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AN ECONOMIC ANALYSIS OF U.S. SPORTS BETTING MARKETS: IMPLICATIONS OF STATE REGULATION

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Abstract
In May 2018, the Supreme Court declared the Professional and Amateur Sports Protection Act (PASPA) unconstitutional for violating the Tenth Amendment. For the first time in nearly thirty years, state legislatures have the opportunity to legalize and regulate sports betting. What are the likely effects of regulatory interventions on this emergent market? Using regulatory theory from Stigler (1971) and Tullock (1975) as an analytical lens, this paper applies microeconomic theory to uncover the effects of increased regulation on pricing, entrepreneurship, and consumer welfare. Anticompetitive regulatory interventions threaten to undermine the sports betting market and reduce consumer welfare.

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I. Introduction

In May 2018, the Supreme Court ruled that the Professional and Amateur Sports Protection Act (PASPA) was unconstitutional for violating the Tenth Amendment. For the first time in nearly thirty years, the power to legalize and regulate sports betting was returned to the states. This newfound power presents both opportunities and challenges to state legislatures. As evidenced by the millions of consumers that place bets in Las Vegas and the overseas and underground markets, the legalization of sports betting promises immense welfare gains for consumers. Simultaneously, there exists political demand for a regulatory framework to govern this emergent market.

The public interest theory of regulation remains the standard approach to regulation by policy makers. This theory assumes that regulators can and should intervene in cases of market failure to make actors better off. Within the sports betting market, such failures include information asymmetries and the potential for negative externalities. In particular, policy makers are concerned about new, naïve, and addicted sports bettors. Public interest interventions have been, and will continue to be, the main regulatory approach towards this market.

What are the likely implications of public-interest regulatory interventions on the emergent sports betting market? In order to implement effective regulatory policy, legislatures must understand the economic dynamics of this market. Accordingly, policy makers must contend with the costs associated with the public interest approach to regulation. Implementing an anticompetitive regulatory framework would impose costs on the market process, reduce consumer welfare, and limit the effectiveness of the state.

A review of economic theory and literature uncovers the likely effects such interventions would have on the market process and consumers. First, Stigler (1971) and Tullock's (1975) contributions to regulatory theory provide an understanding of the political dynamics of anticompetitive regulation. Because states are regulating this market from the ground up—that is, states begin with legalization—Stigler and Tullock's theoretical frameworks reveal that policy makers are susceptible to imposing long-term costs on the market.

Second, applying microeconomic theory in an analysis of the sports betting market uncovers the likely consequences of public interest regulation on the dynamic market process. The costs associated with regulatory interventions have serious implications for the long-term competitiveness and dynamism of the betting market and consumer welfare.

This paper is organized in the following way. Section II reviews relevant theories of market regulation. Section III documents the history of sports betting markets in the United States, including its regulatory treatment by government. Section IV analyzes the effects of regulatory interventions on pricing, entrepreneurship, and market dynamism. Section V considers various policy implications outside of the theoretical market process. Section VI offers concluding remarks.

II. Regulatory Theory and Sports Betting Markets

A. Regulation as a Response to Market Failure

The legalization of sports betting markets at the state level is an economically and politically complex endeavor. The standard approach to regulation remains the public interest theory of regulation, as established by Pigou. This theory assumes that there are failures associated with the use of the market, including, among other things, monopolies and negative externalities (Schleifer 2005). Therefore, the theory argues, the state can and should correct these market failures with regulatory interventions to make actors better off.

The public interest theory of regulation has been used by governments throughout the history of the sports betting market. In general, application of this theory was justified by perceived information failures. These failures included information asymmetries between the bookmaker and consumer—i.e., the bookmaker had more information about the value of particular bets and could use it to exploit consumers—and myopia on the part of the consumers—i.e., gambling was inherently a vice and trapped consumers in a cycle of addiction. These perceived failures are especially costly for new and naïve gamblers, given their relative ignorance of the market, and gambling addicts, given their relatively inelastic demand.

As a response to these market failure concerns, sports betting was federally banned in the United States from 1992 until 2018. However, existing evidence does not support calls for a continued total ban on the activity. While it was previously estimated that 10 percent of the American public was a compulsive gambler, Davies and Abram (2001, 165) argued that the figure is much closer to 2 percent of the adult population. This contention is reinforced by findings from the National Collegiate Athletic Association (NCAA 2017) and Humphreys (2017). In a survey of NCAA athletes' sports betting habits, the NCAA report found that under 2 percent of the men surveyed met the criteria for problematic gambling behavior. Additionally, Humphreys (2017) argued that problematic gambling in the U.S. is estimated to be exhibited by roughly 0.9 percent of gamblers each year.

Despite reluctance to ban the market entirely, the public interest theory of regulation remains relevant to legalization efforts today. Policy makers and constituents still demand regulatory frameworks that best limit costs on consumers. Thus, policy makers are eager to rely on tools from their regulatory toolbox to achieve these ends. Montana Governor Steve Bullock championed the benefits of regulatory interventions after Montana became the ninth state to legalize sports betting, noting, "…the state will have the ability to control, monitor, and protect sports wagering products and players through security and integrity protocols, policies around responsible gaming, and policies to ensure that sports wagering is competitive, transparent, and reliable" (Candee 2019). Thus far, many state legislatures have approached legalization efforts in a similar way, relying on regulatory tools to tailor the market process.

The regulatory tools used by states may be broad. For instance, policy makers may grant the state government monopoly power to run sports betting operations to eliminate the incentive for profit, thereby also eliminating the incentive for bookmakers to exploit information asymmetries in interactions with consumers. Further, state monopoly privileges would provide the government greater control over individual betting behavior, increasing protection for the most vulnerable consumers. Montana Governor Steve Bullock justified his state's monopoly power by arguing that the private market would favor market actors with the most resources available to advertise and promote their products (Ibid.). Therefore, a state monopoly would maintain complete control over the proliferation of the market.

Conversely, policy makers might allow for private ownership of sports betting enterprises but impose strict quotas on market growth. Such a system would maintain regulatory oversight and control of the market while harnessing some benefits of the emergent market process. This regulatory framework is evidenced in West Virginia (S.B. 415), which established a state-run monopoly that disseminates no more than five licenses for bookmaking operations.

States could also impose licensing requirements to ensure that sports betting personnel are qualified for their positions and are properly trained in consumer protection. Furthermore, states could ban those operators and entities which had previously operated in the underground market from obtaining licenses so as to keep "bad actors" from the new, legal market. These types of regulatory interventions are again evidenced in the West Virginia law, which imposes strict occupational licensing requirements, including restrictions on licensing eligibility for previously underground operators.

Finally, the regulatory interventions may be tailored. For instance, states could regulate the wagering opportunities and services offered by bookmakers so as to maintain control over the proliferation of potentially unsafe products for consumers. This intervention would, in theory, increase consumer welfare by keeping prices low and ensuring that betting products are verified as safe. This is the case in Mississippi (H.B. 967), where all sports wagering systems must first be approved by the executive director of the state's gambling commission.

B. Regulation as a Benefit to Established Firms

As evidenced, the public interest theory of regulation has been, and will continue to be, the first regulatory framework considered by state policy makers. However, this traditional approach can contribute to the implementation of an anticompetitive legal framework that undermines the market process[1] and harms consumers.[2] In particular, two alternative theories of regulation uncover significant costs associated with the public interest theory.

First, contrary to public perception, regulation brings extensive benefits to established and privileged firms. Economist George Stigler's (1971) theory of regulatory capture argued that regulation does not exist simply to correct market failures. Through regulatory intervention, the government also produces goods – subsidies, barriers to entry, impacts on substitutes and complements, and price-fixing – that offer benefits to industries and firms. With high barriers to entry and relaxed constraints on behavior through anticompetitive policies, bookmaking firms

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[1] The market process is explained in detail in Section III. This paper argues that the market process reduces many of the costs associated with market failures and produces outcomes that increase consumer welfare.

[2] Consumer welfare can mean different things to different people. This analysis considers the consumer to be a rational agent operating in the sports betting market; exchanges are assumed to be mutually beneficial. Therefore, lower prices and increased access to and quality of goods and services makes consumers better off.

can use regulatory interventions to protect their profits while undermining the market process and imposing costs on consumers.

Stigler argued that through government regulation emerges a competitive process to secure these goods. Therefore, the possibility of regulatory goods can incentivize industries and firms to seek regulation for their own benefit. Public interest interventions such as quotas, licenses, subsidies, and price controls might protect consumers on some margins. However, they also impose substantial costs. Policies that inadvertently protect current and otherwise privileged firms undermine the economic dynamics that are important to a functioning betting market. For example, high barriers to entry limit the extent of the market. The limitation on the market not only means less choice for consumers and less competition among bookmakers. It also implies restricted information aggregation, contributing to inefficient pricing. Both outcomes would make consumers worse off.

There exists substantial evidence for Stigler's theory within the economics literature. A 1996 Government Accountability Office report found that federal rules continued to act as barriers to market entry in the airline industry even after periods of deregulation (GAO 1996). In particular, the report found that established airlines were able to avoid compliance with certain federal rules due to their already entrenched or privileged locations and status. Additionally, there is evidence that established taxi cab and hotel industries used regulatory frameworks to disadvantage sharing economy platforms such as Uber and Airbnb (Koopman, Mitchell, and Thierer 2015).

Stigler's analysis has problematic implications for the future of the sports betting market. Because the legalized market is both so new and politically contested, there exists numerous opportunities for established firms to advocate for strict regulation of the industry in conjunction with benevolent policy makers subscribing to the public interest theory of regulation. Established bookmaking operations have the resources and incentive to advocate for competitive burdens in the name of consumer safety. A recent *Chicago Tribune* article highlights this emergent competitive process with respect to legalization proposals in the Illinois legislature, writing, "…casinos, horse tracks, and video gambling terminal operators already are lining up for a piece of the action – and hiring well-connected lobbyists to make their cases to lawmakers. Professional sports leagues and players unions also have a stake" (Petrella 2019).

Stigler's theory of regulatory capture is also evidenced in the early states to enact legalization frameworks. West Virginia limits in-person wagering to established racetracks and at *one* historic hotel in the state. Further, all online or mobile betting platforms must first be approved by the state's regulatory commission. A similar environment is evidenced in Delaware (H.B. 100), which specifically allows for legal sports betting to take place within the confines of an existing racetrack property or a property adjacent to the racetrack. The Delaware law does allow for sports betting at other licensed locations. However, the law makes clear that established constituencies are given privileged status.

State policy makers must recognize the costs associated with the provision of regulatory goods. Even if policy makers believe that they *should* impose regulatory interventions on the sports betting market, Stigler questions if such interventions ultimately achieve desired ends.

C. Regulation as a Transitional Gains Trap

Stigler's analysis uncovers the immediate costs of anticompetitive regulatory policies. However, the sports betting market will be distorted for years to come if legislatures enact regulatory interventions that entrench political winners today, as evidenced in West Virginia and Delaware. Economist Gordon Tullock (1975) investigated why government programs that intended to protect certain industries appeared to be failing. Tullock argued that government aid programs provide “transitory” gains to particular industries and firms (Ibid.). In essence, privileged firms earn a windfall in the initial transfer of governmental aid. However, over time the transitory gains —the monopoly profits—are fully realized and provide no incremental benefit.

Tullock argued that, although the benefits of the governmental privilege are now fully realized, industries and firms will continue to invest resources to protect their privilege because they would be immensely hurt by the cancellation of their benefit. Therefore, the social waste exists not only in the initial advocation for and provision of regulatory goods, as established by Stigler’s theory of regulatory capture. The great social costs materialize when the industry expends resources over time to protect the present flow of rents, even though such lobbying provides no marginal benefit to the privileged firms.

Tullock’s theory suggests that the initial liberal provision of regulatory goods can introduce a transitional gains trap in the sports betting market. Established firms and the first movers in the market are at risk of inadvertently trapping themselves in unproductive competition. Therefore, overly ambitious regulatory interventions that codify an anticompetitive regulatory framework will negatively impact the market for years to come.

Tullock’s transitional gains trap is evidenced today in Illinois. The state expanded legal video gambling in 2009, which created political constituencies through the provision of regulatory goods. Today, these constituencies exhibit unproductive competition. The Illinois Casino Gaming Association, an industry group, has fought against new entrants into the casino and slot machine market (Petrella 2019). Such an advocation protects the Association’s members’ already realized rents from the provision of regulatory goods brought about by the video gambling provisions in 2009.

The established firms in Illinois have expanded their reach as the state considers legalizing sports betting. The Association encourages the legalization of sports betting so long as their members "get a piece of the action" (Ibid.). This behavior suggests that the Association is attempting to capture future regulatory goods and their associated rents, introducing an additional transitional gains trap. Reinforcing the anticompetitive nature of this behavior, the Association's executive director was quoted, "We think that [expanded sports betting] is one of the few markets left out there where expansion will help the industry and help the state, as opposed to additional casinos or slots at racetracks" (Ibid.).

Stigler and Tullock conveyed that policy makers must contend with the long-term costs associated with various regulatory frameworks. Regulatory interventions that bestow goods on privileged firms impose substantial short and long-term costs on the competitive market process, thereby reducing consumer welfare. Policy makers must be cognizant of how certain interventions can affect the behavior of actors and exacerbate market failure concerns that justified such interventions.

III. The History of Regulation in Sports Betting Markets

Understanding the historical context of the sports betting market provides insights to state policy makers today. For instance, the sustained consumer demand and market growth suggests that the market is characterized by productive entrepreneurship from bookmakers that provide value to consumers. Further, the government's treatment of the market over time contains themes from all three regulatory theories detailed above. Awareness of the history of this market contributes to a broader understanding not only what policy makers are capable of achieving.

Gambling has a rich history throughout human existence. Individuals across time and place have sought the adrenaline, hope, good company, and profit potential that encompasses placing a bet. Some of the earliest evidence of sports betting dates back to the ancient Romans betting on horse races (Dietl and Weingartner 2012). There is also evidence of gambling by both ancient Jews and indigenous populations in North America (Sauer 1998, 2001).

Likewise, governments throughout time sought to balance ethical and religious objections to gambling with the existing consumer demand. Carolyn Downs (2015) found that lotteries were outlawed in the United Kingdom (U.K.) in 1823 and cash betting was banned in 1906, remaining illegal until 1961. According to Downs, gambling was not viewed by U.K. authorities as leisure consumption, but rather as a vice often consumed by the working class.

Perhaps surprisingly, gambling played a role in the economic development of the United States. Economist Raymond Sauer (2001) found that lotteries in colonial America were used to finance the construction of churches, roads, and even institutions of higher education such as Columbia University, Dartmouth College, Harvard University and the University of North Carolina. Further, the papers of early political leaders such as Thomas Jefferson and George Washington contain references to bets made at local horse races (Davies and Abram 2001, 13).

Sports betting in the U.S. grew out of horse racing and regulatory efforts quickly followed. While many individuals attended horse races for the pageantry and entertainment, the sport was dependent on betting (Ibid., 15). Davies and Abram (2001) found that track betting was encouraged by state governments as a means of revenue. However, similar to the findings of Downs (2015), legislatures ensured betting only took place at the track—not off-track—so as not to encourage betting by the poor (Davies and Abram 2001, 16). The poor could not afford to enter the racetrack, and therefore legislatures sought to price them out from the gambling market.

Horseracing reached the middle and lower classes in the late 1910s (Ibid.). According to Davies and Abram, track managers were incentivized to expand their business and earn higher profits, while politicians were incentivized to increase state tax revenue. State regulators expanded the length of the racing season and encouraged the formation of new racetrack establishments (Ibid., 30). By the 1920s there were more than three hundred horse racetracks operating in the United States (Ibid., 15).

Throughout time, the United States Congress implemented piecemeal legislation in an attempt to control emergent gambling innovations. The U.S. Wire Act of 1961 prohibits the transmission of wagers, or information assisting with the placing of wagers, over communication wires like telephones (18 U.S. Code § 1804).

In 1977, the United States Congress investigated how to equitably treat the regulation and taxation of the gambling industry (Commission 1977). The Commission conducted a survey to estimate the extent of the gambling market and found that 61 percent of the adult population participated in some form of gambling—sports or otherwise—in 1974. The Commission also noted that the generally accepted estimate of $5 billion in illegal gambling per year was too low. Indeed, recent estimates of the market's size suggest that sports wagering grew from an estimated $20 billion in 1975 to $200 billion in 2000 (Davies and Abram 2001).

The Commission's final report found that the federal income tax on gambling winnings was the biggest obstacle to effective competition between legal and illegal gambling operations. As such, the Commission argued that the government should take measures to limit the distortionary effects of the black market. Among numerous other recommendations, the Commission suggested that the government honor ethical concerns by not engaging in or promoting the gambling industry.

In 1992, Congress passed the Professional and Amateur Sports Protection Act (PASPA). This law outlawed sports betting in all states except those that had existing gambling frameworks

(Humphreys and Perez 2012). As history would suggest, PASPA failed to eliminate sports betting in the United States. Federal officials estimated there to be at least 250,000 professional bookmakers in the United States by the late 1990s (Davies and Abram 2001, 93). Further, in the year 2000, an estimated 125 million Americans gambled at least once, including an estimated 15 million American adults that bet on sports regularly (Ibid.).

The growing popularity of the internet further limited the effectiveness of PASPA by significantly reducing the costs of placing a bet. In 2006, Congress responded to the internet innovation by passing the Unlawful Internet Gambling Enforcement Act (UIEGA). This law made transactions between United States based financial institutions and online gambling sites illegal (Humphreys and Perez 2012). According to Humphreys and Levi, as the internet continued to expand across the globe, authorities found it increasingly difficult to regulate sports betting.

Even with PASPA and UIEGA enacted and enforced, sports betting generated over $380 billion in handle[3] in 2012, with only $3.45 billion wagered legally in Nevada (Furman 2015). A report from the American Gaming Association (AGA 2018) estimated that Americans illegally bet at least $150 billion annually on sports, with more than $10 billion wagered on the NCAA men's basketball tournament alone in 2018. Only 3 percent of that $10 billion is estimated to have been wagered legally through Nevada sports books (AGA 2018).

In a May 2018 challenge of PASPA, the Supreme Court ruled the law unconstitutional by a 6-3 decision for violating the Tenth Amendment of the United States Constitution. For the first time since 1992, the power to legalize and regulate sports betting was returned to the states.

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[3] Handle represents the amount of money wagered on sports betting by market patrons. This is often the figure cited when estimating market size (Global Market Advisors 2018).

IV. The Effects of Regulation on the Sports Betting Market Process

A. Implications for Price Efficiency

Gambling markets can be analyzed as simple financial markets (Sauer 1998). The market is characterized by complexity, value and information asymmetries, and uncertainty. Like financial markets, bookmakers facilitate trades through the use of emergent prices—money lines, odds, and point spreads—that aggregate information, signal scarcity, and incentivize behaviors. The prices offered by bookmakers emerge from the decentralized wagering behavior of individuals and tend the price towards predictive efficiency. Betting markets that are price efficient expand the amount of voluntary trades in the market, drive the competitiveness of bookmaker profits, reduce market risk, and increase consumer welfare.

Regulatory interventions have complex secondary effects because they disrupt an emergent pricing process and affect the distribution of local knowledge among agents. Pricing distortions exacerbate the costs of economic errors, uncertainty, and information asymmetries in the market. This reduces the amount of trades in the market, making both bookmakers and consumers worse off. Therefore, policy makers must recognize the complexity and importance of emergent pricing and carefully consider how regulatory interventions will impact this process.

1. Prices Balance Value

An efficient price implies that the expected value of a wager on Team A is equal to the expected value of a wager on Team B. Therefore, the initial price will evolve as betting activity takes place so as to ensure the price matches the relative value as determined by *consumers*. It is only through the emergent gambling process that this dynamic balancing act can occur.

An uninhibited process which allows for the balancing dynamic may not always work perfectly, as judged ex-post. However, ex-ante, this process is the most robust way towards efficient pricing. The value in a bookmaker having equal action on either side of a wager exists in the evolutionary process through which it results. Economist James Buchanan (1982) argued that there is a distinction between end state economic allocation and the process through which the end state emerges. According to Buchanan, an omniscient designer could create a set of economic outcomes. However, this would fail to account for the relative values as determined by consumer decision-making. Thus, an omniscient designer is unable to duplicate the emergent gambling process that properly balances consumer and bookmaker value.

The process which balances value produces three welfare implications. First, this process expands the market by incentivizing wagers that otherwise would have been unprofitable to both consumers and bookmakers. Second, this process balances not just expected values, but also volumes of bets. This reduces the risk to the bookmaker, increasing the likelihood that the bookmaker can stay in business long-term. Access to mutually beneficial betting opportunities at repeated points in times makes both bookmakers and consumers better off. Third, this process guides the bookmaker's interests into alignment with the consumer's interests, disincentivizing the bookmaker from exploiting consumers in the market.

Regulatory interventions can exacerbate the value and information asymmetries present in the market. Policies such as mandated limits about how much a consumer can bet, or how much money a bookmaker may accept, inhibit this evolutionary process. While often instituted to protect consumers, these limitations would actually limit the market forces that incentivize the alignment of behavior between bookmakers and consumers.

Further, strong barriers to market entry, such as the state granting monopoly privileges or imposing excessive licensing fees, protects bookmakers from being as responsive to consumer value at the margin. This has important pricing implications for consumers. Consider the bid-ask spread in financial markets. The less competitive is the market, the greater is the spread between the bid-ask price (Chen 2019). Sports betting markets operate in much the same way. The less competitive is the market, the greater is the vigorish[4] charged by the bookmaker. Interventions which impose substantial barriers to market entry not only protect established constituencies. They also undermine the balancing of value between bookmakers and consumers and contribute to consumers paying higher prices.

2. Prices Aggregate Dispersed Knowledge

Emergent betting prices account for the wide set of information held by all market agents. While the bookmaker may be the one individual most knowledgeable about the wagering event, it is unlikely that the bookmaker has more knowledge than the extended wagering market. For example, the bookmaker may believe that the market-clearing spread is seven points. However, if betting action is heavy on one side of the wager, it becomes clear to the bookmaker that there is information about the wager which he either does not have or does not understand. As more information about the event is gathered through betting activity, the price evolves and limits the distortionary effects of imperfect agents.

Economist F.A. Hayek's insight reinforces the role of the wagering price as an aggregator of information. Hayek wrote, "The data from which the economic calculus starts are never for the whole society "given" to a single mind which could work out the implications and can never be so given" (1945, 536) Hayek noted that each market actor has information unique to a particular time and place. Through market individuals acting on their local knowledge and information—in this context, both offering and placing a bet—the market is able to aggregate this scarce and disparate information, minimizing information and uncertainty costs.

[4] The vigorish, or the vig, is the charge taken by the bookmaker for facilitating the bet.

The reduction of information and uncertainty costs provides the following benefits to the market process and consumers. First, more robust information aggregation reduces pricing risk for bookmakers. As will be detailed later, bookmakers act as holders of substantial risk in this market. Therefore, reducing their risk increases the long-term solvency of bookmaking operations at the margin.

Second, the limitation of information costs reduces the harm to new and naïve consumers. Inexperienced consumers can rely on emergent prices as guides for their own betting behavior, exploiting the aggregated knowledge of more informed agents to reduce their own risk in the market. Further, such aggregation protects consumers from bookmaker exploitation. Because the bookmaker's prices act as aggregators of all sorts of betting behavior, it becomes difficult—though not impossible—for bookmakers to target and exploit particularly uninformed consumers with higher prices.

Regulatory policies that limit the extent of the market reduce the aggregation of scarce and disparate information in pricing. Relevant policies include location restrictions and bans on mobile and internet betting. Limiting where consumers can place bets—therefore limiting the robustness of information aggregation—exacerbates information asymmetries and uncertainty in the market. This increases the risk for new and naïve consumers, making them worse off.

3. Prices Predict Market Outcomes

Prices that better aggregate scarce market information account for more determinants of the wagering outcome. Therefore, an efficient price will act as a strong predictor of the outcome of the wagering event. This has important implications for market actors. As the price becomes a more reliable predictor of the outcome, profit opportunities and risk for market actors are competed away.

If a bookmaker consistently prices wagers in a way that doesn't accurately predict outcomes, it opens itself up to increased risk because the price is not properly aggregating information and ensuring accurate expected values to a bet. Similar to financial markets, if prices told us little about future realities, profit opportunities would either be random or subject to exploitation by particularly informed bettors. This is not to suggest that all sports betting markets must be perfectly predictive at all times, just that the competitive dynamics that produce emergent prices tend the market towards predictive efficiency.

There is literature that suggests wagering markets do indeed tend towards predictive efficiency. Vergin and Scriabin (1978) found that differences in the point spread as small as one or two points had a tangible effect on wagering profitability. Gandar, et al. (1998) found that bets

at the opening spread of NBA games are profitable, while bets at the closing spread are a coin flip; the first movers in a particular wagering market have greater profit opportunities to exploit before the aggregation of information evolves the price towards a market-clearing value. Sauer (1998) found that the odds generated at the racetrack efficiently predicted the order of finish, and point spreads efficiently estimated the median of the distribution of score differences. Lastly, Sauer, et al. (1988) investigated claims that a newly developed model bettor predicted actual point spreads than the Las Vegas betting line. The authors found that the model actually incurred substantial losses.

These findings suggest that the more developed a wagering market, the more accurate is the price as a predictor of the event's outcome. Therefore, the greater freedom the price has to evolve to consumer interests and aggregate information, the more predictive the price becomes. These findings also imply that bookmakers' pricing response to wagering activity advances the extent of the market by minimizing bookmaker risk.

Policy makers must understand that the predictive capabilities of wagering prices are the *outcome* of efficient wagering markets, not a *determinant* of efficient wagering markets. Therefore, prices that are less predictive are not cause for regulatory intervention or control. Rather, policy makers should focus on creating a competitive and innovative regulatory environment for these outcomes to emerge. Such an environment incentivizes the accumulation of knowledge and balancing of consumer value that contributes to more predictive pricing and makes consumers better off.

B. Implications for Entrepreneurship

The bookmaker provides value to consumers by facilitating trades, holding risk, and innovating. All three behaviors occur due to the competitive nature of the sports betting market. Indeed, the emergent market process described above is the result of the bookmaker acting as an entrepreneur. Therefore, rigorous regulatory analysis should study the bookmaker as an entrepreneur rather than a villainous caricature. Regulatory policies that restrict, disincentivize, or criminalize entrepreneurship undermine market dynamics, making consumers worse off.

1. The Bookmaker Facilitates Trades

It may be tempting to view bookmakers as mere middlemen that make wagering markets more expensive. This position fails to appreciate the bookmaker's role in facilitating mutually beneficial trades between consumers seeking to place a bet. Indeed, by facilitating bets between market actors, bookmakers uncover previously unidentified opportunities to satiate consumer demand, as detailed by Krizner (1997). This discovery process increases consumer welfare by lowering costs and extending the market to additional willing and able participants. Further, the extension of the market produced by bookmakers creates the environment necessary for efficient pricing to emerge.

One can imagine that it would be less costly—in terms of monetary outlay—for a consumer to ask friends or family to take her bet. Indeed, if she found a willing participant, they may even take the bet at zero vig. But this consumer faces substantial search costs in finding a willing and able partner. The bookmaker greatly reduces these costs by offering to take a wide range of bets at repeated points in time.

The bookmaker also reduces “animosity” costs for consumers. Animosity costs arise when two parties experience feelings that one has taken money from the other. We see evidence of this outside of the gambling market when friends are hesitant to go into business with one another. By increasing the social distance between betting consumers, bookmakers reduce potential and realized animosity costs, furthering the extent of the market and increasing welfare.

Lastly, the bookmaker lowers uncertainty costs by ensuring that the transaction is brought to a satisfactory completion. Davies and Abram (2001) found that, between the 1920s and 1950s, bookmakers ensured that all winners were paid off on a weekly basis to maintain the long-term loyalty of repeat customers. By ensuring the proper conclusion of the transaction, bookmakers increase confidence and reduce uncertainty in the market.

Regulatory policies that enact barriers to entry reduce the supply of bookmakers and increase costs on consumers. As such, a lower supply of bookmakers reduces the amount of trades facilitated in the market. Thus, monopoly privileges, location restrictions, and banning bookmakers that previously operated in the underground market lead to unsatisfactory outcomes for consumers. Competitive regulatory frameworks recognize the role bookmakers play in facilitating trades, reducing costs, and making consumers better off.

2. The Bookmaker Holds Risk

Bookmakers act as holders of substantial risk. While it is always the bookmaker's goal to have equal betting action on either side of a wager, it is not always possible to guarantee this outcome. First, a bookmaker may set an inappropriate initial betting price. While the emergent behavior of consumers ultimately drives the price towards efficiency, the bookmaker takes on substantial risk if many consumers "buy" a wager at an early inefficient price.

Consider if the initial wager price was *Team A (-3 points)* and the ending price was *Team A (-7 points)*. The consumers decided that the initial price was too low, indicating that *Team A* was previously underestimated as a favorite. Those consumers that purchased the wager at the initial price now have a built-in advantage. For these consumers, *Team A* only needs to win by 3 points or more, not 7 points or more. In this scenario, the bookmaker could be on the hook for large payouts even if the closing price tended towards efficiency.

Second, a bookmaker may seek unequal action on a wager. If a bookmaker sees a profit opportunity on an existing wager, they may "purchase some of their own product" by neglecting to change the price. The bookmaker acts as a rational consumer in this instance. Importantly, such behavior does not interfere with the balancing of value between consumers and the bookmaker, but it does increase the amount of risk held by the bookmaker.

Third, the bookmaker may operate in a limited market. For example, consider a small-town bookmaker that currently has 60 percent of the action on *Team A* and 40 percent of the action on *Team B*. In this scenario, all existing demand—at any price—may be exhausted before the bookmaker has the opportunity to change the expected values of the wager to even the action. Similar to financial markets, the bookmaker seeks to diversify its client base in order to minimize risk. While this example is unrealistic in the world of internet wagering, it seeks to convey the importance of a broad extent of the market and the inherent risk held by the bookmaker throughout the wagering process.

Anticompetitive regulatory policies that push producers and consumers to the black market exacerbate these risks. Coontz (2010) noted that illegal bookmakers are unable to publicly advertise to grow their business. This greatly diminishes the extent of their market and makes them more susceptible to pricing and diversification risk. Further, illegal bookmakers have no recourse for those who fail to pay on their debts. Therefore, Coontz (2010) argued that they must invest significant resources in scrutinizing customers' ability to repay. Indeed, Strumpf (2003) found that bookmakers must retain large cash reserves in order to maintain their business.

Policies that pressure firms into the black market also negatively impact consumers. The increased risks of the black market incentivize firms to reorganize resources from a productive manner—such as lowering vigs charged to consumers—to risk management. This reorganization reduces welfare as marginal consumers may not find a willing facilitator at a low enough cost. Further, this also limits the aggregation of information, leading to less efficient prices, increased market uncertainty, and lower bookmaker revenue. Therefore, competitive regulatory frameworks limit risk costs by reducing the power of the black market to firms and consumers.

Alternatively, regulatory interventions that ensure the safety and soundness of bookmakers may be desirable. For example, regulations that codify reserve requirements on bookmaking firms, similar to regulations on banks and insurers, might limit the systemic risk in the market. Indeed, such policies would essentially reinforce the behavior of bookmakers detailed by Strumpf (2003). This policy is evidenced in Mississippi, where bookmaking operators are required to maintain a cash reserve no less than $50,000 (H.B. 100).

However, such requirements do come with associated costs. Given high enough expected values, bookmakers would be incentivized to work around reserve requirements. Big banks have worked around reserve requirements imposed by the Dodd-Frank Act as they chase higher yields (Hoffman 2019). That said, requirements such as these are economically and financially sound, and far more desirable for consumer welfare, than those which impose dramatic and wide-reaching interventions such as monopoly privileges.

3. The Bookmaker Innovates

Kirzner (1997) noted that entrepreneurs, in their alertness to economic opportunities, innovate to make consumers better off. Kirzner argued that not only do entrepreneurs use existing resources in more economical ways, but that they also develop new kinds of output through both technique and product innovation. Bookmakers illustrate this entrepreneurial process described by Kirzner. Historically, bookmakers have innovated by lowering transaction costs, reducing price, and improving the betting experience.

As a middleman, the bookmaker's main innovation is in reducing opportunity and transaction costs. For example, in the early 20th century, the horse races took place between 2:00 PM and 5:00 PM when most gamblers were at work. Therefore, illegal bookmakers would wait in line, buy tickets, and place bets in person for particular clients (Hindelang 1971). Bookmakers would also offer credit to clients with which they had a strong relationship (Ibid.). These actions significantly lowered opportunity costs and extended the sports betting market to those marginal consumers that were previously excluded.

Similar to legal businesses, bookmaking operations innovate within the price dimension. In order to make a profit, bookmakers charge a commission, the vigorish, for taking a bet. For example, a standard price in legal operations requires the consumer to bet $11 to win $10. In this scenario, the bookmaker guarantees itself a $1 profit for taking the bet. However, the vigorish need not be as low as 9 percent. In less competitive environments, a consumer could expect a bookmaker to charge $13 to win $10, for example. As the environment becomes more competitive, bookmaking operations compete for business by driving their vigorish price lower.

Bookmakers also innovate on quality of sports betting experience. The point spread system lowered risk for bookmakers and resulted in larger betting levels and greater profits. Following the invention of the point spread system, a professional line-setting firm was established in Minneapolis, Minnesota in the 1930s (Davies and Abram 2001). This firm provided value to bookmakers and bettors by lowering information costs and efficiently pricing nationwide sporting events.

Sports betting markets also leverage the positive externalities of unrelated innovations. The invention and widespread use of the telegraph and telephone meant that consumers did not need to be at the racetrack to place a bet. Davies and Abram (2001, 30) wrote, “Recognizing a strong demand, entrepreneurs established elaborate nationwide communications networks to service the growing number of horse wire rooms that enabled dedicated players a chance to bet on major races held hundreds, if not thousands, of miles away.” Indeed, in 1940 the fifth largest AT&T customer was the nation’s leading horse wire service (Davies and Abram 2001, 31). In the age of the internet, bookmaking operations make wagering much easier for consumers through online sports betting applications.

The competitive market process incentivizes bookmakers to provide value to consumers. Contrary to fears of exploitation of information asymmetries, history and economics suggests that bookmaking firms that better protect and provide benefits to consumers are the firms that will thrive. Regulatory policies that undermine the bookmaker's innovative role reduce consumer welfare in the market.

V. Policy Implications

Thus far, this paper has used economic theory to uncover how the sports betting market emerges and persists, and how particular regulatory interventions would impose costs on this process. There do exist policy lessons beyond this focus, specifically regarding consumer sovereignty and taxation of sports betting, that I would like to briefly address. First, I recognize that many regulatory interventions are not made on economic grounds, but moral grounds. I detail various implications of morality-based interventions below. Second, I address the likely implications of burdensome taxation on the market. Third, I apply the theoretical approach of this paper to a tangible case study: West Virginia's sports betting law. Lastly, I provide a practical policy recommendation for state policy makers.

A. The Implications of Morally Justified Regulatory Interventions

If one assumes consumer sovereignty—that is, consumers are the best judge of how their decisions impact their welfare—then burdensome restrictions of sports betting would harm many consumers for the benefit of roughly one percent of consumers that exhibit problematic gambling behavior. However, policy makers often do not assume consumer sovereignty when regulating traditionally vice markets, of which many consider sports betting to be one. Indeed, in a debate on legalization proposals in Maine, state representative Josanne Dolloff signaled her opposition to legalization stating, "I sure as heck don't want somebody's grocery money going towards this," and voiced her concerns that legalization would lead to increased family time spent online (Thistle 2019). Representative Dolloff's sentiments are not uncommon; gambling policy has often been crafted as protection for the working class.

Even if one does not assume consumer sovereignty, there exist relevant costs of government interventions on consumers. For those that are addicts or otherwise exhibit troubling gambling behavior, the burden of increased taxation is higher due to their inelastic demand. Lyon and Schwab (1997) found that alcohol and cigarette taxes are regressive both annually and over a lifetime. Further, Vandenberg and Sharma (2016) found that regressive effects of alcohol taxes in Australia were concentrated among heavy consumers. Studying gambling specifically, Suits (1977) found that, on a range from +1 (extremely progressive) and -1 (extremely regressive) gambling taxes rated as -0.25. Therefore, aggressive taxation frameworks would risk failing to control socially costly behavior while simply facilitating a financial transfer from problematic gamblers to the rest of society.

There are also concerns that regulatory frameworks could exhibit regressive characteristics. Chambers, Collins, and Krause (2017) found that regulations may be regressive if they impose the preferences of the wealthy on the poor. This finding is especially troublesome when one considers that Downs (2015) and Davies and Abram (2001) found that, historically, gambling policy was crafted to restrict access to the working class. Beyond the impacts on competition and the market process, policy makers advocating for morally-justified regulatory interventions must recognize the possibility for those regulations to negatively impact the consumers that they seek to protect.

B. The Implications of Taxation

Many states are eager about implementing a legalization framework in part due to the expected tax revenue. However, policy makers should not look to sports betting as a panacea for longstanding budget constraints. Legislatures tend to overestimate expected tax revenue by confusing the handle[5], revenue[6], and profit.[7] Economist George Ignatin (1984) argued that, although bookmaking involves a lot of money, actual profits are quite small. Further, a recent study by the state of Rhode Island estimated tax revenue from sports betting to be $2.7 million this fiscal year, far less than an initial estimate of $23.5 million (Lima 2019). Additionally, while not specific to sports betting, Hindelang (1971) found that the New York state lottery provided only about one-third of the tax revenue that leaders initially projected.

Anticompetitive tax and regulatory frameworks can also quickly make bookmaking an unprofitable enterprise, increasing both the size of the underground market and prices for consumers, as argued by the 1977 Congressional Commission. Indeed, Davies and Abram (2001) found that when the federal gambling tax rate rose to ten percent, many sports books avoided the tax by taking bets off the book (Ibid., 125). This outcome drove bookmakers and consumers to the less-desirable underground market. Additionally, some bookmakers changed their betting rate from 11 to 10 (a 9 percent vigorish) to 12 to 10 (a 16 percent vigorish), increasing prices for consumers. This is consistent with general tax incidence theory in economics. Assuming supply and demand are neither perfectly inelastic or elastic, tax burdens are shared in some way between producers and consumers.

C. Anticompetitive Regulatory Frameworks: An Example

West Virginia became the sixth state to legalize sports betting in March 2018 when the state legislature passed Senate Bill (S.B.) 415 in anticipation of the Supreme Court ruling. This law has numerous anticompetitive elements.

[5] Handle represents the amount of money wagered on sports betting by market patrons. This is often the figure cited when estimating market size (Global Market Advisors 2018).
[6] However, on average bookmakers only hold on to 5 percent of handle as revenue (Global Market Advisors, 2018).
[7] Sports bookmakers generally retain 40 percent of their revenue, or 2 percent of handle, as earnings before interest, taxes, depreciation, and amortization (Global Market Advisors 2018).

1. Monopoly Privileges

S.B. 415 mandates that all sports betting be done through the West Virginia Lottery games owned by the state government (S.B. 415 2018). As such, sports betting can only be offered at a licensed gaming facility. Qualifying facilities include *one* existing historic resort hotel, or any existing facility authorized to operate racetrack video lottery machines (Ibid.). By awarding the state the means of production, S.B. 415 undermines the competitive emergence of the sports betting market. Without market competition, state enterprises face less pressure to innovate in quality and price. There will also be fewer bookmaking services offered to consumers. This undermines the bookmaker's role of connecting consumers to facilitate trades. Further, the monopolization of bookmaking centralizes market risk in a few established firms. This is welfare reducing for all market actors if future errors contribute to greater reduction of the size and scope of the legal market.

The establishment of a state monopoly also disregards the 1977 Congressional Commission argument that governments should respect the moral beliefs of those opposed to legalized gambling by not engaging in the activity itself. The West Virginia government undermines its own regulatory legitimacy by declaring itself the sole producer in a politically contested market.

Granting state monopoly privileges also creates costly competition for government regulation. While the market will bear significant anticompetitive costs today, the true costs exist down the road. S.B. 415 establishes constituencies that are now incentivized to spend resources to protect their monopolies throughout time. The creation of these constituencies increases the costs of future reform for both policy makers and the regulated firms. Creating the environment for a transitional gains trap will harm consumers for years to come.

2. Excessive Licensing

S.B. 415 establishes four types of licenses: operator, supplier, management services provider, and occupational (S.B. 415 2018). Only five total operator licenses are permitted by S.B. 415, and there is a $100,000 application fee for each operator. All management services providers must pay an annual $1,000 fee. Firms that lease or sell sports wagering equipment systems or other services must pay an annual fee of $1,000. All persons employed to be engaged directly with sports betting related activities must be licensed at an annual fee of $100. Finally, no company or individual that has been directly employed by any illegal or offshore book that serviced consumers in the United States is eligible for any type of license.

The quota imposed on operator licenses, along with the $100,000 fee, represent explicit barriers to entry for bookmaking operations. Pricing in the West Virginia sports betting market will be less efficient because there are fewer firms aggregating and economizing on scarce market information. Bookmakers are worse off because they now have fewer opportunities to balance betting action and predict outcomes, increasing operational risk for the state. Consumers are worse off because they now face less efficient and competitive prices, restricting the size and scope of exchanges made in the market.

3. A Way Forward

We still know very little about how this market operates, especially given the role of the internet, and the likely costs and benefits of various regulatory proposals. State policy makers simply do not have the information necessary to realistically avoid implementing anticompetitive frameworks. In order to avoid the mistakes of West Virginia, state legislatures may consider taking a step back to the 1970s. The Congressional Commission took a methodical and careful approach to studying gambling markets and uncovered many important, and still relevant, policy implications for gambling legalization.

State legislatures should create their own gambling commissions. Doing so will allow for further research into this market and create a space for discussing the economic, moral, and political considerations of legalization. Greater information increases the probability that states implement competitive frameworks that benefit consumers and entrepreneurs and increase the quality of state governance. In particular, states would greatly benefit from insight into consumer sentiment of their sports betting experience, as it would inform policy makers' measures of consumer welfare in the market.

A commission, however, is not inherently free from the regulatory capture concerns detailed throughout this paper. If the commission is comprised of legislators and industry advocates, there exists the incentive for policy proposals to become captured by established constituencies. As such, Mitchell (2019) suggested that any investigative commission be comprised of experts familiar with the literature on the subject and with no financial stake in the current legislative or regulatory regime. Mitchell also argued that lawmakers should generally take the commission's advice (Ibid.). If the commission is just for show, there doesn't exist much value in its existence in the first place.

State policy makers would be wise to slow the rapid pace of legislation so as to avoid the widespread anticompetitive regulatory regimes. There are great welfare gains to the state that implements sports betting *correctly* rather than the state that does so *first*.

VI. Conclusion

The return of sports betting policy to the states creates great opportunities and challenges for policy makers. This paper conducts an economic analysis of sports betting markets to uncover the effects of public-interest justified regulatory interventions on the market process and consumer welfare. Regulatory interventions introduce costs to bookmakers and consumers. Anticompetitive regulatory frameworks create privileged political constituencies, undermine the emergent pricing mechanism, inhibit innovation in the quality and experience of sports betting services, and reduce the incentives for bookmakers to drive increases to consumer welfare. State policy makers would be wise to consider the economic complexity of this market when considering various legalization proposals.

This paper also uncovers some practical policy implications. First, the population of problematic gamblers is exceedingly small. Due to their inelastic demand, aggressive tax and regulatory frameworks stand to harm these consumers. Second, the opportunity for states to enjoy dramatic tax revenue is small. Therefore, legalization proposals should emphasize market innovation and competition that benefits consumers rather than the promise of increased revenue to solve longstanding budget constraints. Third, much can be learned through the anticompetitive regulatory framework instituted by the early movers, such as West Virginia. States would be wise to slow their legalization process, study the market, and invest time and resources studying regulatory proposals. Bearing the costs at the front end of the regulatory process promises substantial long-term welfare gains for bookmakers, consumers, and state governments.

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