fully remove the identified bias in totals lines. This inefficiency enables a profitable technical trading strategy, as the resulting win rate of our proposed simple betting strategy against the closing totals line is 56.72%.

JEL classification: G10; G14; G19; Z00

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1. Introduction

Financial economists have thoroughly analyzed trader behavior in equities markets and have documented several important anomalies. For instance, information asymmetries (Ritter, 1991), overreaction and underreaction to news events (De Bondt and Thaler, 1985; Chan et al., 1996), mood (Hirshleifer and Shumway, 2003), and outright confusion (Rashes, 2001) are shown to

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cause significant deviations between stock prices and their associated underlying values. However, it can be problematic to draw conclusions from equities market analyses because the true value of a traded security is never revealed with certainty. Betting markets, on the other hand, do not suffer from the same drawback, and the accuracy of aggregate market forecasts (closing betting lines) can be easily compared with observed outcomes (bet wins/losses).

The sports betting market consists of a market maker, called a bookmaker or sports book. The bookmaker establishes the opening lines at which betting commences. Bettors in US markets typically pay the bookmaker $11 to win $10, ensuring the bookmaker a risk-free profit if monies bet on each side of the proposition are balanced. This $11-for-$10 rule means that bettors do not realize a profit, on average, unless their win rate is greater than 52.38%.[1] Therefore, moving forward it is important to differentiate between betting market *statistical efficiency* (when bets are no different than 50/50 propositions) and *economic efficiency* (when no betting strategy can exceed the 52.38% win rate).[2]

One of our goals is to determine whether all relevant information is fully incorporated into *closing* lines (e.g., Brown and Sauer, 1993; Gray and Gray, 1997). In theory, closing lines represent the wealth-weighted-average opinion of all bettors in the marketplace and include all public and private information. In contrast, opening lines are formed strictly from the personal information of bookmakers and their subjective expectations of the market response to the opening line. Our work is most similar to Gandar et al. (1998) and Gandar et al. (2000). These papers show that the betting public removes biases in bookmakers' opening lines in NBA betting. That is, bets placed at the closing line are essentially 50/50 propositions. We examine the same open-to-close movements in NBA lines, but we focus on price formation and line movements during a time when information is more uncertain—early each season.

At the beginning of each new season, the bookmaker is faced with a dilemma similar to that faced by banks (investors) when setting IPO price (estimating IPO value). While an observable prior performance record exists, most newly public firms experience a variety of changes just prior to their offerings, thus forecasting post-IPO performance is a complex and uncertain task. As time passes, actual performance is revealed, and equity prices gradually adjust and stabilize. Likewise, although bookmakers and market participants can use previous seasons' outcomes as a benchmark, off-season personnel maneuvering and rules changes affect future game outcomes in indeterminate ways.[3] As the season progresses, additional data are revealed, team strength becomes more certain, and both opening and closing lines become more accurate indicators of observed outcomes.

Furthermore, the NBA season starts while interest in Major League Baseball, the National Football League, and National Collegiate Athletic Association (NCAA) football betting is reaching its peak, and while the National Hockey League and NCAA basketball seasons are beginning. So, in formulating opening lines, bookmakers must process more information and are therefore potentially less able to devote adequate resources to predicting NBA game outcomes. Bettors

[1] The most common sports bet is the *sides* wager in which a gambler bets on the difference (the point spread) between the number of points that two teams will score. The *totals* wager, on the other hand, is one in which a gambler bets that the combined scores of both teams in a contest will be over or under the number posted by a sports book.

[2] See Sauer (1998) for a discussion of betting market efficiency.

[3] Two examples of player movement affecting team performance are the departure of Shaquille O'Neal from the Los Angeles Lakers and the free agent signing of Steve Nash by the Phoenix Suns. An example of a substantial rule change is the allowance of the "zone defense." The introduction of the new ball design beginning in the 2006–2007 season is also likely to have affected outcomes, as is the switch back to the old ball design in January 2007.