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Thesis Outline & Bibliography

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Examining Post-Earnings-Announcement-Drift through Sports Betting Markets

Introduction:

Asset pricing theory has long caught the attention of investors and economists trying to rationalize certain common capital markets' investment strategies and behavioral patterns. Most famous is Eugene Fama's work regarding the Efficient Market Hypothesis, which argues that the price of any asset is efficient, or at fair market value, because all market participants have access to all relevant information regarding prices. Accordingly, if the asset price were always at the fair market value it's impossible to beat the market. However, investors don't always act rationally. The recent pandemic day trading phenomenon and meme stock boom fueled by wall street bets redditors demonstrated to the entire financial world that a sizable group acting irrationally could cause a major disturbance in the industry. Hence, behavioral economists' theories have also tried to rationalize this behavior by often targeting certain patterns and testing them in the market.

One prominent example of financial market activity that can appear to contradict the efficient market hypothesis is stock price reactions around major news events, such as quarterly earnings or stock buyback announcements. For instance, academic researchers have conducted numerous studies on the phenomenon termed Post-Earnings-Announcement-Drift. Their findings of which demonstrate that a significant positive or negative earnings surprise has the tendency to lead to abnormal stock returns in the following trading days that drift in the direction of the surprise. This would suggest that investors underreact to the earnings announcement, which leads to the post-announcement drift. If the efficient market hypothesis were in full effect, then the information from the announcement would be quickly acted upon such that there were no empirical abnormal returns in the following days.

However, it is difficult to argue that these studies are clear examples of a failure in the efficient market hypothesis. This centers back to Fama's notion of the Joint Hypothesis Problem, which claims that testing for market efficiency is extremely difficult, if not impossible because any test must use some form of an asset pricing model to predict returns. Thus, it is impossible to say whether the perceived deviation from the predicted returns is because of market inefficiency or rather because of an error in the asset pricing model that predicted the returns. Hence, this issue of needing to simultaneously prove the inefficiency of the market and the accuracy of the asset pricing model has conflicted with academia.

As a result, some economists looking to define certain behavioral properties have turned to sports betting markets as a laboratory for empirical research. Sports betting presents a clean testing ground because of a few properties. Importantly there is no correlation between the standard risk of the traditional financial market and the overall economy. While certain individuals betting amounts may decline during a recession, there is no impact on the line moving significantly in one direction for two football teams based on the latest jobs report. In addition, sport betting contracts have a fixed payoff set to mature on a defined day. This then alleviates the need to define an asset pricing model for sports betting markets, as we can simply look at the payoffs and compare that to the initial pricing to test for any potential mispricing.

While sports betting markets have certain characteristics that distinguish the industry from capital markets, they are largely subject to the same behavioral patterns that are seen in traditional finance. For instance, we know those market participants are strictly better off when their bet wins, regardless of whether they are primarily betting for the entertainment factor. A sports bet is simply another form of a risky decision that subjects the player to the same behavioral principles and models used to examine participants in capital markets. This basic

premise allowed Yale Professor Moskowitz the motivation for using sports betting markets to test three behaviors influencing asset pricing theory: value, momentum, and size.

Thus, this paper intends to extend the work done by other researchers by now examining how the sports betting markets react to major news events surrounding the game. To begin, I will focus on looking at injury reports and evaluate what level of data this will provide. I plan on examining games with an injury report that caused a sizable move in the betting line, like the effects that an earnings surprise would instill. Then, having isolated these games, I will examine whether there are any mispricing effects once the game is actually played out. If there is a significant underreaction to the news, this phenomenon would partially help rationalize the behavioral activity demonstrated in the stock market and provide a better asset pricing model for capital markets.

Literature Review:

As alluded to previously, there have been many studies that have analyzed the behavior of Post-Earnings-Stock-Drift. Fama has even coined it the “Granddaddy of underreaction events”. Bernard and Thomas examined this famously in a 1989 study where they grouped stocks by the size of their respective earnings surprise. They then constructed a portfolio with the groupings in which they went long in stock with positive earnings surprises and short on the ones with negative. This strategy resulted in a statistically significant excess return of 18%.

Additionally, as mentioned earlier, a key study led by Yale Professor Tobias J. Moskowitz provides a large inspiration and rationalization for this paper to follow up on. Moskowitz makes the claim that asset pricing anomalies are well suited for analysis in the sports betting market because they lack exposure to systemic risk and have terminal values uncorrelated

with betting activity. Moskowitz lays out the motivation for and rationale in depth in the paper but eventually decides to test for momentum, value, and size effects in sports betting markets because of their prevalence in the traditional finance industry. Ultimately, he concluded that sports contracts demonstrated momentum effects in their prices but that the transition costs in the form of the sportsbooks' cut or vigorish were too high to offer a profitable strategy.

Thus, this paper provides a solid starting point for this paper to build off in a few ways. The first main addition is that Moskowitz only examined Data up until 2013. Since then, the sports betting market in the United States had radically changed since the overturn of a law in 2018 that had previously outlawed sports gambling outside of Nevada. Since then, 31 states now have sports betting licenses with many offering an online option that streamlines the betting process onto a user's smartphone with the ability to place a bet whenever. This has resulted in increasing adoption of sports betting activity by the public as seen just from 2021 to 2022 as the number of people placing a bet increased from 20% to 25%. Furthermore, the total money wagered from 2018 to 2021 was \$127 billion which resulted in nearly \$8.9 billion in sportsbook revenue. Additionally, the major players in the U.S. market are now FanDuel and DraftKings who together hold two-thirds of the market. This then presents an entirely different scene from 2013 and thus ought to provide a worthwhile examination of how the sports betting markets may have changed. More maturity and funds would suggest a more efficient market as the potential for arbitrage should be even tougher with more participants and online technology. However, many of the new gamblers are average citizens looking for a chance to win some money while enhancing their enjoyment of the game. This is vastly different from the finance industry where nearly all trading activity stems from institutions. Thus, with the less smart money, the increased size of the market may demonstrate different pricing activity from the previous decade.

Secondly, whereas Moskowitz centered on the behavioral effects related to momentum, value, and size, I hope to do an in-depth analysis of surprise news reports. I believe that the hardest part of the paper will be how to define what constitutes a big enough injury that it would be comparable to something like an earnings surprise for a stock. I will need to flush this out to eliminate bias and strengthen the analysis of the experiment. I believe that this is possible, and I will now begin the process of looking at the best available sports games and betting data to perform this experiment. Once conducted, the next major step will be determining to what extent the results are useful for drawing connections to asset pricing theory in the financial markets. While I don't anticipate a strict correlation between the two markets, I do believe that the behavior witnessed in reaction to major injuries surrounding a sporting event can provide a meaningful cross-analysis for the anomaly that is Post-Earnings-Announcement-Drift.

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