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The Economics Behind the Legalization of Sports Gambling and Financial Market Relations

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by

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To adequately understand the sports betting market through an economic and financial lens, it is important to delve into its recent inception. Across many past civilizations, humans have always used different mediums to turn their money or items into more. Although this is not a foreign concept, it has recently picked up steam with the creation of professional sports leagues in the late nineteenth and early twentieth centuries. In our current society, sports betting is common, but it has not always been an accepted practice. For example, from 1931-2018, sports betting was only legal in the state of Nevada (Bonesteel). It was common practice for there to be some sort of sin tax to discourage engaging in gambling. In 1951, the federal government created the Revenue Act of 1951 which "imposed a debilitating 10% excise tax on the total amount wagered on sporting events" (Braig). The federal government did this to stop the spread of sports gambling outside the state of Nevada. This was also an act to control organized crime syndicates which gambled illegally. By 1983, the excise tax was reduced by the federal government to a mere .25%, (Bonesteel). As the desire for sports gambling slowly increased, the US Supreme court repealed the act prohibiting gambling, known as the Professional and Amateur Sports Protection Act in 2018 saying it was, "not consistent with the constitution" (Bonesteel) and declared that "states are free to establish their own sports gambling laws in the absence of a federally regulated system" (Bonesteel). Currently, there are thirty-eight states including Washington D.C where sports betting is legal (American Gaming Association). There are also three states where it is currently legal but not operational and seven states with legislation that has not been activated. This has all happened since the repeal of the Professional and Amateur Sports Protection Act and represents the magnitude of growth that has occurred in the sports gambling industry.

Within the industry, it is incredibly important to study the impact of economic factors and financial implications that drive this industry. The first economic factor that is necessary to understand the sports gambling market is incentives. Economic incentives encourage participants in the market to act in a certain way. They help us understand the market and explain how it changes. The people that make up this market are the bettors, referees/athletes, national organizations, sportsbooks, and governments.

The economic incentives for bettors are convenience, return on investment, betting unit size, and quality information. Convenience strongly incentivizes betting because most betting apps such as DraftKings or FanDuel accept bets 24/7. The most impactful incentive is return on investment because the hope of realizing a return explains continued betting. The next incentive for bettors is unit size. With higher unit sizes, bettors can obtain a higher profit; with lower unit sizes, bettors can avoid taxes on winnings and itemize winnings. Quality of information serves as an incentive because if the bettor has all the information, they will more likely bet using an informed decision. This starts to implicate an efficient market hypothesis.

Next, referees and athletes have an incentive to play fairly and call the game to the best of their ability. Professional major league baseball (MLB) player Pete Rose was caught betting on his team and other MLB players and was suspended from baseball for life. More recently, National Football League (NFL) player Calvin Ridley was suspended for a whole season due to gambling on the NFL and other professional sports. This shows that players are incentivized not to gamble on or fix their games because they will lose respect of the organizations who employ them, along with their sources of income. Tim Donaghy disgraced former NBA referee, "decided to bet the NBA… [he] decided to bet on [his] own games" (Eden). He ended up getting caught and banned from the league which shows that referees are incentivized to not prefer teams, call games fairly, and keep the playing field level.

Another important group in the market is national organizations related to sports gambling such as the NFL, Entertainment and Sports Programming Network (ESPN), or the National Council on Problem Gambling. To start, the incentives for major leagues such as the NFL, MLB, or National Basketball Association (NBA), are partnerships, revenues, and viewership. The importance of partnerships is a new emergence that has increased since the legalization of sports gambling. For example, on April 15, 2021, "the National Football League announced that DraftKings [would] become an Official Sports Betting Partner of the League" (DraftKings) in a one-billion-dollar deal. This deal represents the future for sports leagues and sportsbooks (where bets are placed), and it enables additional revenues for the leagues. Next, since viewership and revenues are directly correlated, the leagues are incentivized to increase viewership in order to increase their revenues. As a greater number of bettors participate, viewership will increase. ESPN and related corporations represent journalism companies that have an interest in sports, and sports betting. The incentives for companies such as ESPN are increased relationships, increased revenues, and new shows created. With the legalization of sports betting in 2018, it is important for companies like ESPN to adapt to the popularity in order to stay ahead of the curve. Because of this, ESPN was incentivized to create new segments that focused mainly on sports betting such as the *Scott Van Pelt Show*, *ESPN Bet Live* and *Daily Wager*. I infer that this new discussion of sports betting on ESPN has increased revenue streams for the company and incentivized the organization to use that revenue to make greater relationships with other organizations. Lastly, the incentives for the National Council on Problem Gambling (NCPG) are ensuring future safety of bettors, limiting sports betting, and conducting studies. Although the NCPG is primarily concerned with psychology and safety, it is important to note that economics is the study of choices and why they make those choices (University of Minnesota Libraries). With that being said, the NCPG has an incentive to help prevent sports gambling addiction. To accomplish this, they have an incentive to limit sports betting by studying past addicts and their choices.

Arguably, the second most important factor in the market is the actual sportsbooks themselves. The main incentives that keep the sportsbooks in the market are customer retention and high profit margins when creating bet lines. In order to secure a profit, the sportsbooks need repeat customers. They advertise and promote bets to attract customers. However, the sportsbooks also need to make sure they secure profits to keep the market running. They do this by creating lines that encourage the bets to be split evenly on both sides. To exemplify how a sportsbook gets profit, "The marginal dollar is commission, enabling the betting house to earn a profit" (Gray). To further acknowledge this, whenever a person bets ten dollars on a perfectly even spread, they only receive a nine-dollar profit rather than a ten-dollar profit.

The last character in this market is the federal and state governments. The government's incentive is to receive taxable income from gambling winnings and retain the bettors in the industry. To break it down, if the government can sportsbooks open and citizens bet on sports, they will continue to reap massive revenue from taxable income on winnings. To start, they use legislation to legalize it. After that, they can allow the sportsbooks to advertise to draw in more bettors.

Now that market participants and their incentives have been explained, it is important to analyze the prevailing economic advantages in the market. While in the past this market was mainly open to betting in Nevada or illegal betting in other states, the legalization opened the doors for new benefits to be studied. The first benefit of this legalization is that the bettor's money stays in America and can influence a new public market. When sports betting was illegal

in forty-nine states, many people bet illegally through offshore accounts, or locally through illegal bookies (Poindexter). One tactic is using a virtual private network (VPN) (Sportsmole UK) to bet in other countries. The problem is that, "while it is not technically illegal to use a VPN to access online products outside your jurisdictions (when gambling is legal at the point of origin), you still run afoul of several regulations. For a start, you will have broken the platform's terms of service – in several ways – including providing false information" (Sportsmole UK). Not only does this break the law prohibiting false identification; it also diverts money from the United States to produce revenues in other countries. This is parallel to alcohol prohibition in 1920s America. When something is banned, human nature sees it as more attractive. Also, just as Americans still found ways to get alcohol in the 1920s, Americans still found ways to gamble illegally. For example, the Foundation of Economic Education (FEE) states that "Americans bet an estimated $4.76 billion on Super Bowl 52 in February [2018], with only three percent of that fortune gambled legally. The other 97% is mostly wagered using international betting applications" (Hauf). This illustrates the magnitude of illegal wagering prior to 2018. Similarly, the UN has said "global illegal sports bets total up to 1.7 trillion each year" (Poindexter). It is nearly impossible to eliminate illegal sports betting, but legalizing some of it has created an economic benefit by keeping gambling winnings domestic. Also, with more revenue staying in the United States, important sectors that effect the US economy such as healthcare, infrastructure, and education can be improved at a higher rate.

The next benefit is the revenue that is produced for sportsbooks, bettors, and the government. In a chart that shows the total US Sports Betting Revenue and Handle by Legal Sports Report, since 2018, the total taxable revenue spanning active American sports betting markets is "$28 billion" (Ramsey). To compare, the total handle (wagered) of all American sportsbooks is "$332 billion" (Ramsey). These revenues have varied throughout the years but are very cyclical since betting numbers increase around the start of football season, March Madness, and the holidays (Alongi). Next, the total amount of money that has been taxed and given to the government since 2018 is "$5 billion" (Ramsey). As seen before, this explains why the government is so incentivized to keep American citizens stuck betting in the market. It is important to note how influential the five billion dollars in taxes are because without this market, those five billion additional tax dollars do not exist or help. If the government uses this tax money to increase expenditures, then it "stimulates spending, output, and employment" (Moudud). This serves as a catalyst for an economic chain because with increased output, there is increased productivity, and with increased employment, there is lower unemployment. However, according to Forbes, "When the economy is strong and unemployment is low, this growth can increase inflation as businesses raise wages to attract and retain workers (Tretina). The Phillips Curve believes that rising wages should lead to higher prices for products and services in an economy, ultimately pushing the overall inflation rate higher," (Picardo). Even though this is not ideal, unemployment and inflation are inversely related, and it will eventually even out due to the Federal Reserve. Lastly, the taxes recorded in 2019 were "$131 million" (Ramsey) and were roughly "$2.8 billion" (Ramsey), in 2023. This massive increase is largely due to more states legalizing gambling and shows how profitable and taxable this industry is for future years. Regarding revenue holding percentage, it is interesting that the average revenue holding percentage is 8.3% (Ramsey) when the market has been open for only six years. Right after the legalization in June 2018, sportsbooks had a revenue holding percentage of "2.9%" (Ramsey). This is an outlier. Since there are fewer sportsbooks now, everything is in smaller volumes, and it is more difficult to swing a profit. However, in May 2023, the revenue holding

percentage was “11.3%” (Ramsey) which is an effect of 35 states legalizing; it is also an effect of large betting states such as New York creating 2.6 billion dollars in revenue alone. As we progress further away from the fall of the Professional and Amateur Sports Protection Act, the sports betting market is growing exponentially in terms of revenues for books and bettors along with taxes that benefit the government.

The last benefit of the legalization of sports betting is that it boosts the economy definitively. To start, the legalization of sports betting has led to boosted employment and job creation. There are jobs at the books that specialize in odds making, data analytics, and risk making, along with marketing and management that did not previously exist. In fact, in 2017, Oxford Economics predicted that there would be “216,671 total jobs supported, both direct, indirect and induced” (Oxford Economics). This study was done using a Convenient Availability-Base Tax Rate Scenario and is based off the coming years. Similarly, Oxford Economics predicted that legalizing sports betting could “contribute 22.4 billion dollars to US gross domestic product” (Oxford Economics). Oxford Economics serves as a reliable source because they have contributed to many studies in different sectors that are “relied on by economists, financial managers and decision makers in private and public sectors” (Refinitiv). This growth in GDP can help America boost output, spending, employment, and income. GDP and employment are in a direct relationship and can serve as a positive feedback loop whereas one increases, so does the other.

Although sports betting undeniably boosts the economy, it can decrease economic output. Productivity within the workplace can also decrease. When a person bets on a sporting event and watches the game in its entirety or focuses on it from afar at the expense of the task at hand. This is especially prevalent when there is a large sum at stake. Whenever there are large events such as The Masters, March Madness, or the NBA Championship, it is entirely possible that a sports bettor will spend their time watching their bets during working hours. This can also be prevalent in school where a student will watch games they bet on during class because it is more entertaining than learning. It is hard to account for every lost hour of productivity due to sports betting; However, a specific event such as March Madness “will cost US employers up to $17.3 billion in lost productivity” (Briggs). While this is an estimate, the American Gaming Association stated “March Madness betting was up 50% [in 2023]” (Briggs). Betting on sports during work hours is likely to amount to decrease productivity in the workplace.

Another disadvantage that occurs at the legalization of sports betting is in increased risk for gambling addiction. This may not be a numerical economic issue, but it is an issue of behavioral economics. It is important to recognize how an addiction to sports gambling can impact gamblers’ future choices. The engagement in sports betting has escalated due to the normalization of it across America. For example, Pew Research states, “Overall, 56% of adults say they have read or heard a lot [about legal sports betting]” (Gramlich). This number indicates how prevalent it is today. It can also explain why revenues and GDP are increasing at an exponential rate. In today’s day and age, sports betting has never been easier because of app developments creating mobile sportsbooks. “Online gambling has drastically increased the accessibility of gambling and as a result, the potential frequency of gambling and risk to experience symptoms of problem gambling” (Valenciano-Mendoza). This shows why people have begun to overindulge in sports betting and do not know when to stop. In this technological era, sportsbooks and media companies use alluring advertising schemes to entrap people and increase their revenues. Mobile sportsbooks such as Draft Kings or FanDuel are open for use any time, any day, which gives rise to unlimited bets and options. Another popular type of sports bet

is the live bet, which is betting on games as they occur, and it can "increase the speed and frequency of gambling and exacerbate the risk of problematic behavior" (Kindbridge Behavioral Health). This type of betting is the most addictive because if money is lost during a game, people will try and make it back by live betting again. Ads that "promise risk free gambling" are constantly shown on television daily and attract new customers. Northeastern University states, "[close] to $300 million was spent last year on TV ads for sports gambling" (Thomsen) and "[ads] for sports betting have been more effective than the original cigarette campaigns" (Thomsen).

These types of advertisements reveal why some sports bettors make certain decisions economically. Some are so addicted that they are completely blinded by a chance at profit and will spend all their life savings. It is very interesting to think about the different ways that these advertisements are used to encourage sports gambling and how those affect choices. In some cases, sportsbooks such as FanDuel use a celebrity such as Drew Brees to launch a promotion. It can be inferred that people who like this celebrity will then bet at a higher rate based on the promotion. Another method some sportsbooks use is a risk-free bet where new customers bet $5 and get $200 in free bets. It is common that this lures new customers in because by the time the free bets are out, they are hooked and chasing a fix. Those most prone to sports gambling addiction are "a vulnerable group who are single, younger, and lower socioeconomic status" (Valenciano-Mendoza). This mainly arises because "[y]oung people, particularly those under the age of 25, still have underdeveloped brains that make them predisposed to addiction, particularly to gambling addiction" (Gunn). A survey by Pew Research Center indicates that racial and ethnic minorities may be more likely to engage in sports betting. Twenty-seven percent of Black adults and twenty-four percent of Hispanic adults said they have personally bet money on sports in the last twelve months, compared to 18% of White adults. Although it is not inherently clear cut, betting groups that engage more in sports betting are more likely to possess an addiction. Another demographic of interest that is prevalent is males. Keith Whyte, executive director of the National Council on Problem Gambling stated, "We believe that the risks for gambling addiction have grown 30 percent from 2018 to 2021, with the risk concentrated among young males 18 to 24 who are sports bettors" (Gunn). If the trends that have occurred in the last six years continue, it is likely that these rates will keep rising. According to Mayo Clinic, compulsive sports gambling can result in "[r]elationship problems, financial problems including bankruptcy, legal problems or imprisonment, poor work performance or job loss, and poor general health". This suggests that in relation to the economy, spending may go down, unemployment may increase, productivity may decrease, and consumption may decrease.

When looking at the inner workings of the sports betting market, it is necessary to analyze if it is an efficient market. In general terms, a market can be classified as efficient if the prices in the market accurately reflect the available information about the values that impact the market. In an efficient market, it is also impossible to outperform the market on a consistent basis. In simple terms, for a sports betting market, it represents paying a fair price to collect a profit with the same information that everyone else in the market has. My contention is that the sports betting market is an efficient market. This is because the linemakers create fairly priced lines that reflect all the available information in the market and the bettors are allowed to do what they will with that information whether it be a profit or a loss. To understand where this starts, it is essential to learn how lines are formed and how line shifting works. The sports book will have a linemaker that is very skilled in data analytics, create a line that will encourage half of the bettors to bet on one side, and the other half to bet on the latter. This is essentially how

they can either guarantee their profits or mitigate their losses. After the creation of the line, if too much volume is on one side, the line maker will then move the line in a favorable direction to the other side to get the volume to fifty percent on each side. To put numbers to this, if a line maker sets an opening line of Kansas City Chiefs (-1.5) vs San Franciso 49ers (+1.5) and 1100 dollars is bet on the Chiefs, this is negative for the book because all the money is on one side (The Data Jocks). If the line maker noticed this trend early on and shifted the line to achieve $550 on both teams, it would result in, "$1100-$1050 of profit for the book because they moved the lines," (The Data Jocks). This explains that sports betting markets are efficient because the adjustment of lines reflect the collective knowledge of the market participants, and it cannot be exploited and outperformed since it is adjusted in a timely manner based on game information and market volume. This also describes the imperative to set the line correctly at the start because otherwise, the sports book will lose money due to inefficiency, meaning the prices did not accurately reflect their true value. A sports betting market is also efficient due to the unrestricted access to information. Unless there is a corrupt scheme, every bettor has the same public knowledge about a game before placing a bet. This aspect of the market is impossible to beat unless a participant has insider information about which players might be sick or injured before other participants. The fact that participants can take a communal group of information and form different opinions and methodologies to create bets also points to an efficient market. To provide some backbone to this argument, The Data Jocks, a sports analytics organization dedicated to using mathematical foundations to reach conclusions in sports, state, "Even though each individual sports bettor has their own methodologies and biases and may not be making very smart bets, the closing Vegas line is an ensemble of all the individual predictions of the individual bettors". The beauty is that the market self-corrects for inefficiency such as bias or exploitation, due to the nature of line shifting, quick market response time, and its collection of individual ideas. Similarly, Reading University in England conducted a study on the English Premier League looking for inefficiencies and biases concluding, "At the overall market level, we found no statistically significant evidence which could reject an efficient market hypothesis for the online betting market for English football match results. The odds offered by bookmakers were generally not biased towards any particular result outcome" (Elaad). The last condition that it satisfies within the efficient market hypothesis is related to outperformance of the market. If one is to consistently outperform the sports betting market, they must beat the average over a long period of time. In the terms of sports betting, the breakeven point in a sports bettor's career is equal to 52.4% on spread bets (-110). This is because the sportsbooks have the house edge known as vig, which is the cut that the sports book gets for receiving a bet; it is also known as the marginal dollar that is a commission for the sportsbook. Although it is hard to put an exact number on the number of bettors that can achieve above 52.4% in the long run, it can be estimated that two to three percent are capable of achieving this. This is simply due to the fact that the market is efficiently priced and linemakers have the edge in information when setting the lines. Also, sports naturally possess a degree of unpredictably and humans' innate biases lead to certain economic decisions. Thus, there is strong evidence that the sports betting market is efficient because it cannot be exploited, price lines accurately reflecting value, and information is collectively available.

However, even though there is ample evidence of an efficient market, in specific situations the market could be considered inefficient. This can occur due to a breach in the information available to the market, or when a plethora of participants that can outperform the market. Statistical significance is necessary to prove a correlation in situational consistency. The

first item that could contribute to an inefficient market is cognitive bias. In its most basic form, cognitive bias is an error in the line of thinking when information is processed and interpreted. Some proponents of this type of inefficiency will argue that although all the information is widely available and the prices accurately reflect true values, a number of bettors will not think logically and bet on their favorite teams or big payout bets. However, Reading University shows "that on occasion the markets did display significant bias and inefficiency, for example the Premier League in 2010, but these examples occur no more frequently than natural randomness and variation in match outcomes would imply" (Elaad). This is further supported by an in-depth study over market efficiency in the NFL gambling market that displayed that, "[d]ocument spreads set in the NFL betting market are systematically biased predictors of actual results. Findings such as this are sometimes offered as evidence of inefficiency in the sports betting market although it is not always clear that this bias can be exploited via a profitable trading strategy" (Gray). While it is true that inefficiencies can occur because of cognitive biases, these studies suggest that they are no more than random occurrences that cannot be used consistently to outperform the market. Another inefficiency that can exist is corruption. This can arise from information asymmetry where the betting party may illegally wield more information to "outperform" the market, resulting in corruption. Some contend that the potential for information asymmetry and corruption exist, but the inefficiency can be found and terminated. For example, "leagues acknowledge that legal betting markets make it easier for regulators to uncover suspicious betting behavior that could suggest corruption" (Valenciano-Mendoza). However, others say that "all economic analyses conclude that the more money there inflowing to sport, the greater the sport corruption" (Eden). I think this can be true in many sectors of life, but I cannot say with certainty that it is true in the sports betting world.

Recently, Los Angeles Dodgers baseball player Shohei Ohtani had the public eye on him as his translator was accused of gambling $4.5 million dollars of Ohtani's money and it was not clear whether Ohtani was involved. With the MLB amassing "10.9 billion" (Badenhausen) dollars in revenue (tied for second out of all major pro sports leagues), it seems that the corruption was uncovered rather swiftly and that this type of inefficiency cannot thrive in the market. As the sports betting market grows exponentially and the professional sports leagues are more familiar with gambling, that the leagues are advocating for increased fines and suspensions for corruption and spending more money to obtain an educated perspective on the matter. Thus, corruption is an inefficiency that does not affect the market in the long run. Throughout the course of the market, many have tried to exploit it through different betting strategies in order to outperform the market. Although this inefficiency is incredibly rare and difficult to achieve, that does not mean that it cannot happen. However, the percentage of bettors capable of doing this is not enough to affect the collective market. In a specific example, *Sports Journal* administered a study to uncover the effects of different NBA betting strategies in the early 2000's. The study proved that "gambling markets for both point spread betting and totals betting for NBA seasons spanning from 2000–01 to 2007–08 are efficient" (Compton). Also, the "results for point spread betting also showed strong support for an efficient market in NBA gambling, with one exception: betting the home underdog was profitable for underdogs of 10 points or more. However, this was only true for a very small sub-sample and the inefficiency fades in the most recent sample period" (Compton). Studies like these suggest that inefficiencies exist in the sports betting market, like any other market, but over time they always fade, suggesting that it is an efficient market overall.

An interesting subject of economics that must be studied is the equilibrium that is present in every market. For efficient markets in general, due to the nature of economics and the way the world works, when inefficiencies happen, the market will reverse to equilibrium eventually. Whenever the sports betting market is plagued with inefficiencies as stated above, certain actions and events draw the market toward equilibrium/efficiency. To start, cognitive biases cause the market to shift out of equilibrium because the true value of the lines/the outcome of the game do not matter to a biased bettor. This occurrence could induce the sportsbooks to overestimate the odds of a certain game because popular fan bases will have a higher market share due to their cognitive bias over inflating the side of their favorite team (The Data Jocks). Even though this occurs, it is also equally possible that well informed bettors use all the available information to bet against teams with large market share and shift the market back toward equilibrium (The Data Jocks). While some overinflation can occur with blind biases, another example of overinflation can occur when bettors invest in the teams that are outperforming their expectations. In fact, Tobias Moskowitz, renowned American economist, and Professor at Yale suggests, "Sports betting contracts exhibit strong momentum effects. If you look at teams that have done well recently, bettors overprice those teams" (Allen). Linemakers at the sportsbooks must understand this on a deep level. To account for this, the well informed linemakers shift the lines in order to bring the market to equilibrium. The creation and movement of the lines is a necessity to bring the market back to equilibrium and efficiency. To start, when a linemaker sets an inaccurate opening line, it causes a poor reflection of the line's true value, and it then follows that bettors will place all their money on that side. The event that serves as a catalyst for equilibrium is when the linemaker shifts the line in the correct direction to accurately reflect the true value, and the money follows to equilibrium. This cycle will continue day in and day out. Like any other competitive efficient market, the sports betting market fluctuates through efficiency and inefficiency, but I contend that it is more likely to remain in efficiency equilibrium.

After noting the large scale of the economic effects of the sports betting market and the economic factors that fuel the market, it is equally important to analyze the sports betting market from a financial lens. Fascinatingly, sports betting resembles the stock market, over the counter markets, and derivative markets. From a basic perspective, the stock and sports betting markets are very popular and involve high risk and a use of capital for a chance at profit. The first similarity the markets share is its propensity toward efficiency and market dynamics. Burton G. Malkiel, famous American Economist who graduated from Harvard and Princeton offers, that "the Efficient Market Hypothesis (EMH) has been an article of faith for most financial economists and is even accepted in part by many market practitioners" (Malkiel). The stock market seems to correct inefficiencies at incredibly high speeds and revert to equilibrium. "The stock market is remarkably efficient in adjusting to, and reflecting in a rational way, all relevant information concerning individual stocks and the economy as a whole" (Malkiel). Due to this fast correction in both markets, it is inherently difficult, arguably impossible, to outperform the whole market.

The next similarity lies in the fact that both sports betting market and the stock market have increased in technology dramatically. At the beginning of the sports betting market in 2018, or even in Nevada in the 1950s, bettors placed bets in person at sportsbooks. Similarly, bettors in the stock market used to call places such as Merrill Lynch or Vanguard and meet with a broker to place their stock bets. Today, "[t]hanks to tons of online betting sites, you no longer need to visit the bookmaker to place your bets" (Robillard). The stock market has many investing apps such

as Robinhood or Vanguard that make it easy, at the investors' fingertips. As mentioned earlier, this can make the stock market addictive. The bettors' and investors use of quality information and their ability to adapt and analyze data sets serves as another striking similarity. Likewise, both markets discourage insider trading/information to ensure the bettors and investors have all the available information to make informed decisions. While sports bettors spend their time examining all available information regarding past player and team performance, investors look at industry averages, financial statements, and stock trends to arrive at: an informed decision.

Although the stock market and sports betting share more important similarities than differences, it is necessary to note some of the differences. The first difference relies on diversifying portfolios to lower the risk. Conventional wisdom holds that investors should "diversify their portfolios to increase the chance of owning an asset that skyrockets, while avoiding total disaster if a company goes Enron" (Holzhauer). While this can include investing in either index funds or different industries in the stock market, it would require sports bettors to bet on many different spreads. Due to the commission taken by sportsbooks, this would likely cause the bettor to lose money in the long run. It is smart for bettors to narrow their scope by betting on the types of bets and sports about which they are the most knowledgeable. "Successful sports betting is about picking your spots and being extremely willing to pass on any prop where you don't see a clear edge" (Holzhauer). Another important difference is the investor/bettor's ability to get out of the "contract". "Bettors cannot exit the wager once it has been placed. But, in the financial market, you can get out of a loss-making trade anytime" (Robillard). There are times in the sports betting market where you can cash out on certain if the bet is looking good so you can cut your winnings but secure a guaranteed profit. However, this is rather uncommon and if the bet does not look good there is no way to get the money back. The stock market is more friendly by allowing you to buy or sell a stock as long as the market is open.

Another interesting set of differences laid out by Professor Tobias Moskowitz is that "sports betting behavior for any given game or on any given weekend is not affected by macroeconomic factors. (Of course, the sports betting market as a whole responds to the overall economy—fewer people will be willing to gamble during a recession—but at a more granular level, "what's going on with the Fed or oil prices has nothing to do with whether the Packers-49ers game is priced differently than the Buccaneers-Rams game," Moskowitz says.) Third, in sports betting markets, there is empirical evidence for whether prices are correct or not: the outcome of the game. "It's a very clean laboratory" (Allen). It goes without saying that macroeconomic factors affect the stock market depending on the type of stock every single day. This then influences what investors decide to bet on. It is also interesting to analyze the difference between outcomes in games compared to the line that was set, as it shows if the prices are efficient and accurately reflect the value. If a line is set perfectly with even money on both sides, and the outcome was close, then it is efficiently designed.

Another type of financial market that can draw similarities to the sports betting market is what is known as an Over-the-counter market (OTC). This includes "decentralized platforms or networks without the supervision of an exchange. In these markets, stocks, bonds, commodities, and other financial assets are bought and sold directly between buyers and sellers" (N26). A recent occurrence in the sports betting industry has allowed bettors to place bets, and then sell those bets to other bettors, exactly like an OTC. It is not a feature on some sportsbooks such as DraftKings, but it is a feature on local sportsbook Saracen and apps such as WagerWire and Sporttrade. It can serve to make more money based on the value of the bet at the time of the sale. At the same time, it is of higher risk than a regular bet on a sports book because not only is there

no recourse, but if purchased at the wrong time, tremendous losses can accrue. However, OTCs are different in that they are not supervised while bet swaps are monitored by the book or app in which the trade takes place. Also, there is an element of transparency to the swapping of bets on books and apps because the bettor knows exactly what they are getting.

The last financial market that is in comparison to the sports betting market is the derivatives market. The CFA contends that a derivative is "a financial instrument that derives its performance from the performance of an underlying asset. The underlying asset, called the underlying, trades in the cash or spot markets and its price is called the cash or spot price. Derivatives consist of two general classes: forward commitments and contingent claims" (*CFA Institute*). These markets essentially deal with the trading of futures and options. The idea behind trading futures in a derivative market can be acquiring a price now for something in the future so it is not subject to future changes in market conditions. In the sports betting world, a futures bet is akin to derivatives. For example, the Superbowl will occur in February of 2025. If a bettor was to place a bet this June on the Dallas Cowboys for example, this would be futures bet. This is because when the bet is placed, the odds at the time of the bet are locked in for a future event and they are not subject to changing odds in the future. For example, if Dallas has an outstanding season, their odds of winning the Superbowl will increase and the bet would yield in less money, but since the future bet was locked in, those odds do not matter. Another type of derivative known as options trading is betting that a stock price will either fall or rise in the stock market. Options trading in the sports betting market contains bets on team or player performance increasing or decreasing; betting on a line change is prohibited. Like options trading, when a sports bettor bets on improved performance such as winning the next three games of the season, it is equivalent to purchasing a call that a stock will appreciate. On the contrary, when betting that a team will lose the next three games, it is equivalent to a put, that a stock will depreciate in value. The main difference in options and sports betting however, is that options have an expiration date, and as the option approaches that date, the investor has the opportunity to sell that option at an increased value. With sports betting, there is not an exact equivalent that involves an expiration date, but they can sell their bet early depending on the success and timing of the bet.

The next aspect of financial markets that has an acute relationship with sports betting markets is the types of betting strategies and ways humans approach risk. Firstly, it is important to understand the types of risk that affect the stock market and the sports betting market. The first type of risk is systematic risk, which "cannot be reduced by diversification within the stock market. Sources of systematic risk include inflation, interest rates, war, recessions, currency changes, market crashes and downturns plus recessions" (*Institute of Business & Finance).* Systematic risk arises in part due to macroeconomics and affects the stock market due to its unpredictable nature. In contrast, the sports betting market has a "unique feature of no systematic risk" (Moskowitz). This is largely because sports teams and sportsbooks are not subject to changes in macroeconomics. The bets will remain the same.

The other type of risk that is present within the stock market along with the sports betting market is known as unsystematic risk. This is known as company-specific risk and "represents risks of a specific corporation, such as management, sales, market share, product recalls, labor disputes, and name recognition" (*Institute of Business & Finance*). Unsystematic risk can take many different forms in the sports betting market such as team scandals, unexpected injuries, and changes in league rules. These unexpected events cause risk for certain teams and leagues and can therefore cause differences in betting activity.

With the risks described previously, each person who invests in the stock market or bets in the sports betting market will have a reaction to risk. In essence, there are three risk profiles for investors/bettors: risk averse, risk neutral, and risk-seeking. In terms of the risk averse profile, *Yahoo Finance* defines it as a strategy "where you emphasize preventing loss over making gains" and this means "avoiding high-volatility, high-uncertainty products in favor of income-based assets and well-diversified portfolios" (Reed). Risk averse investors/bettors must adjust to lower returns because since risk and profit are directly correlated, lower risk stocks will result in smaller returns. Also, increases in uncertainty in the market will cause the equilibrium of investments in the market to go down. Risk averse sports bettors will generally bet on heavy favorites and get lower returns because the outcome they bet on is more likely to occur. For example, if a bet promises a return of five dollars and it is likely to occur, a risk averse bettor will pick that over a bet that promises a fifteen-dollar return for something that is unlikely to occur.

A risk neutral bettor is relatively indifferent to risk and is not included in their decision to invest/bet. The effect of this is that risk neutrality, "implies the absence of costly information from asset price in competitive markets" (Muendler). This is because a risk-neutral bettor investor is indifferent to a perceived risky asset vs a safe asset and expects the same return in the market, so the ability to obtain information does not matter to them. In the sports betting market, an example of this would be betting on a team that you believe has better odds than the linemaker set, but the bettor is indifferent to the line set even though it is more likely to be correct due to information asymmetry.

The last profile, risk-seeking, is the opposite of risk aversion. Risk-seeking is defined as "one's acceptance of greater risk, in finance often related to price volatility and uncertainty in investments or trading, in exchange for the potential for higher returns" (Hayes). In other words, they have a higher tolerance for risk as the potential for losses does not bother them as much as other profiles. To relate it to the sports betting market, it is most useful to illustrate the situation in which one team is the best in the world, of Olympic caliber, and the other is a high school team. It is inherently obvious that the best team in the world would win, but a risk-seeking bettor would bet on the high school team because it promises tremendous returns and has high levels of risk.

After risk profiles formation, behavioral finance indicates that there are other behaviors on top of these profiles that exist and explain why certain investments or bets are made. The first theory that can explain certain sports bets is known as the gambler's fallacy. The gambler's fallacy is the "mistaken belief that past events can influence future events that are entirely independent of them in reality" (*The Gambler's Fallacy*). A prime example is if a coin landed on tails three times in a row, then it must be heads next time, even though each coin toss is independent of the other. This is a common occurrence in sports betting and explains why someone might bet on a team regardless of where the lines are. For example, if the St. Louis Blues have lost to the Minnesota Wild three times in a row, some will bet on the St. Louis Blues because they are "due" and expect the Wild to win less in the future. The effect of the gambler's fallacy is bettors taking two independent events and relating them, thus causing a change in betting strategy. Another bias that relates to risk-seeking is overconfidence bias. This bias is common within the stock market and the sports betting market. Overconfidence bias occurs when investors and bettors overestimate their knowledge and make the wrong decisions in the market. The effects of this bias are "excessive trading, under-diversification, and taking excessive risks" (Hayes). It can also lead to higher losses than an investor is used to because they

ignore indications from the markets and lines. For example, there are some sports bettors out there who think they are simply smarter and better than others for a plethora of reasons. This can then them to place more bets than usual, and due to their overconfident nature, a massive decrease in profits. Every human is equipped with hubris and it eventually takes a toll in all aspects of life, like stated before.

The next theory also coincides with a risk-seeking profile and is known as the house money effect. The house money effect states that, "risk-taking behavior is influenced by prior monetary gains and losses. When endowed with house money, people become more risk taking" (Ackert). This plays out in investment or gambling because bettors believe since they have already profited, it does not matter if they lose that stake of the money because it is technically an unrealized gain until they cashout. To further support this, EconStor, a publication server for scholarly economic literature, conducted a study in a financial setting concluding, "experimental results provide strong support for a house money effect. Traders' bids and price predictions are influenced by the amount of money they are provided with prior to trading. Market prices are consistent with a house money effect in all treatments" (Ackert). If a bettor hit a bet that gave them a profit of $200, and subsequently bet that $200 and lost it, they would not feel that they lost anything because it is house money. This also explains how they start to gamble at higher risks and costs.

The last two theories that are arguably the most important in behavioral finance are loss aversion and the prospect theory. These two theories are very interrelated and explain most investors and bettors in this day and age. Loss aversion is "the tendency to avoid losses overachieving significant gains. Broadly speaking, people feel pain from losses much more acutely than they feel pleasure from gains of the same size" (Schwab). The prospect theory, coined by psychologists Daniel Kahneman and Amos Tversky in 1979 studies "How people choose between different options (or prospects) and how they estimate (many times in a biased or incorrect way) the *perceived* likelihood of each of these options" (Harley). Essentially, how do people react to uncertainty during risk? Well, imagine someone offered you $900 or a 90% chance at winning $1000. Most people would take the $900 because it is guaranteed as opposed to only a 90% chance at $1,000. However, if someone offered you the choice between losing $900 or taking a 90% chance at losing $1,000, most people would choose the latter (Harley). Psychologists discovered "people derive utility from gains and losses in wealth, rather than from the absolute level of wealth. Utility functions are concave in the domain of gains (implying risk aversion) and convex in the domain of losses (implying risk seeking)" (Ackert). Thus, investors and bettors are more likely to secure profits, and more likely to take risks when it comes to losses. This shows that individual investors and sports bettors risk profiles may vary according to circumstance. A bettor may be more risk averse in winnings and risk seeking in their losses, or they might be risk averse in both wins and losses.

Another concept worth considering is how a specific stock component and its movement relates to a specific sports line component and its movements. The stock I analyze is Walmart (WMT) and the line I analyze is from (1) University of Connecticut vs (9) Northwestern on 3/24/24. The first component is an opening and closing line. For example, Walmart opened at $60.87 and by the end of the day it closed at $60.51. This could be due to a variety of factors, mainly that the economy is in a bear market or because people sold the stock to get profits, thus decreasing volume. Likewise, sports games have opening and closing lines which indicate volume and money. For example, Connecticut opened as -12.5 favorites and closed as -14 favorites. This line shifted greatly because too much money was on Connecticut at the start.

Consequently, the bookmakers shifted the line to make Connecticut look less appealing in order to shift the money to Northwestern's side, i.e. pursuing equilibrium.

The next component is volume. The volume, or number of transactions/trades of Walmart's stock on March 27th was 14,342,064. The volume for the sports betting market represents the total amount of bets placed on one side net of money. According to the CBS Sports App, 48% of public bets were on Connecticut. This number represents the volume, and this number is likely below 50% due to negative line movement.

Market capitalization is another important financial concept that both markets share. In terms of Walmart, it is the total dollar amount related to its outstanding shares of stock and it is roughly $489 billion. This higher market cap looks more appealing to investors and may explain why more investors choose to invest in Walmart. Similarly, Connecticut athletics is worth "more than $225 million" (UConn Athletics). Higher value teams allow for higher contracts with name image likeness (NIL) which leads to better players. Thus, more people bet on Connecticut to win due to a higher value, along with their performance throughout the year.

The last commonality between stocks and betting lines is a term known as beta. Beta measures the systematic risk of the stock compared to the market. Walmart's beta is .5, indicating that it is half as risky as other stocks in the market. Although sports betting lines do not have a beta indicating market risk, as the odds for both teams get closer, the bet is riskier because it is equally likely that either team could win. If one team was heavily favored, the bet is considered less risky, i.e. lower beta because there is an obvious winner.

In conclusion, it is ever so important to understand, analyze, and accept the sports betting market because it is an exponentially growing industry that will soon be a staple in American recreation. Yahoo Finance projects "the sports betting market is expected to grow by USD 143.73 billion from 2023-2027, market growth at 10.09% CAGR expected during the forecast period". The sports betting market can create a huge economic benefit for America through massive increases in employment, taxable revenues, sportsbook revenues, GDP, and domestic dollars for years to come. However, it can also behave in a manner that contributes to unacceptable economic practices such as lost productivity and sports gambling addiction. In some schools of thought, the market can be seen as inefficient due to possibilities of corruption, insider information, and cognitive bias. However, there is evidence to suggest that these problems are minor abnormalities and not consistent with the market overall. Academic literature suggests an efficient sports betting market because prices of the lines are accurately reflected in the value of the lines, all information is available, and it is anti-exploitative. The market also rests in equilibrium with regard to prices and true values. Economic factors help produce outward results, while financial factors resemble the inner workings of the market. The sports betting market shares similarities with the stock market in that both use risk and capital to make profits, similar to OTCs allowing for direct exchange between buyers and the sellers, and the derivatives market's use of futures contracts to secure profits. Likewise, analyzing risk strategies and behavioral finance theories explains the psychology of investors and bettors. Lastly single stocks are similar to single game betting lines. As the sports betting market grows, economic and financial professionals have the opportunity to use their respective industry knowledge to understand the sports betting industry better.

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