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# Dangerous Games: The Psychological Case for Regulating Gambling

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# DANGEROUS GAMES

## The Psychological Case for Regulating Gambling

Emanuel V. Towfigh\*, Andreas Glöckner†, Rene Reid‡

### ABSTRACT

The gambling market is growing rapidly, as is the number of gambling addicts. This is fueling the call for changes in regulation. Some regulators intend to enable the entertainment industry to fully harvest a market potential magnitudes larger than today's gaming market by minimizing regulation. Others aim at further limiting games to reduce pathological gambling and to enhance consumer protection. Current legal doctrine subjects a game to restrictions if chance, rather than skill, is its predominant trait. This rests on the assumption that only games of chance are harmful. As our experimental study shows, this is wrong: if a notion of skill seems relevant for a game, players fall prey to psychological biases that are breeding grounds for addiction and economic exploitation. We therefore suggest to abandon the distinction between skill and chance, and to condition regulation instead on the psychological biases a game induces, i.e. on the danger it actually poses.

The empirical part of the argument focuses on sports bets which are among the set of particularly controversial games, as there is contention whether skill or chance dominates the performance of bettors. Recent academic papers and court decisions argue that such games are properly categorized as games of skill, and as such should not fall afoul of current gambling laws. We show that, empirically, skill does have an—albeit extremely limited—impact on performance. However, the participants' general assumption that skill does matter for performance makes them suffer an illusion of control and overconfidence, that as has been established in clinical research makes them highly vulnerable for excessive betting and pathological gaming behavior. We therefore suggest to subject sports betting to regulation.

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## CONTENTS

I. INTRODUCTION .....	3
II. PROBLEM.....	5
A. STATE AND FEDERAL GAMING LAW .....	5
B. REASONS FOR REGULATION .....	9
III. RESEARCH QUESTIONS.....	14
A. ARE SPORTS BETS GAMES OF CHANCE OR SKILL GAMES? .....	14
1. <i>The Normative Standard</i> .....	14
2. <i>Operationalizing “Skill” for an Empirical Assessment</i> .....	15
B. IS SPORTS BETTING DANGEROUS? .....	19
IV. EXPERIMENT .....	20
A. ARE SPORTS BETS GAMES OF CHANCE OR SKILL GAMES? .....	20
B. IS SPORTS BETTING DANGEROUS? .....	21
V. RESULTS .....	22
A. ARE SPORTS BETS GAMES OF CHANCE OR SKILL GAMES? .....	22
B. IS SPORTS BETTING DANGEROUS? .....	24
1. <i>Illusion of control</i> .....	25
2. <i>Overconfidence</i> .....	27
C. VALIDITY OF THE RESULTS .....	30
D. A NOTE ON FUTURES TRADING.....	31
VI. LEGAL IMPLICATIONS .....	31
A. IMPLICATIONS FOR SPORTS BETTING.....	31
B. IMPLICATIONS FOR GAMBLING LAW.....	33
V. OUTLOOK.....	33
APPENDIX.....	35
PERFORMANCE .....	35
ILLUSION OF CONTROL EFFECT.....	35
OVERCONFIDENCE EFFECT .....	36

## I. INTRODUCTION

The activities of gambling and sports-betting have received special attention in recent years, especially within the areas of criminal and regulatory law. The discourse over gaming has flourished within both the debate over public policy and the application of legal analysis. At least partially responsible for this surge in interest is a series of developments in the gaming and betting markets; notably, fostered by the advent of the Internet, the 1990's saw the emergence of what would become a substantial and thriving market for those providing platforms facilitating sports bets. A number of commercial Internet-based businesses followed, such as sports bets and online poker tournaments, gaining market share quickly as the Internet became more widespread. Legal developments followed the growth of this market. State and Federal courts have had to decide on the regulatory nature of these activities, as well as re-interpret applicable legislation in light of the new activities. In most states, betting, within the context of a game of chance, as well as bookmaking, is an illegal activity. However, there has been pressure from the gaming industry and within academic literature to re-interpret what constitutes a game of chance<sup>1</sup>, and whether games of chance are harmful to the public<sup>2</sup>, as opposed to games of skill<sup>3</sup>.

This question of regulation is not confined to jurisdictions within the United States; across the Atlantic there is a very similar debate occurring between those with an interest in regulating gambling activities and those wishing for the market to be liberalized. In Germany, state monopoly and restriction of gambling activities, promoted and guided by very similar rationales to its US counterparts, has been challenged by recent European court decisions, providing that interference in the free exchange of services and the freedom of establishment is only justified if the goals are coherently pursued by the member state, which the European Court of Justice (ECJ) found not to be the case in Germany.<sup>4</sup>

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1. Christine Holleman, *Fantasy Football: Illegal Gambling or Legal Game of Skill?* 8 N.C. J.L. & Tech. 59 (2006).

2. *National Gambling Impact Study Commission Report*, 1999, found at <http://govinfo.library.unt.edu/ngisc/reports/7.pdf>, at page 7-1.

3. See Yves Chantal & Robert J. Vallerand, *Skill v. Luck: A Motivational Analysis of Gambling Involvement*, 12(4) J. Gambling Studies 407 (1996).

4. ECJ, Judgments dated 8 September 2010, in Joined Cases C-316/07, C-358/07 to C-360/07, C-409/07 and C-410/07 as well as in Case C-46/08 and in Case C-409/06 at <http://curia.europa.eu/>; cf. Emanuel Towfigh and Andreas Glöckner, *Geschicktes Glücksspiel*, 65 *Juristenzeitung* 1027 (2010). For a good overview over the highly fragmented European gambling market and the relevant law see European Commission's 2006 Study of

(footnote continues next page)

Resolving this issue involves resolving a tension between an individual's freedom to act and the government's interest in protecting the public, as well as the state's desire to find alternative means to raise revenues. This tension is readily observed in the gaming space of sports betting. There is controversy as to whether sports betting should be more heavily regulated; some advocate for little regulation, arguing that sports betting is an activity of skill, and as such, falls outside of the range of activities that are legitimately controlled. They also further that sports betting is a safe activity, pursued by well-adjusted adults, and as such does not involve the same dangers that motivate regulation for games of chance.

The motivation behind this paper is to use scientific—in our case psychological—benchmarks to properly investigate and discuss in an informed manner the attributes of sports betting. This paper investigates its characterization within the chance-skill dichotomy, as well as the unique dangers that exist within the context of sports betting. It advocates for stronger regulation in this area of gaming. The bedrock of this discussion is the research conducted in an experiment. Individuals were asked to predict the outcome of future sport events. The experiment also sought to characterize individuals as either skilled or unskilled based on a subjective self-assessment and a more objective test.

The results of the experiment are several: firstly, it was found that those identified as “skilled” did not significantly outperform their unskilled counterparts. In some cases, in fact, individual unskilled participants in our experiment outperformed their more skilled counterparts in making sports predictions. The experiment also found that those who were characterized as “skilled” suffered from potentially adverse psychological biases to a much greater degree than those characterized as “unskilled”. The psychological biases specifically active and identified are the *illusion of control* and *overconfidence* effects. Illusion of control refers to the exaggerated conviction of one's own faculty to influence or control the outcome of an uncertain event<sup>5</sup>. This psychological bias is a known mediating effect for addiction, and therefore a dangerous cognitive bias. The overconfidence effect consists of the consistent belief of being able to garner greater success at an activity than is in reality true. Overconfidence in the arena of gambling tends to lead to bets larger than what

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Gambling Services in the internal market of the European Union“ at [http://ec.europa.eu/internal\\_market/services/gambling\\_en.htm](http://ec.europa.eu/internal_market/services/gambling_en.htm).

<sup>5</sup> See Langer 32 J of Personality and Social Psychology 311 (1975).

the person, would risk *ceteris paribus*, i.e. departing from their preferences.

In light of these results, this paper proposes that sport betting is not properly characterized as a skill-based activity. This is due to the similarity in success rates between those labeled as skilled participants and those labeled as unskilled participants. Under an appropriate analytical framework, which is introduced in the paper, sports betting thus constitutes a game of chance. The legal implications are that sports betting is unlawful in states that have statutes prohibiting wagers made on chance events.

While this paper engages in the chance-skill discussion, its objective is to make a much more fundamental point. The common distinction of the law between “games of skill” and “games of chance” justifies a strict regulation of games of chance and leniency towards games of skill with the assumption that the former are more dangerous than the latter. Our research shows that this traditional assumption, common to many jurisdictions, is wrong. Therefore, the predominant factor doctrine cannot provide a sound distinction between games that—due to the dangers that emanate from them—should be restricted and those that should not be. If inherent dangers are the reason for regulation, then the fact that sports betting evokes psychological biases is sufficient merit for its regulation. The dangers that flow from such activities are the very same dangers that have been identified in other regulated activities, and therefore, if one is to take a principled approach, activities of similar pathology should be similarly controlled.

## II. PROBLEM

### A. STATE AND FEDERAL GAMING LAW

Games of chance are almost unanimously subject to heavy state regulation, be it through outlawing certain chance based activities, or setting restrictions as to the form they can take. For instance, most states have statutes heavily regulating lotteries such that their operation is restricted to that by government sponsored entities.<sup>6</sup> California’s Constitution provides a typical formulation: It stipulates in Art. IV § 19 subdivision (a) that

The Legislature has no power to authorize lotteries, and shall prohibit the sale of lottery tickets in the State.

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6. Constitution of Idaho, Section 20, Gambling Prohibited; Constitution of the State of Kansas, Art 15, Section 3; North Carolina General Statutes, Subchapter XI. General Police Regulations, Art 37, Tennessee Code 39-17-506.

with a significant caveat in subdivision (d),

notwithstanding subdivision (a), there is authorized the establishment of a California State Lottery.

In other states lotteries are unlawful unless specifically authorized by law<sup>7</sup>. In the extreme case, lotteries are subject to blanket prohibition.<sup>8</sup> The trend over the last three decades has been towards a gradual legalization of lotteries. For example, until recently Tennessee's constitution did not permit the state government to operate a lottery<sup>9</sup>. Now, however, changes to the code have eliminated this prohibition<sup>10</sup>. This regulatory phenomenon is not confined to the US; in Germany, as in most European countries, lotteries are also the subject of State monopoly<sup>11</sup>. Within US state law, the overwhelming theme motivating the restriction of gaming venues is the protection of its citizens from the pitfalls of gambling. There is a rich body of literature illustrating historic perceptions of gambling: state lotteries have been criticized for being, in effect, a highly regressive tax<sup>12</sup>, which have a

pernicious effect upon morals, "creating a spirit of gambling which was productive of idleness, vicious habits, and ruin of credit and character."<sup>13</sup>

The perception legal authorities have had, at least historically, towards gambling, is aptly crystallized in the United States Supreme Court opinion *Marvin v. Trout*, whose effect was to affirm Congress' constitutional ability to exercise its police powers in regulating lottery materials in interstate commerce:

It is well settled that the police power of the state may be exerted to preserve and protect the public morals. It may regulate or prohibit any practice or business, the tendency of which, as shown by experience, is to weaken or corrupt the habits of those who follow it, or to encourage idleness instead of habits of industry. Whether gambling is demoralizing in its tendencies is no longer an open question. Gambling is injurious to the morals and welfare of the

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7. New York Constitution, Art 1, § 5-14.

8. See Florida Statutes, Chapter 849.09.

9. Tenn. Const. Art. XI § 5, cited in Mike Roberts, *The Constitutionality of Gaming in Tennessee*, 61 Tenn. L. Rev. 675 (1994), at 683.

10. Tennessee Code 39-17-506.

11. Emanuel Towfigh & Andreas Glöckner, *Game Over: Empirical Support for Soccer Bets Regulation*, 17 Psychology, Pub. Policy, & L. 475 (2011).

12. Ronald J. Rychlak, *Lotteries, Revenues and Social Costs: A Historical Examination of State-Sponsored Gambling*, 34 B.C.L. Rev. 11 (1992), at 33.

13. *Id.* at 34.

people, and is not only within the state's power to suppress gambling in all its forms, but it is its duty to do so.<sup>14</sup>

Thus, within the legal literature, there is a theme associating gambling with idleness, corruption, moral decay, and exploitation of the weak and poor. With this in mind, there is little wonder that legal and academic literature has been critical of the inconsistency between the states' alleged purpose of protecting its public, and yet offering its own citizens games of chance through its own monopolies, thus directly profiting from the alleged weakness of those it seeks to protect through restrictive legislation<sup>15</sup>.

The Federal government's position has also been the source of criticism<sup>16</sup>. Notable has been its current use of provisions from the Wire Act of 1961 to prevent gambling activities. The relevant text of the Wire Act is as follows:

Whoever being engaged in the business of betting or wagering knowingly uses a wire communication facility for the transmission in interstate or foreign commerce of bets or wagers or information in assisting in the placing of bets or wagers on any sporting event or contest, or for the transmission of a wire communication which entitles the recipient to receive money or credit as a result of bets or wagers, or for information assisting in the placing of bets or wagers, shall be fined under this title or imprisoned not more than two years, or both.<sup>17</sup>

President Kennedy's statements made in the statute's legislative history illustrate that the motivating purpose of the Wire Act was to aid the Federal government in its fight against organized crime:

The word "organized" is italicized because it should be clear that the Federal Government is not undertaking the almost impossible task of dealing with all the many forms of casual or social wagering which so often may be effected over communications. It is not intended that the act should prevent social wager between friends by telephone. This legislation can be a most effective weapon in dealing with one of the major factors of organized crime in this country...<sup>18</sup>

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14. *Marvin v. Trout*, 199 U.S. 212 (1905), at 224, cited in Rychlak, *supra* note 11 at 44.

15. See Roberts, *supra* note 9, at 676. See also Rychlak, *supra* note 11, at 12 and 48.

16. Martin D. Owens Jr., *Don't Look Now, But the Mice are Winning: Predictable Backfires and New Departments in the War on I-Gaming's Payment Solutions*, 14 Gaming L. Rev. & Econ. 595, at 595 (2010).

17. The Interstate Wire Act, 18 U.S.C. §1084 (2006).

18. *1961 Hearings*, 6, Found at David G Schwartz, *Not Undertaking the almost-impossible task: The 1961 Wire Act's development, initial applications, and ultimate purpose*, 14(7) Gaming L. Rev. and Econ. 532 (2010), at 535.



At the time it was enacted, criminal groups had become proficient at laundering money and funding themselves through operating lotteries. The underlying concern voiced poignantly by Kennedy was that:

Over the years an ever-increasing portion of our national resources has been diverted into illicit channels. Because many rackets are conducted by highly organized syndicates whose influence extends over State and National borders, the Federal Government should come to the aid of local law enforcement in an effort to stem such activity.<sup>19</sup>

Through the Wire Act the Federal Government sought to combat organized crime through its ability to regulate inter-state commerce by making it a lot easier to establish a case for conviction of members of these criminal organizations.

Criticism to the current application of the Wire Act is twofold: Firstly, the Department of Justice under the Bush administration has interpreted the Wire Act to be applicable against Internet-based gaming activities. Critics point out that the Internet had not yet been invented when the Act was passed, and therefore Congress did not intend for the Wire Act to be applicable against such forms of communication<sup>20</sup>. This interpretation has met with mixed success when tested at litigation<sup>21</sup>. The second line of criticism comes from the fact that the Department of Justice has sought to curb gambling activities for the purpose of reducing society's participation in gambling altogether, instead of applying the Wire Act toward the originally tailored end of merely combating organized crime.<sup>22</sup>

Perhaps responding to its mixed success, and desiring to curb what it saw as dangers resulting from the proliferation of online gambling activities, specifically online poker, Congress passed the Unlawful Internet Gambling Enforcement Act (UIGEA) of 2006. The statute provides that:

No person engaged in the business of betting or wagering may knowingly accept, in connection with the participation of another person in unlawful Internet gambling –

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19. H.R. Rep. No. 87-966, reprinted in 1961 U.S.C.C.A.N., 2666 cited in Schwartz, *Not undertaking the almost-impossible task*, at 534.

20. Owens, *supra* note 16, at 595.

21. See *In re Mastercard Int'l Internet Gambling Litig.*, 313 F.3d 257 (5<sup>th</sup> Cir. 2002), with the court holding that online gambling is not covered by the Wire Act, and *U.S. v. Lombardo*, 636 F. Supp. 2D 1271 (10<sup>th</sup> Cir. 2007), with the court coming to the opposite conclusion, holding that the Act does apply to internet based activities.

22. Roberts, *supra* note 9, at 680.

- (1) credit, or the proceeds of credit, extended to or on behalf of such other person (including credit extended through the use of a credit card);
- (2) an electronic fund transfer, or funds transmitted by or through a money transmitting business, or the proceeds of an electronic fund transfer or money transmitting service, from or on behalf of such other person;
- (3) any check, draft, or similar instrument which is drawn by or on behalf of such other person and is drawn on or payable at or through any financial institution; or
- (4) the proceeds of any other form of financial transaction, as the Secretary and the Board of Governors of the Federal Reserve System may jointly prescribe by regulation, which involves a financial institution as a payor or financial intermediary on behalf of or for the benefit of such other person<sup>23</sup>.

Thus, Congress, through this act, sought to curb online gambling by restricting means of payment methods. To accomplish this purpose, the Act creates procedures to identify and block restricted transactions.<sup>24</sup> Note that qualified fantasy sports are exempt from the prohibition of this legislation<sup>25</sup>, though fantasy sports may still be subject to prohibition through state law and application of the Wire Act.

#### B. REASONS FOR REGULATION

There are several motivations behind regulating gaming activities. Firstly is the desire to control the harm of a perceived social evil. In this way, gambling regulation can be described as classic social control legislation; its purpose is to control or limit a perceived social evil from harming the public by either outright banning its legality or funneling the activity into state approved outlets. The rationale goes as follows: through the state offering its own, legal, outlets, whose proceeds are taxable, and whose operations contribute to the tax base, the state directly competes with those providing illegal gambling outlets, thereby drawing participants and resources from illegal establishments to state sponsored ones<sup>26</sup>. By limiting the legality of certain betting activities, state law seeks to protect the pub-

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23. The Unlawful Internet Gaming Enforcement Act, 31 U.S.C. §§ 5361-5367 (2006), § 5363.

24. *Id.* § 5364.

25. *Id.* § 5362.

26. Rycklak, *supra* note 12, at 54.

lic from the “lure of chance for easy money” and its anti-social effects<sup>27</sup>.

In addition, there is a host of criminal activity and undesirable social behavior correlated with gambling that the state has an interest in addressing and curbing<sup>28</sup>. Such undesirable social effects include: loss of interest in family and friends; increased incidents of divorce<sup>29</sup>; abdication of familial support and other obligations resulting from marital breakdown and nonsupport<sup>30</sup>. Also, there is evidence that “compulsive gamblers are often delinquent with child support payments”<sup>31</sup>. Adverse effects on the children of compulsive gamblers have been noted, such as “feeling angry, hurt, lonely, guilty, abandoned and rejected. They [the children of compulsive gamblers] experience troubled teen years and run away from home, use drugs, become depressed, and experience psychosomatic illnesses.”<sup>32</sup> In addition, the children of compulsive gamblers often suffer from abuse<sup>33</sup> or neglect<sup>34</sup>. As well, the incarceration rate of compulsive gamblers is troubling, strongly suggesting a correlation between compulsive gambling and engaging in illegal activities: it has been found that “approximately 97 percent of incarcerated pathological gamblers and two-thirds of the un-incarcerated pathological gamblers have admitted to engaging in illegal behavior to finance gambling or pay gambling related debt”<sup>35</sup>. Incidents of fraud and theft have been widely reported to this end: testimonies heard by the *National Gambling Impact Study Commission* involved “a Detroit man who faked his own son’s kidnapping to pay a \$50,000 gambling debt.”<sup>36</sup>

This behavior—pathological gambling—is a consequence of gambling addiction. A survey of almost 400 Gamblers Anonymous mem-

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27. *State v. Rucker*, 46 N.J. Super. 162 (N.J. App. Div. 1957), at 169.

28. *National Gambling Impact Study Commission Report*, at 7-13.

29. *National Gambling Impact Study Commission Report*, page 7-26. Problem gamblers in the study demonstrated a divorce rate of 53.5 percent, in contrast to 18.2 percent among non-gamblers.

30. Rychlak, *supra* note 12, at 60.

31. *Id.*, at 70.

32. *Id.* at 70.

33. *National Gambling Impact Study Commission Report*, page 7-28. “NRC (National Research Council) reported on two studies indicating between 10 and 17 percent of children of compulsive gamblers have been abused”.

34. *National Gambling Impact Study Commission Report*, page 7-28. “The Commission heard testimony of numerous cases in which parents or a caretaker locked children in cars for an extended period of time while they gambled. In at least two cases, the children died. It was brought to the Commission’s attention that cases of parenting leaving their children in the Foxwoods casino parking lot became so commonplace that Foxwoods management posted signs warning that such incidents would be reported to the police”.

35. Rychlak, *supra* note 12, at 71.

36. *National Gambling Impact Study Commission Report*, page 7-12.

bers reported that more than half of these members admitted to engaging in theft to finance their gambling addiction<sup>37</sup>. As well, homelessness is correlated with gambling problems<sup>38</sup>. Suicide is commonly contemplated among pathological gamblers as a means of escape<sup>39</sup>. In addition, there are significant economic losses attributed to compulsive gambling, such as work absenteeism, bad debts, and crime. The economic cost to society has been estimated to be over \$34 billion annually<sup>40</sup>. What is startling is how widespread a problem compulsive gambling is, with an estimated 1.6 percent of America's adult population, amounting to 3.2 million adults, identified as pathological gamblers<sup>41</sup>. One of the main reasons for regulation is therefore to prevent gambling addiction.

However, perhaps in tension with the desire to protect public morals and psychological health, there are also fiscal interests at issue: in 2009, 70 percent of all adult Americans are said to take part in some form of gambling.<sup>42</sup> In that year, approximately \$900 billion was wagered in legal betting, producing \$80.5 billion in gross gambling revenues<sup>43</sup> (GGR). In the same time period US GDP was \$14,120 billion<sup>44</sup>. Thus, revenues from legal gambling constituted 0.57 percent of American GDP. Gambling revenues have been a significant contributor to state government tax revenues, with casinos contributing \$5.2 billion to state government coffers in 2006<sup>45</sup>.

As an aside, it is important to note that those categorized as problem gamblers, however, disproportionately occupy the lower socio-economic strata of society, having lower educational attainments and

37. *Id.*, at 7-13.

38. *Id.*, at 7-27: "In a survey of 1100 clients at dozens of Rescue Missions across the United States, 18 percent cited gambling as a cause of their homelessness. Interviews with more than 7000 homeless individuals in Las Vegas revealed that 20 percent reported a gambling problem. A survey of homeless service providers in Chicago found that 33 percent considered gambling a contributing factor in the homelessness of people in their program."

39. *National Gambling Impact Study Commission Report*, page 7-25. "A Survey of nearly 400 Gamblers Anonymous members revealed that two-thirds had contemplated suicide, 47 percent had a definite plan to kill themselves, and 77 percent stated that they wanted to die."

40. Rychlak, *supra* note 12, at 66.

41. *National Gambling Impact Study Commission Report*, 7-19.

42. Richard K. Miller & Associates, *Casinos, Gaming & Wagering 2011*, found at <http://www.marketresearch.com/Richard-K-Miller-Associates-v723/Casinos-Gaming-Wagering-6382860/>.

43. *Id.* *Gross gambling revenues* are defined as the difference between monies placed into a bet and monies paid out as winnings. It represents the revenues of the venue facilitating the betting transaction.

44. See <http://www.indexmundi.com/g/g.aspx?v=65&c=us&l=en>.

45. Pedro Raventos & Sandro Zolezzi, *Sportsbooks and Politicians: Place your bet!*, 64 *J. of Bus. Research* 299 (2011), at 300.

household incomes than their non-problem gambling counterparts.<sup>46</sup> Inasmuch as problem gamblers gamble disproportionately more than non-problem gamblers, taxes exacted from gambling activities are particularly regressive, and constitute a transfer of wealth from those of lower income groups to the rest of society.

Compared to the total gambling market, the US market for online sports betting is relatively small, producing \$5.8 billion GGR<sup>47</sup>. However, it has been growing rapidly, and its GGR is predicted to continue growing between seven to 10 percent annually<sup>48</sup>. Thus it is an immature market that still has great unmet potential, and promises to be lucrative for those who successfully offer services demanded by this market<sup>49</sup>. Therefore there is a large pecuniary interest at stake with regards to government actions to regulate this space of the gambling market.

The gambling industry is subject to both federal and state regulation; state law mostly provides the substantive regulation, while federal law generally exists to assist with the implementation of state regulation<sup>50</sup>. For example, the Illegal Gambling Business Act of 1970 makes operating a gambling business that violates state law also a federal crime. However, a departure from this dynamic is the Wire Act of 1961. The Act explicitly prohibits the making of sports bets using 'wire communications'. As well, while the UIGEA's regulatory text refers only to 'unlawful Internet gambling', and defines unlawful with reference to provisions already in place under state and federal law<sup>51</sup>, its mechanism was set up to target a specific gambling activity, namely online poker.

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46. Inger Johanne Bakken et al., *Personality and Social Sciences: Gambliign Behavior and Gambling Problems in Norway 2007*, 50 *Scandinavian Journal of Psychology* 333 (2009), at 337; Robert T. Wood & Robert J. Williams, *Internet Gambling: Prevalence, Patterns, Problems, and Policy Options*, Final Report Prepared for the Ontario Problem Gambling Research Centre, Guelph, Ontario, Canada (2009), at 90; Paul Sacco et al., *The Association Between Gambling Pathology and Personality Disorders*, 48(13) *J. Psychiatr Res.* (2008), 1122, at 1126.

47. Raventos, *supra* note 45, at 300.

48. Holleman, *supra* note 1, at 61.

49. In June 2009 Goldman Sachs reported that were online gambling to be legalized and regulated, it would grow exponentially, with the US market potentially being worth \$12 billion. Found at: <http://www.onlinecasinospro.com/news/goldman-sachs-predicts-future-of-online-gambling-in-usa/>, and <http://www.onlinecasinoreports.com/news/theheadlines/2009/7/9/goldman-sachs-us-to-legalize-online-gambling.php>.

50. Anthony N. Cabot & Louis V. Osoka, *Fantasy Sports: One Form of Mainstream Wagering in the U.S.*, 40 *Marshall L. Rev.* 1195 (2007), at 1202.

51. The Unlawful Internet Gaming Enforcement Act, 31 U.S.C. §§ 5361-5367 (2006), § 5362.

The common law principles define gambling as an activity that includes

- (1) an award of a prize,
- (2) is determined on the basis of chance,
- (3) and for which consideration was paid.<sup>52</sup>

State law generally follows this common law formulation; for instance, New York State law prohibits

... all wagers, bets or stakes, made to depend upon any race, or upon any gaming by lot or chance, chance, casualty, or unknown or contingent event whatever<sup>53</sup>.

Under states' laws, wagers on outcomes based on skill are excluded from prohibition. For example, in the mentioned New York statute, wagers made with reference to activities not subject to chance, and/or whose outcome is not contingent to an unknown event, are not unlawful; thus one can conclude that wagers made on outcomes based on skill are lawful.

A danger to the public interest is perceived in games of chance because the outcome of the game is independent of a player's skill and cannot therefore be influenced. This is due to the perception that games of chance are especially appealing to those most vulnerable in society, and that the pursuit of easy riches leads to moral decay, and social problems associated with it<sup>54</sup>. This opinion is based on the implied assumption that a player's lack of influence on the game makes that game more dangerous, and is correlated to its addictiveness, especially to those most vulnerable in society<sup>55</sup>. This argument is seductively reasonable, which may be the cause of its widespread acceptance. For instance, state courts have described lotteries as the most problematic of form of gambling, one which causes the most antisocial behavior, as it disincentives people from bettering themselves through hard work and offers "lady luck" as an easy route to riches<sup>56</sup>. The perception is that those most vulnerable in society, whom state law seeks to protect, more readily fall prey to games of chance, such

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52. Cabot, *supra* note 52, at 1203.

53. N.Y. Consol. Laws, § 5-401.

54. *Marvin*, 199 U.S. at 224.

55. Rychlak, *supra* note 12, at 72. "In general, persons in lower income groups have the most incentive to purchase lottery tickets. Leading routine lives for lack of money, they derive comparatively more benefit from the lottery's excitement and potential profits than do the affluent."

56. *Rucker*, 46 N.J. Super. at 169.

as lotteries, rather than games of skill<sup>57</sup>. For this reason, games of chance are subject to state and federal regulation.

However, there are certain activities that pose a complication to the legal question as to whether its outcome is skill-based or chance-based. Few activities are clearly chance-based, such as lotteries, or clearly skill-based, such as chess. In between there is a wide range of activities that fall within the chance-skill spectrum. Thus, determining whether an activity, for legal purposes, is one or the other is a question of judicial judgment. As well, focusing on whether an outcome is determined by skill, and therefore lawful, or chance, therefore unlawful, misses the dangers in those activities that are currently construed, both in popular opinion and statute, as skill based. If the purpose in the regulatory regime is to protect society from the pernicious effects of gambling, then it is imperative to look beyond the labels of chance and skill and determine what motivating forces are causing the problem behavior. What has been found is that activities that particularly appeal to serious gamblers, and therefore pose a special danger, are those that involve excitement, low odds, and a sense of mastery<sup>58</sup>.

Two questions are at the core of this research project: First, based on the usual distinction between games of chance and games of skill, we approach the question whether sports bets should be qualified as games of chance or as games of skill, under consideration of empirical evidence. Second, against the background of the regulation goals of gambling law, and using sports betting as an example, we approach the question whether games of chance and skill games should be considered “dangerous”. At the same time, the effectiveness of the usual distinction between games of chance and skill games is analyzed.

### III. RESEARCH QUESTIONS

#### A. ARE SPORTS BETS GAMES OF CHANCE OR SKILL GAMES?

##### 1. *The Normative Standard*

There are several tests that have been developed to determine whether a gaming activity is a game of chance or a game of skill. Most widely used is the predominance factor test, also known as the dominant factor test. The elements of the test are

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57. Rychlak, *supra* note 12, at 71, “Because lotteries hold out the promise of quick riches, they are particularly appealing to those in dire economic straits. The dream of financial security offered by lotteries and illegal numbers finds a special place in the subculture of poverty and despair that pervades the inner cities of our society.”

58. *Id.* at 66.

- (1) participants must have a distinct possibility of exercising skill and must have sufficient data upon which to calculate an informed judgment;
- (2) participants must have the opportunity to exercise the skill, and the general class of participants must possess the skill;
- (3) skill or competitors' efforts must sufficiently govern the result; and
- (4) the standard of skill must be known to the participants, and this standard must govern the results<sup>59</sup>.

Thus the “presence of chance becomes significant only when chance predominates over skill”. In essence, the threshold for predominance is the point at which either skill or chance crosses the 50% mark<sup>60</sup>. This established classification obviously has to be subject to some skepticism, most notably in the case of zero-sum games. In this type of game, one player can only win what the other players lose (as is the case with sports betting, if we take the bookmakers' margins out of the equation which make it a negative-sum game): If we consider the average player, his or her earnings, due to the zero-sum character of the bets, by definition has to be 0—there is a redistribution of the stakes from the unlucky players, or those with below-average talent, to lucky players or players with above-average talent. If one wished to classify zero-sum games as games of chance generally, then even a betting game of chess between *Kramnik* and *Anand* would be a game of chance<sup>61</sup>—a result that could hardly be considered desirable, if we take the entire jurisprudence and legal literature into consideration. Therefore it makes more sense in zero-sum games to see whether the participants for betting games are more likely to win the more skilled they are. Thus the question becomes whether redistribution occurs as a result of higher skill, or whether it occurs merely for reasons of chance.<sup>62</sup>

## 2. Operationalizing “Skill” for an Empirical Assessment

We first need to characterize skill, and the dynamics that manifest skill in the context of competitive engagements, so to be able to empirically assess it. The first question is an investigation of the in-

59. *Morrow v. State*, 511 P.2d 127 (Ala. 1973), at 129.

60. Anthony N. Cobot & Glenn J. Light and Karl F. Rutledge, *Alex Rodriguez, a Monkey, and the Game of Scrabble: The Hazard of Using Illogic to Define the Legality of Games of Mixed Skill and Chance*, 57 Drake L. Rev. 383 (2009), at 391.

61. It is, however, beyond doubt that the two world chess champions have at their command a considerable degree of skill which (as *Anand's* winning streak since 2007 shows) is decisive for the result of the game.

62. Redistribution as a matter of skill is a typical feature of a goods market.



teraction between the skilled and the unskilled, in the hope to better understand skill, so as to more accurately categorize participants and activities. To this end, let us engage our imagination towards the following scenario: were a warrior, supposedly highly trained and skilled, to go to an arena and fight against a contestant without any experience or special innate ability, and yet face a defeat or even a draw, one could quickly and correctly conclude that this warrior was not skilled after all; despite any prior belief in his training, it was not relevant to the task at hand, as it did not translate to greater success when tested, and therefore did not effect any skill in the warrior.

Skill is defined as special ability and proficiency. Further,

skill is generally considered more than mere competence. It is special competence that is not part of the reasonable person's ordinary equipment, but that results from aptitude cultivated through special training and experience<sup>63</sup>.

"Special" is defined as "unusual, extraordinary"<sup>64</sup>.

Linguistically, the notion that the skilled for a particular endeavor would have the same ability as the unskilled in that endeavor is precluded. If both groups have the same ability, the former is not skilled. Thus there is both a strong conceptual and linguistic argument that it amounts to a mischaracterization to categorize participants in a game as "skilled" when they performed comparably to their unskilled colleagues. This then raises the question: if in an activity or game, there are no participants that can be accurately characterized as skilled, and with regards to this activity there does not exist a dichotomy between skilled and unskilled, can it be correct to characterize this activity as an activity of skill?

This issue is especially relevant if the activity is a zero-sum game, where one participant's outcome is dependent and the inverse of another's; that is, one wins if and when another loses. This will be labeled as *relative outcome*. If this is an activity where none of its participant's has (relevant) skill, then the relative outcome of the activity is not determined by skill. The outcome is determined by influences that are without and beyond the ability of the participants. The relative outcome will, in conclusion, depend on chance and or luck. Thus, one of the requirements of the predominant factor test, that "skill or competitors' efforts must sufficiently govern the result", would not be fulfilled. This being the case, such an activity fails the

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63. *Black's Law Dictionary* 1514 (9<sup>th</sup> ed 2009).

64. *Id.* at 1524.

common law analysis in being categorized as a game of skill, and is thus legally categorized as a game of chance.

One can then set up the following analytical framework: a participant has an activity to which she will engage. The participant then wishes to increase its odds of success in the engagement. To do so, the participant must first identify traits that will be relevant to the outcome of this activity, and then acquire the traits. As well, there are two spaces: the universe of reality and the eye of perception. In the universe of reality, there are infinite traits, some linked to the activity, most not. The eye of perception sees the outcomes of an activity, and perceives traits as well, which it links to the outcome of the activity.

There are several different possible scenarios with respect to the relation between the schema generated by the eye of perception and its counterpart in the universe of reality:

- Firstly, it could be that the eye of perception and the universe of reality have perfectly paired outcomes and traits. In this case, the eye of perception accurately ascribes traits to pursuing an outcome. Thus we have the case that participants correctly identify the traits they need to acquire to enhance their outcomes. Graphically speaking, this is the case where a man applies friction and sparks to dry grass to make a fire.
- The second scenario is that the eye of perception, for whatever reason, does not pair the same traits to the outcome as does the universe of reality. In this case, the participant believes that certain actions will enhance his success, when in reality they bear no relationship. Thus we can imagine ancient man, praying to his idol of stone, for fire. When there is no fire, the ancient man prays harder, perhaps even making a sacrifice. When lightning hits and creates a nearby flame, he gives praise to the powers of his stone idol, and feels his efforts in pleasing it have been rewarded.
- The third scenario is a hybrid of the two, where the eye of perception correctly pairs some but not all of the traits to the outcome. Thus, like the creation of fire, we might have an activity that is potentially an activity using skill, but, as it is currently pursued, is not one of skill. However, the legal question is not whether an activity is *potentially* one of skill; it is whether it *is* an activity of skill. Thus under current legal analysis, until at least some portion of the participating public identify and acquire the requisite skill, the activity will not be a one of skill but one of chance.

To account for cases when we observe that for a particular outcome participants do similarly well despite their labeled skill level, we need to adapt this framework. If the skill these participants claim to have is relevant to the outcome, there are two possibilities: the

first is that there exists a threshold skill level. Before this threshold level of skill is obtained, there is no noticeable relation between skill and results. What might be the case is that the threshold is set so high that, though participants genuinely have different skill levels, there is no noticeable impact of this skill and the results of the activity. The other possibility is that the threshold skill level is set so low, and the effect of additional skill beyond this threshold level is diminishing so sharply that having additional skill is of little or even no utility. This again explains why all participants, despite their genuine skill level, demonstrate similar performance. The former of these possibilities is anticipated in the predominant factor test, which states that (1) participants must have a distinct possibility of exercising skill and must have sufficient data upon which to calculate an informed judgment; (2) participants must have the opportunity to exercise the skill, *and the general class of participants must possess the skill*; (3) skill or competitors' efforts must sufficiently govern the result; and (4) the standard of skill must be known to the participants, and this standard must govern the results<sup>65</sup>. If the level of skill required is so far beyond that which is the ability of the general class of participants, the activity is not considered a game of skill<sup>66</sup>. The latter of these possibilities, where everyone has the requisite skill level, and additional acquisition of skill has little impact on ability, falls afoul of the common linguistic definition of skill as cited above altogether. Thus, in both cases it will not be an activity of skill.

Finally, one may state that although one cannot correctly identify the traits that lead participants to be skilled in an activity, one can assume that skill is implied because of the fact that some participants do perform better than others, and that if one de-aggregates the data, one can see that some participants do better than others, though this difference in performance is not correlated to the measured differences in objective/subjective traits that were once deemed skill. However, if the results are such that only a small minority of participants have this skill, again the requirement that "participants must have the opportunity to exercise the skill, *and the general class of participants must possess the skill*" is not met, and the observed game therefore does not pass the predominant factor test as a game of skill.

In general, courts do not seem to be well-equipped to draw the necessary inferences to disaggregate the causal attributes of a result

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65. *Morrow*, 511 P.2d at 129 (emphasis added).

66. *People v. Turner*, 629 N.Y.S.2d 661 (Crim. Ct. 1995), cited in *Cabot*, *supra* note 52, at 400.

with respect to skill or chance. This is due to the fact that the relation between skill and chance in games is very complex and requires sophisticated and specialized statistical analysis, not to mention collecting and compiling sufficient data. Therefore, instead of attempting to conduct a complicated analysis through imperfect proxies it is more appropriate for the law in general, and for courts specifically, to focus their analysis directly on public policy considerations that are motivating regulation, i.e. protection of the public from undue dangers.

### B. IS SPORTS BETTING DANGEROUS?

In order to classify a game as either a game of chance or a skill game, law makers, administration and courts must decide, at some level, whether it is skill or chance that predominates, in the sense developed in the sections above. With respect to sports betting, there is still controversy and debate in the literature whether this activity constitutes a game of chance or a game of skill. Our study is independent of the actual rules or forms of play and merely asks how much influence a player's skill has in predicting results. In view of the zero-sum character of sports betting, let us view the influence of skill as being in close connection with the result: does higher skill result in a higher probability of success or not?

Law makers assume that games of chance are more dangerous to the public (with respect to addiction, crime, fraud and exploitation) than are games of skill. This study's purpose is therefore furthermore to determine the validity of this assumption. With this in mind, we will analyze to what extent bettors in soccer bets are subject to psychological fallacies that potentially undermine the assumption that skill-based gaming is "safe" relative to its luck based counter-part. Specifically, we will investigate to what extent bettors when making their predictions are subject to the *illusions of control effect*<sup>67</sup>, and whether such test persons display over-developed self-confidence, termed *the over-confidence effect*<sup>68</sup>. Both effects are established patterns in cognitive psychology which lead to systematic misconduct; the former is regarded as an eminently important mediating factor

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67. Illusion of control refers to the exaggerated conviction of one's own faculty to influence or control the outcome of an uncertain event, *see Langer* 32 *J of Personality and Social Psychology* 311 (1975).

68. The concept of over-confidence describes the evidence that decision-makers systematically tend to be more certain about the accuracy of their judgment or decision than they should be, *see Dunning et al.* 58 *Journal of Personality and Social Psychology* 568 (1990).

for game addiction,<sup>69</sup> while the latter is a psychological bias that can be exploited by betting organizers to induce players to place more and higher bets than they would if they adequately assessed their actual skill. Determining the magnitude these effects have on games categorized as “games of skill” is legally significant because current gambling regulation is at least partially motivated by the goal of shielding the public from evils such as addiction and exploitation.

#### IV. EXPERIMENT

Whether games of chance ought to be considered more dangerous than skill games—or whether a gamble ought to be categorized as a game of chance or a skill game—is a question that cannot ultimately be answered without normative valuations. But in legally evaluating concrete cases, the law has to empirically assess facts outside of the legal arena to determine the factual basis for the application of the law. However, empirical insights *per se* have no consequence on the law. Rather, they merely help us to make informed normative statements within the framework of legal hermeneutics. Such statements are close to reality and can be infused as doctrinal or systematic arguments into the legal discourse.

##### A. ARE SPORTS BETS GAMES OF CHANCE OR SKILL GAMES?

The first question in our study was whether sports bets are games of chance or games of skill. To answer this question we conducted an online survey consisting of 214 participants.<sup>70</sup> The survey asked the participants to predict the results of a real soccer match to be held in the near future. An example of a question that was used was whether, on the 12<sup>th</sup> day of the Premier League season 2009/2010, the match between *Bayer Leverkusen* and *Eintracht Frankfurt*, played in Leverkusen, would see either one of those teams win, and if so which

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69. A number of recent models see illusion of control to be an important mediating factor for the development of gambling addiction, see *Blaszczynski/Nower* 97 *Addiction* 487 (2002). Cf. *Goodie*, 21 *Journal of Gambling Studies*, 481 (2005).

70. The fundamental psychological research that provides the basis of this paper and its analysis was conducted in Germany, using German participants. However, given that the results are motivated by behavioral and psychological characteristics basic to human individuals, it is our position that the results obtained are not the product of traits due to a particular German cultural characteristics, and therefore should be valid across countries, including the United States; the publication of a paper focusing on the psychological dimensions of this research in an high-ranking American psychology journal supports this view. The sports teams listed in the study are German soccer teams.

For a more detailed description of the experimental setup, including the instructions, and more in-depth statistical analysis see Emanuel Towfigh and Andreas Glöckner, *Game Over: Empirical Support for Soccer Bets Regulation*, 17 *Psychology, Pub. Policy, & L.* 475 (2011).

one, or whether the game would end in a draw. Those participants whose predictions turned out to be correct could win five Euros (approximately \$6.60), and those whose predictions were incorrect did not lose anything (however, they of course incurred opportunity costs). Further, the questionnaire ended by testing the “skill” of participants in two ways: first, they were asked to self-assess their soccer related knowledge, and then they had to answer a sports quiz consisting of 20 questions<sup>71</sup>. Self-assessment and the results from the sports quiz were highly correlated<sup>72</sup>, i.e. participants properly assessed their skill level to some degree<sup>73</sup>. Combining the data on participants self-reported skill and their success in betting allowed us to investigate the influence skill, both objective skill and perceived, had on the outcome of sports-bets.

The participants were questioned in three test groups: the first group (treatment #1), consisting of 95 participants, had to place bets three weeks prior to an actual game, giving the participants a long forecasting period; the second group (treatment #2), consisting of 74 participants, placed its bets three days before the game, giving them a short period of time to forecast the results of the match; finally, the third group (treatment #3) of 45 participants had to make short-term and long-term predictions for two different days.<sup>74</sup>

## B. IS SPORTS BETTING DANGEROUS?

The second question in our study was whether sports betting is dangerous. To answer this question we asked test persons to state on a scale, and for each bet they placed, to what degree they thought the correct prediction depended on chance or on skill, and how certain they felt in their prediction. If we compare these results with our insights on whether skill has influence on a bet’s success, then we can draw conclusions on whether an illusion of control and over-

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71. The experimental design was improved after the first set of participants (see text) by adding, in addition to the (subjective) self-assessed skill level a sports quiz as an (objective) control of the self assessment for the second and third set of participants in the experiment. Consequently, the correlation reported is based on 119 participants only.

72. Correlation  $r=.60$ ,  $p<.001$ .

73. In reporting the results of the study, we will rely on the self-assessment as a measure of skill because of its more fine-grained scale; however, all results hold in principle if we use the scores of the sports quiz (limiting the analysis to the second and third set of participants).

74. To avoid that a single exceptional match day distorts the results, the groups of participants were spread over different match days. The first group was asked to predict outcomes of the 26<sup>th</sup> match day, late in the 2008/2009 season (April 2009); the second group was polled on the 12<sup>th</sup> match day in the 2009/2010 season (November 2009); and the third group placed their bets on the games played on the 13<sup>th</sup> and 16<sup>th</sup> match day of the 2009/2010 season (November and December 2009).

confidence is at play. The test persons of the third group were also asked to state how many of their predictions they thought would turn out to be true. This figure was compared with the actual number of correct predictions to determine the presence or absence of (excessive) overconfidence. These conclusions can be used to determine whether sports betting is dangerous.

To ascertain how the dangerousness of sports betting acts in relation to games of chance, test persons were also asked to place bets on the first or last two digits in a popular German lottery (*Spiel 77*), with participants stating here also to what degree they thought correctly predicting the lottery's outcome depended on skill or chance, and how certain they felt in their prediction. The same experimental subjects were, as a further comparative measure, also asked to place bets predicting the development of blue chip stocks in a fashion similar to futures trading.<sup>75</sup>

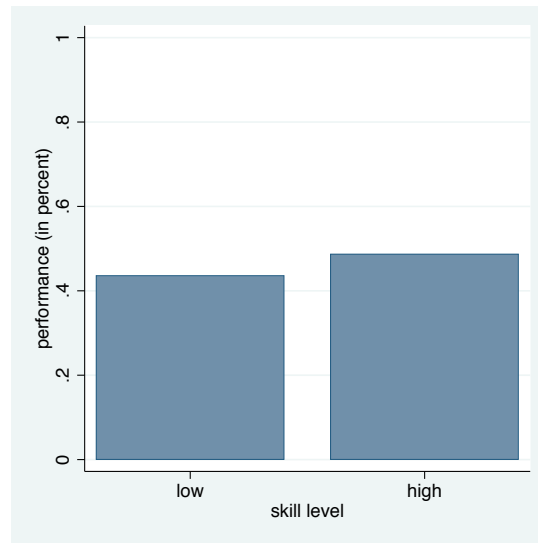
## V. RESULTS

### A. ARE SPORTS BETS GAMES OF CHANCE OR SKILL GAMES?

The terms “games of chance” and “games of skill” are legal terms that are, as such, obviously not amenable to an absolute empirical evaluation. Every game is to a certain degree both a game of chance and a game of skill. For example, the game of chess, the prototypical game of skill, has a chance element; prior the start of the game, a coin is tossed to determine which player starts first. Thus, whether or not a game is one of skill or chance is based on legal judgment and normative evaluations. However, there are empirical reference points that can assist in making the legal judgments, and provide rationality to the normative evaluations. Our study therefore sought to determine empirically to what extent a player's success in sports betting reflects his skill.

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75. The experimental design and results for this part of the research have also been published: Emanuel Towfigh and Andreas Glöckner, *Game Over: Empirical Support for Soccer Bets Regulation*, 17 *Psychology, Pub. Policy, & L.* 475 (2011).



*Figure 1: Correct Predictions of Game Result According to Skill Level (Median Split)*

The graphs *Figure 1* highlights the performance of the participants overall. We display them here to convey a graphical intuition for the results of the more technical regression analyses (see also Appendix, *Table 1*). To be able to draw the bar graph, we split the experimental subject by skill level at the median, leaving us with a “high skill” and a “low skill” group. If one aggregates the results of the three treatment groups, overall labeled as “high skilled” outperform those labeled as “low-skilled” (49% vs. 44%), however, the difference is not statistically significant, least of all from a practical stand-point<sup>76</sup>. Thus, these graphs illustrate how little skill contributes to the correctness of a predicted sports outcome.

In a second step we analyzed results separately for the short and the long prediction horizons. For the short-forecasting period, our data predicts a positively effect of skill on performance, i.e. as skill goes up, so does the probability that a participant’s forecast will be correct. This effect is significant. However, we do observe an—albeit weak—inverse relationship between skill and performance for longer

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76. To investigate the influence of skill on correct predictions statistically, we conducted a logistic regression with correctness as dependent variable and (subjective) skill as predictor controlling for effort and task differences (i.e., dummies for each task) for the complete soccer bets data as well as using cluster corrected standard errors at the level of participants. The total effect of skill turned out not statistically significant ( $b=.0028$ ,  $z=1.47$ ,  $p=.14$ ), and the effect similar when using the objective instead of the subjective skill measure (i.e., the quiz score;  $b=.00571$ ,  $z=1.58$ ,  $p=.11$ ).



forecasting periods. When predicting correct outcomes, the *combination* of skill and forecasting horizon effects the result<sup>77</sup>.

To sum it up, the brief answer to the first research question, whether sports betting is a game of chance or a game of skill under the predominant factor test, is that *it depends*. In the case of bets with a short forecasting period of three days, a small, yet statistically significant, positive influence of skill on correct predictions can be observed. For a short forecasting period, according to our data, the likelihood of a participant with a maximum skill level winning is at best 13% higher than is the case for an unskilled participant. Where the forecasting period is three weeks, skill has no detectible influence on the success of a participant's bet. Thus, for a short-term forecast there is a small effect of skill on betting success, while for long forecasting periods, there is no observed effect. If we consider all data in aggregate, we find that skill has no observable influence (however, in aggregate, participants placed more successful bets than would be dictated by pure chance).

How can these results be explained? We suggest that specific knowledge about soccer makes a difference, especially in the case of short forecasting periods: if a self-proclaimed soccer expert knows that the game of *Real Madrid* depends in no small part on *Ronaldo*, then that knowledge is of particular importance to the expert if he finds out Wednesday that Ronaldo will no longer be able to play on Saturday, due to having sprained his ankle. If the forecasting period is longer, this special knowledge loses its value because the same knowledge could also be obtained, for instance, by looking at the position of the respective club in the League Table – something that the majority of test persons (54%) did when betting.

#### B. IS SPORTS BETTING DANGEROUS?

If we then turn our attention to the question which is pertinent to law-makers, that is the existence of concrete dangers, we can develop benchmarks that can be used to evaluate the legally relevant danger using empirical methods. The dangers stemming from sports betting are examined, in particular gambling addiction and the exploitation of players' behavioral errors. As explained above, illusion of control and excessive overconfidence appear to be good indicators for these two issues.

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77. There was an effect of subjective skill for 3-day predictions ( $b=0.0075$ ,  $z=3.13$ ,  $p=.002$ ) but not for 3-week predictions ( $b=-0.00178$ ,  $z=0.62$ ,  $p=.533$ ).

### 1. Illusion of control

Clinical studies have shown that the addictive potential of sports betting is higher than that of playing the lottery.<sup>78</sup> An important factor for addiction in games is the illusion of control:<sup>79</sup> if a player has the impression that he can influence the game in some way, he becomes more engaged in the game, and therefore is more likely to place bets, even when the perceived probability of winning is kept at a constant level.<sup>80</sup> The participant's perception of control in a gaming activity, where such control is illusory, has a high correlation to pathological gambling behavior. This is especially so when the player has had relative success at the beginning of his run of games.<sup>81</sup>

To measure the degree of the illusion of control in test participants in this study, the participants were asked to what extent they thought the correct prediction of the particular soccer match depended on their personal skill. If the participants were realistic in their self-assessment, then their answers would closely reflect the actual results. That is, as the participant's skill increased, the importance to which they attributed their skill to the accuracy in predicting the outcome should also increase, albeit only to the level that skill actually does influence predicting accuracy. Looking at the data in aggregate, our null hypothesis was as follows: if we are dealing with random events and not a systemic bias, what we should expect is a balanced account of overestimation and underestimation by participants in their belief of skill's influence on predicting a bet's results.

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78. An excellent overview over the empirical literature on gambling and addiction is given by Gerhard Meyer & Tobias Hayer, *Problematisches und pathologisches Spielverhalten bei Glücksspielen*, 53 *Bundesgesundheitsblatt* 295 (2010); see also H.J. Shaffer et al., *The Prevalence of Disordered Gambling Behavior in the United States and Canada: a research synthesis*, 89 *Am. J. Pub. Health* 1369 (1999); Dean R. Gerstein et al., *Gambling impact and behavior study: Report to the National Gambling Impact Study Commission*, National Opinion Research Centre, Chicago (1999); Inger Johanne Bakken et al., *Gambling Behavior and Gambling Problems in Norway 2007*, 50 *Scandinavian J. of Psychology* 333 (2009), at 338; Robert T. Wood & Robert J. Williams, *Internet Gambling: Prevalence, Patterns, Problems, and Policy Options*, Final Report Prepared for the Ontario Problem Gambling Research Centre, Guelph, Ontario, Canada (2009), at 90.

79. References *supra* note 69. For video lotteries see Ladouceur & Sévigny 21 *Journal of Gambling Studies* 117 (2005).

80. Adam S. Goodie, *The effects of control on betting: Paradoxical betting on items of high confidence with low value*, 29 *Journal of Experimental Psychology: Learning, Memory, and Cognition* 598 (2003).

81. This effect is exploited by slot machines that provide a whole number of control elements (such as buttons, keys etc.) which, however, do not exert any control over the game except for starting it; instead, a program controlled by random routines is run, completely independent of external influences or the player's behavior.

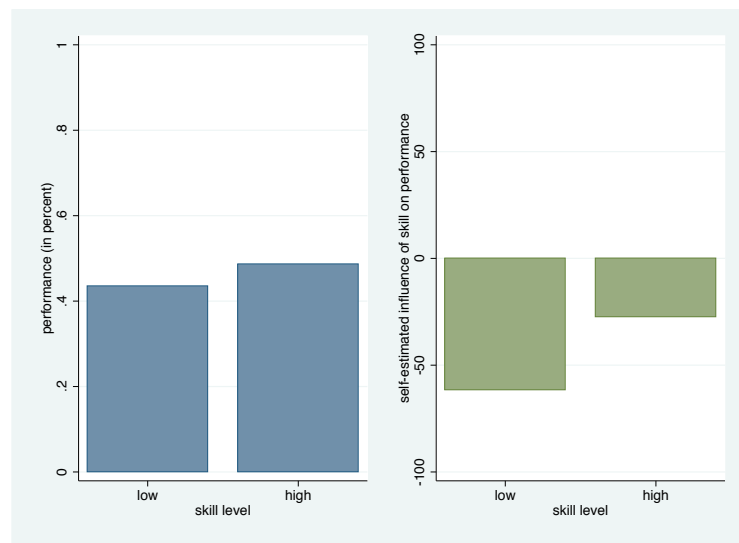


Figure 2: Self-Estimated Influence of Skill on Performance

Again, let us first turn to our descriptive bar graphs to get an impression of the direction of the empirical results. The graphs in *Figure 2* show that participants with high subjective skill attributed considerably more weight to skill's influence on making correct predictions when compared to participants with low subjective skill. Comparing this large difference in estimated influence of skill to the very small difference concerning true influence of skill shown in *Figure 1* indicates an "illusion of control" phenomenon.<sup>82</sup> What we are interested in is the difference between differences in height of *Figures 1* and *2* (yes, that's two times "difference"). *Figure 2* shows a big leap between the two bars separating the low and the high skill participants: those who are skilled have a much higher tendency to believe that their skill will lead to more correct predictions. The difference between both bars is significant, meaning that high-skilled bettors systematically have a stronger belief in the effect of their skill on their performance. *Figure 1* shows the overall effect skill actually had on performance. The two bars, low and high skill, are basically of the same height; the difference in height is not statistically significant. If the test persons had been well-calibrated, the estimated influence of skill graph should look similar to the graph that shows the actual performance. Thus those high in skill suffer from a misperception in their capability, one which increases as their skill level increases. This makes the activity dangerous psychologically.

82. Note the different scales of the two graphs. The graphical demonstration is just used to give an intuition of the effect that is at play here; the statistical explanation will follow immediately.

This intuition that one gains from looking at the descriptives of the experimental data is also manifested in a more technical statistical analysis (see Appendix, *Table 2*). Our data shows that participants with higher skill assume that the result of the bets depend more on their skill: in other words, the more skill a participant displays, the stronger she estimates the influence of skill to be on the result. We can, however, only reckon with an illusion of control if the higher estimation of the influence on the result is not justified by betting results that are in fact better. The question can be answered statistically by controlling for the correctness of bets. In other words, we need to check whether the illusion of control effect stays even when one includes in the statistics the increased number of correct betting results, where the increase can be explained with higher skill. Even with this statistical control, however, the effect remains.<sup>83</sup> We can thus conclude that we observe an illusion of control in people who give themselves a high skill-related self-assessment.<sup>84</sup> If we compare the illusion of control to which test persons are subjected in sports betting with that present in normal lotteries, we can furthermore see that, on aggregate and throughout all test groups, the illusion of control is a bit more prominent in the context of sports betting but the difference did not reach conventional significance levels<sup>85</sup>.

## 2. Overconfidence

A similar approach was chosen for measuring self-confidence in the case of the current bet. Self-confidence was tested simply by asking participants how certain they felt in their predictions. If participants are able to accurately measure their skill, their self-confidence should be strongly positively correlated to their ability to correctly

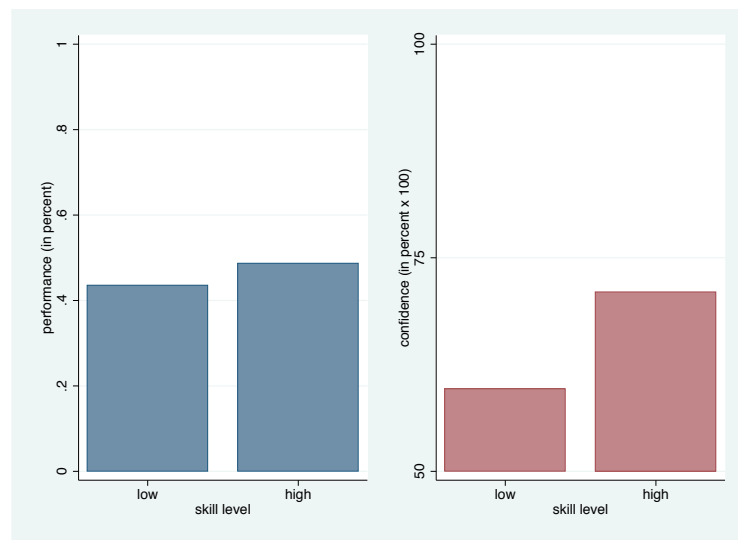
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83. We regressed perceived control on subjective skill for all soccer bets, controlling for accuracy, effort, and task differences using a linear regression model. The analysis shows a strong effect of subjective skill on perceived control ( $b=0.69$ ,  $t=8.70$ ,  $p<.001$ ), indicating illusion of control. The effect prevailed if the objective skill measure was used instead of the subjective one ( $b=6.63$ ,  $t=4.54$ ,  $p<.001$ ). In a linear regression the coefficient indicates how many units of increase we observe in the dependent variable if the independent variable increases by one unit (controlling for influences of all other factors). Participants indicated to which degree the correctness of their bet depends on chance versus their skill on the scale of -100 (100% luck/chance) to 100 (100% skill). After making predictions for all bets, participants were asked to indicate their skill and knowledge level in the respective domain on a scale from 0 (no skill) to 100 (expert), the effort in placing the bets 0 (no effort) to 4 (extensive information search). Our result therefore suggests that with any additional point on the skill scale (0–100) there is an increase of 0.69 points on the scale of perceived influence on skill (scale 100–100).

84. Similar results have been shown by Cantinotti/Ladouceur/Jacques 18 *Psychology of Addictive Behaviors* 143 (2004) and Myrseth/Brunborg/Eidem *Journal of Gambling Studies*, online 19.02.2010 (DOI 10.1007/s10899-010-9180-6).

85. The respective interaction was not significant ( $b=-0.13$ ,  $t=0.91$ ,  $p=.365$ ).

predict soccer match results. That is, the dependent variable “self-confidence” should be explained by the independent variable “correct predictions”. However that is not what was observed. The ability to make correct predictions correlated with self-confidence only weakly<sup>86</sup>. Instead, it was found that participant’s self-assessed skill level was strongly correlated to their self-confidence.<sup>87</sup> In other words, perceived skill had a strong influence on self-confidence, while self-confidence was only weakly correlated to the ability to correctly predict results. Taken together, one can conclude that how excessive a participant’s overconfidence is, correlates strongly with how skilled the participant thinks he is. That is, highly skilled people demonstrate excessive overconfidence when it comes to predicting results. The comparison with lottery bets also leads to the conclusion that excessive confidence levels are higher in sports betting.



*Figure 3: Confidence of low-skilled and high-skilled bettors in own predictions and actual correctness of predictions*

86. The respective coefficient for correctness of prediction in the regression on confidence reported in the next footnote (see also Appendix, Table 3) was far from significant,  $b=0.511$ ,  $t=0.98$ , n.s. (Model 1, Overall Subjective).

87. Again, we analyzed the experimental data with a linear regression analysis. In the overall analysis of confidence in soccer bets, we find a strong effect of subjective skill even after controlling for accuracy, effort and task differences (i.e., dummies for each task),  $b=0.22$ ,  $t=12.83$ ,  $p<.001$ , indicating overconfidence particularly for people with high self-assessment of skills. Further analyses revealed that the effect is not only driven by overestimating one’s own skills, because it remains when using the objective skill measure from the quiz,  $b=1.95$ ,  $t=5.44$ ,  $p<.001$ . The overconfidence effect is stronger for soccer compared to Lotto as indicated by a significant interaction ( $p=.033$ ). Confidence in each bet was rated in percent on a scale from 50% (guessing) to 100% (certain). For an explanation of these coefficients, please refer to explanation *supra* n. 83.

*Figure 3* gives us an intuition of the effect skill has on one's confidence in the correctness of predictions which can be compared to the actual influence on correctness of predictions in *Figure 1*. It contrasts the confidence low-skilled and high-skilled participants have in their ability to correctly predict outcomes, and their actual ability to correctly predict outcomes. Notice that those with high skill demonstrate much higher confidence in bets than their low-skilled counterparts, and yet their actual ability is close to equal. This result hints at an *overconfidence effect* particularly for "high-skill" participants which is confirmed in the statistical analysis (see also Appendix, *Table 3*)<sup>88</sup>.

To analyze more concretely whether excessive self-confidence is actually present, we directly asked the participants in treatment group #3 how many of their soccer bets they believed would win. This allows a direct comparison between bets that were perceived to be correct and bets that were actually correct. If we subtract from the former the actual number of correct predictions, placing the result in relation to skill level, then we find that those players with little skill only slightly over-estimate themselves, while self-overestimation grows disproportionately with increased skill.<sup>89</sup> If we divide people at the median according to their skill level, we get an over-estimation of only 0.33 of 9 matches (3.7%) for test persons with the lowest levels of skill, but an over-estimation in people with high skill levels of 1 of 9 matches (11.1%). *Figure 4* directly shows the deviation between a participant's ability to correctly predict an outcome, and participant's perceived ability to correctly predict outcomes. Note that as skill level increases so does the deviation between participants' perceived and actual results.

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88. See statistic reported *supra* n. 87.

89. One can consider whether the observed effect might be endogenous, i.e., whether experimental subjects who self-assess their skill higher, also tend to higher confidence, thus overestimating themselves on both scales. However, we have to consider, that even an overestimation on both scales would not limit the external validity of these results as we would observe the same pattern of overconfidence in real life: after all, players place their bets based on their self-assessed skill. Moreover, the reported results hold and stay significant even when only considering the second and the third treatment group and using the results of the sports quiz instead of the self-assessment (see *supra* n. 71).

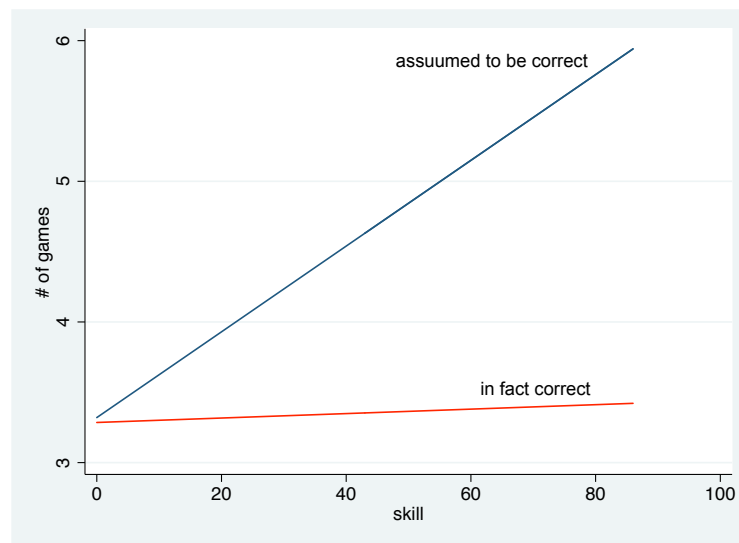


Figure 4: Predicted Over-Estimation by Skill

### C. VALIDITY OF THE RESULTS

From a statistical point of view, the sample size is large enough to draw a statistically valid conclusion. Participants were recruited using the *DecisionLab* of the Max Planck Institute for Research on Collective Goods. On average, the participants were 24 years of age, 42% of participants were male and 86% were students; 11% had previously placed bets on sport events, and 28.45% were fans of a soccer club. Soccer expertise covered the entire spectrum. All test persons can therefore be seen as a potential participant in sports betting, or as a target audience for such betting games.<sup>90</sup> Conducting the experiment as an online study also allowed the test persons to use all the possibilities of a search for information that would also be at their disposal if they placed bets in regular circumstances; there were no time restrictions either, apart from the closure of the study three days or three weeks prior to the event.<sup>91</sup> The study was hence conducted in a natural environment; doing so gives the study additional external va-

90. The experimental subjects do not constitute a representative sample of the actual gamblers population. However, as they were randomly drawn and as there are no indications for a sample of the described composition to distort the empirical results, statistical tests can suggest the robustness of our results. Moreover, we have also checked whether there are significant statistical differences between experimental subjects who had previously participated in sports bets or who were supporters of a soccer club and the rest of the sample; this was not the case.

91. At the same time we inquired which sources the experimental subjects had used, and how much effort they exerted in forming their predictions.

lidity, i.e. the results can be transferred and generalized beyond the test scenario.

#### D. A NOTE ON FUTURES TRADING

One domain in which bets are treated differently from usual game is “betting” on the stock market. Persons have the possibility to buy and sell often times complex financial products; this activity of buying and selling often is the result of some analysis that includes a prediction of future valuations of such products. Some people, including those participating in this activity, believe that a participant’s level of skill can influence their ability to predict the movements in the stock market, and therefore affect their ability to realize a profit through trading activities. Thus, trading on the stock market has a similarity with sports bets, in that participants in both activities assume that they can influence their ability to “win” through their level of skill.

With this in mind, we have also investigated whether stock bets are less dangerous than soccer bets with respect to cognitive biases discussed earlier in the paper. Our results in the overall analysis indicate that overconfidence and illusion of control were also present when people predicted future values of stocks, but they seemed to be somewhat smaller for stock as compared to soccer bets. Hence, our data is generally in line with the hypothesis that unregulated bets on stocks might be less dangerous than soccer bets concerning cognitive biases. However, this might also be because of the fact that participants can be assumed to have low skill, if any, in stock predictions.<sup>92</sup> While we are confident, that our results can be generalized to non-experts engaging in futures trading, we want to caution against taking our experimental sample as representative of an expert trader population. Professional stock traders may well display very different behavior. Hence, our results concerning stock bets need to be investigated in further analysis.

### VI. LEGAL IMPLICATIONS

#### A. IMPLICATIONS FOR SPORTS BETTING

The empirical results thus show that, in the case of sports betting, a player’s skill can influence the betting result, depending on the forecasting period, and that sports betting can induce an illusion of control as well as excessive confidence. This is true across the pool of

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92. See Don A. Moore & Paul J. Healy, *The Trouble with Overconfidence*, 115(2) *Psychological Rev.* 502 (2008).



all test persons. What does this mean for our research questions from a legal point of view?

First of all, our data suggests that it is not clear-cut whether sports betting should be categorized as a game of skill or a game of chance. The forecasting period seems to have a decisive influence, such that in short-term bets skill has a positive influence on the result. This influence, however, is slight, though it is statistically significant. This class of games *could* therefore be categorized as a skill game if the threshold for accepting a game as a skill game is that skill has *any* (even a minimal) effect on performance. However, under the predominant factor test, skill must *predominate* performance which arguably is a much higher threshold. Furthermore, this effect is far from stable: if the forecasting period is prolonged, skill no longer has any influence: overall, sports betting appears as a “mixed game”. This is all the more valid since the forecasting periods in our study were randomly chosen: we cannot exclude the possibility that skill shows even more prominently in bets that were placed only a few minutes before a game, nor can we exclude the possibility that skill effect will no longer be discernible if the forecasting period is four days or more. Finding the precise limits of skill for every game and every variant, though, is hardly feasible.

In view of the current apodictic and dichotomous game of chance vs. games of skill regulation, the question arises how we should deal with games of mixed chance and skill. Answering this turns on normative evaluations. Precisely because the boundary between games of chance and games of skill cannot be empirically determined in a clear-cut manner, one must examine the game holistically. Then, especially with regards to the result on danger levels in sports betting, there would be much to recommend a classification of a game as a game of chance. Metaphorically speaking, one drop of chance poisons the well that is otherwise a game of skill. Conversely, it would also be legitimate to exempt mixed games from the requirements of gambling regulation, inasmuch as they are also games of skill.

From a teleological point of view, the ultimately decisive question is whether sports betting is dangerous. The present study shows that it can be, particularly when it comes to the potentially addictive nature, because of the illusion of control it induces. The illusion of control found in the case of soccer bets is much more prominent than is the case of lotteries. Our research hence cognitively confirms clinical results according to which the potentially addictive nature of sports betting is around ten times than is the case with lotteries. Further, sports bets are also dangerous, from the perspective of the regulation goals of gambling laws, because the cognitive weaknesses of players can be exploited. Systematic overconfidence, which can lead to exces-

sive stakes, is notable among these. According to our findings, this effect is also higher than in simple lotteries. For this reason, we conclude that sports betting should be classified as dangerous, and, with regards to the purposes of gambling law, should therefore be strictly regulated.<sup>93</sup>

#### B. IMPLICATIONS FOR GAMBLING LAW

The results of the empirical analysis might have far-reaching consequences for gambling law and legislation, as they demonstrate that the traditional differentiation between games of chance and games of skill when determining dangerousness has no empirical basis and may therefore be considered arbitrary. Even worse: if no skill was necessary and the result of the game depended merely on chance, then, following our empirical data, there would be less space for an illusion of control. One could even go so far as to say that sports betting *becomes* dangerous precisely *because of the skill* that is (subjectively assumed to be) necessary for playing. Skill being necessary may be enough to cause participants to fall victim to an illusion of control; furthermore, it is precisely *because* it seems plausible for a certain measure of skill to have a positive effect on the betting outcome that more skilled players over-estimate themselves. On the other hand, every lottery player knows that his or her success depends on chance alone—hence, there is no scope for an illusion of control, and less for overconfidence. It follows that distinguishing between games of chance and games of skill is not a suitable means for achieving regulatory goals.

#### V. OUTLOOK

The argument put forward here purports itself to be a *single* contribution to the eminently complex discussion on regulating gambling in the United States. We wish to place more emphasis on the legally relevant empirical aspects of gambling. However, we only concentrate on two of the many regulation goals in gambling legislation—curbing gambling addiction and preventing the exploitation of the human passion for games. Apart from the empirical dimension, we emphatically believe there are other dogmatic, legal, and political considerations that may lead to different results or focus on other protected goods.

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93. The European Court of Justice, in its *Zenatti*-Judgment, comes to the same conclusion. The Court finds that sports bets are not similar to lotteries but that because of their inherent danger have to be treated as games of chance. The question whether sports bets are a form of gambling or whether they are just to be treated as such remains open.

However, several recommendations drawn from our empirical results could be taken into account:

- Sports betting is a potential source of danger to the central legal interests of gambling law and hence needs to be regulated.
- Distinguishing between games of chance and skill games is not suitable for differentiating between dangerous and harmless games. The category “skill game” should therefore be done away with altogether, and with it we should give up the “dominant factor test”. Instead, we should directly focus on the dangers that emanate from a game: either a game is dangerous—and may hence be classified as a game of chance—or it is not.
- Dangerous games should be homogeneously regulated: if sports betting is to remain regulated, then so should be horse-betting and slot-machine games.
- Ultimately, it does not seem possible to make a general distinction between hazardous and harmless games, using only a single criterion. Instead, the States will have to take the trouble of assessing the danger potential of a game and its variants, on the basis of independent empirical findings that are either already available or must be demanded from the game providers. Variants and protected goods that are to act as benchmark for such an evaluation must be decided upon *ex ante*. In light of this evaluation, then, administrations can decide whether a game should be restricted.

## APPENDIX

## PERFORMANCE

Table 1. Logistic Regression Models Predicting Performance in Soccer Bets by Skill Level

	(1) Overall Subjective	(2) 3-days	(3) 3-weeks	(4) Overall Objective
Skill level (subj.) (0-100)	0.00284 (1.47)	0.00755** (3.13)	-0.00178 (-0.62)	
Skill level (obj.) (0-10)				0.0571 (1.58)
Effort (0-5)	0.0940 (1.52)	0.236** (3.03)	-0.0603 (-0.72)	0.176* (2.36)
Observations	1951	1071	880	1476
Pseudo $R^2$	0.254	0.244	0.258	0.237

$z$  statistics in parentheses. Dummies for each prediction task and constant are not reported. SE corrected for 214 / 119 / 140 / 119 clusters at the subjects level. The analysis is based on the data aggregated over the three studies reported in Towfigh and Glöckner, 2011.

\*  $p < 0.05$ , \*\*  $p < 0.01$

## ILLUSION OF CONTROL EFFECT

Table 2. OLS Regression Models Predicting Self-Estimated Influence of Skill on Performance in Soccer Bets

	(1) Overall Subjective	(2) 3-days	(3) 3-weeks	(4) Overall Objective
Skill level (subj.) (0-100)	0.695*** (8.70)	0.603*** (5.50)	0.787*** (7.27)	
Skill level (obj.) (0-10)				6.632*** (4.54)
Effort (0-5)	12.77*** (4.82)	13.71*** (3.60)	11.73** (3.29)	17.71*** (5.24)
Performance (0-1)	2.901 (1.23)	2.827 (0.92)	3.436 (0.99)	3.244 (1.29)
Observations	1951	1071	880	1476
Adj. $R^2$	0.260	0.216	0.305	0.228

$t$  statistics in parentheses. Dummies for each prediction task and constant are not reported. SE corrected for 214 / 119 / 140 / 119 clusters at the subjects level. The analysis is based on the data aggregated over the three studies reported in Towfigh and Glöckner, 2011.

\*  $p < 0.05$ , \*\*  $p < 0.01$ , \*\*\*  $p < 0.001$

## OVERCONFIDENCE EFFECT

Table 3. OLS Regression Models Predicting Confidence in Soccer Bets

	(1) Overall Subjective	(2) 3-days	(3) 3-weeks	(4) Overall Objective
Skill level (subj.) (0-100)	0.222*** (12.83)	0.219*** (8.92)	0.226*** (10.70)	
Skill level (obj.) (0-10)				1.953*** (5.44)
Effort (0-5)	3.741*** (6.50)	3.854*** (5.01)	3.655*** (5.08)	4.586*** (5.36)
Performance (0-1)	0.511 (0.98)	-0.170 (-0.25)	1.352 (1.78)	0.162 (0.26)
Observations	1951	1071	880	1476
Adj. $R^2$	0.360	0.329	0.383	0.247

$t$  statistics in parentheses. Dummies for each prediction task and constant are not reported. SE corrected for 214 / 119 / 140 / 119 clusters at the subjects level. The analysis is based on the data aggregated over the three studies reported in Towfigh and Glöckner, 2011.

\*  $p < 0.05$ , \*\*  $p < 0.01$ , \*\*\*  $p < 0.001$