Journal Information
Journal ID (publisher-id): jgi
ISSN: 1910-7595
Publisher: Centre for Addiction and Mental Health

Article Information

Received Day: 2 Month: November Year: 2000
Accepted Day: 17 Month: August Year: 2001
Publication date: October 2001
Publisher Id: jgi.2001.5.10
DOI: 10.4309/jgi.2001.5.10

The Effect of Skilled Gamblers on the Success of Less Skilled Gamblers

Nigel E. Turner, PhD Affiliation: Centre for Addiction and Mental Health, Toronto, Ontario, Canada, E-mail: Nigel_Turner@camh.net

Barry Fritz, PhD Affiliation: Quinnipiac University, Hamden, Connecticut, USA

[This article prints out to approximately 16 pages.]

This article was peer-reviewed.

For correspondence: Nigel Turner, PhD, Scientist, Centre for Addiction and Mental Health, 33 Russell Street, Toronto, Ontario, Canada M5S 2S1, Phone: (416) 535-8501 Ext. 6063, Fax: (416) 595-6899, Nigel_Turner@camh.net

Nigel Turner *received his doctorate in cognitive psychology from the University of Western Ontario in 1995. He has worked at the Addiction Research Division of the Centre for Addiction and Mental Health for the past five years where he has developed psychometric tools to measure addiction processes. He is currently focused on understanding the mental processes related to gambling addiction. He has extensive experience in various research methods including psychometrics, surveys, experimental studies, computer simulations, interviews and focus groups. He has published numerous papers in peer-reviewed journals, including three on problem gambling, and he has made many conference presentations.*

Barry Fritz *is professor of Psychology at Quinnipiac University, Hamden, Connecticut. He is a member of the board of the Connecticut Council on Problem Gambling. He graduated with a BA from the University of Vermont, an MA from Connecticut College, and a PhD from Yeshiva University.*

"My current research interests are focused on understanding the motivation to gamble and those factors which differentiate between problem gamblers and recreational gamblers. I enjoy the game of poker and hope that my research will keep me on the recreational side of the table."

Abstract

This paper uses computer simulations to examine the effect of highly skilled gamblers on the success of moderately skilled gamblers. It shows that skilled players negatively impact the outcome for less skilled players. A player's winnings are not only affected by the house rake or vigorish but also by the skill of other players. It is concluded that less skilled players are often better off playing a game of chance than a game of skill.

It is our contention that professionals in the field of gambling studies can gain a great deal of insight into problem gambling by closely examining the games gamblers play. The purpose of this article is to examine some differences between games that involve some skill and those that involve only chance in order to help treatment and prevention workers understand the dynamics of these games. For example, understanding the nature of the game and its effects on the individual gambler can help a therapist understand a client's motives and beliefs, which may facilitate a more individualized, client-centered approach to the treatment.

Gambling games can be divided into two categories: games of chance, such as lotteries, keno, craps, roulette, baccarat, bingo and slots; and games of skill, such as horse race betting, sports betting, poker and blackjack. For example, playing bingo requires perceptual and motor skills, but winning is purely a matter of chance. In contrast, winning at poker is dependent on skills relative to the other players. The number of skills involved and the long-term prospects of financial return vary for each type of game. In Hold'em poker, skilled players can make a decent living (Warren, 1996), but in poker games played against the "house," such as Caribbean Stud Poker, players cannot beat the house edge, regardless of how skilled they are (Cardoza, 1997). Players of games based on skill are more likely to be male, with the exception of horse racing, and more likely to be younger (Kelly et al., 2001).

The relationship between skill and problem gambling is particular interesting. According to data on problem gambling treatment collected in Ontario, just over 40% of gamblers in treatment list a game of skill as their major area of concern (Rush & Shaw-Moxam, in press). Several researchers have noted that problem gamblers often have an inflated sense of their own skill (Gadboury & Ladouceur, 1989; Toneatto, Blitz-Miller, Calderwood, Dragonetti & Tsanos, 1997). Are problem gamblers who play games of skill simply unskilled players? An alternative view is that some of the "skilled" gamblers in treatment might actually be skilled but not be as skilled as other players.

Books on how to gamble successfully often portray games of skill as games in which the player has a chance of winning in the long run (e.g., Warren, 1996; Patterson, 1990). However, the mixed skills of gamblers playing these games affect the outcome for every player. Against novices the first author (Nigel), can play a successful game of poker, but against experienced players, he most often loses. The second author (Barry) fairs somewhat better against good players. The goal of this paper is to measure how skilled players affect the success of less skilled players, so that the dynamics of a game of skill can be understood.

Method

The goal of this paper is difficult since it often takes thousands of games to accurately measure skill in gambling. Furthermore, tracking enough gamblers for a sufficient amount of time is time consuming and probably not possible (casinos don't like people researching on their property). Consequently, this paper relies upon simulations.

Two games are compared: roulette (see Wong & Spector, 1996) and Hold'em poker (see Warren, 1996). One hundred thousand simulations on both poker and roulette were conducted. Conducting these simulations at exactly the same skill level is not particularly realistic because players do improve (and sometimes get worse). However, applied to the current moment in time, these simulations allow us to get an accurate estimate of a player's level of skill and their expected financial return.

Roulette is a game in which a little ball is thrown around the edge of a spinning wheel. A player places a bet on one of the 37 (or 38) numbered slots that they think the ball will land on. There are many betting options available.

Hold'em poker is a popular casino poker game where as many as 10 players can play at the same time. Players play against each other while the dealer merely deals the cards and handles the money. Each player is given two cards face down; the remaining cards are community cards that are dealt face up in the middle of the table. Players make their hands by creating the best five-card combination of their own two cards and the community cards. There are four rounds of betting. For the poker simulation, Wilson's Software Turbo Texas Hold'em was used.

Turbo Texas Hold'em is an elaborate program that allows players to teach themselves the game. In addition to basic playing instructions, the game provides extensive statistics on how players play as well as how the other characters play. The opponents in this game are not random; they have programmed profiles that react to the many specific poker situations that they might encounter. These profiles are designed to match the types of players one might meet around an average poker table — they have names that are amusing and relevant.

The game comes with 40 pre-designed profiles. Player profiles can vary from "tight" (folds most hands) to "loose" (stays in most hands) to "passive" (checks or calls, but rarely bets or raises) to "aggressive" (often bets or raises). Specific types of players such as "loose but aggressive," or "tight but passive" can be selected, and opponents can learn how to counter their styles. Players can also create their own characters. More to the point, players can set up a line-up of characters and then run a high-speed simulation to determine the long-term outcome of various strategic moves.

In the context of poker, an operational definition of skilled play means that players adjust their play to their position in the hands (i.e. Are they first or last to bet?); they gauge the odds of making a particular hand compared to the size of the pot (the "pot odds"); they try and figure out their opponents hands by "tells" and betting patterns, and usually tend to play tight and aggressive, but must occasionally vary their play by bluffing (loose) or checking (passive) in order to avoid giving away their strength (see Warren, 1996, for details).

Three simulation studies were conducted.

Study 1

Poker

First, a line-up was constructed using an average player, a player that was neither particularly good nor bad, nor tight or loose — but fairly aggressive. This profile is called Igor (by the company's software). To see the normal spread of scores when only average-skilled players were involved, Igor was copied 10 times into the line-up. That is, Igor played against nine other copies of Igor. The game played was 10-20 Hold'em, where a blind bet (a forced bet for the first two players) and the first and second rounds of betting are in $10 increments, and the third and forth rounds ("turn" and "river") are in $20 increments.

The "rake" is the casinos way of making money. They take a percentage of each pot as profit or charge a per hour fee. The rake in casino card rooms varies from 3% to 5%. We selected 5%. The simulation data did not include the rake, so we had to estimate the effect of the rake on each player's net balance, which was based on the average size of pots and the number of pots won.

In real life, the rake is taken off in fixed amounts (e.g., $1, $2, etc.) and is capped at a maximum (e.g., $4). Thus, sometimes the rake is more than 5%, while other times it is less. In this simulation, the rake is an exact percentage from each hand. This inaccuracy somewhat overestimates the size of the rake, but does not otherwise affect any of the conclusions that we draw from the data.

Roulette

Roulette was much easier to simulate than poker because there are few decisions to make. One of the difficulties was to determine how to create a roulette simulation that would produce the same range of scores as a poker game. To do this we first conducted 100,000 simulations of poker and obtained from the program the average investment per hand ($14.80) and average winning pot size ($86.40). It was then determined that the closest roulette bet to these numbers was a $15 bet on a “six line” or “double street” that pays 6 for 1 (i.e. returns $90).

The double street is a group of six numbers that are together on the betting table (e.g., 4, 5, 6, 7, 8, 9) but may be scattered around the wheel. The player wins if the ball lands on any of these six numbers. Poker bets, however, vary from zero to hundreds of dollars. To mimic this situation, the roulette bets were varied from $0.50 to $30, averaging at $15. A rake of 5% on a poker game would produce a house edge in poker of about 2.7%.

To get the equivalent edge in roulette we used the parameters of the European wheel, (one zero), which is available in Europe, Quebec and a small number of casinos in Las Vegas and has a house edge of about 2.7%. These parameters were programmed into a quick basic program similar to Turner's (1998), and then the simulation was run.

Results

Figure 1 shows a comparison of the two games. The poker range is similar, $t(18) = .45$, ns, but includes both lower and higher scores due to the greater variability of the bets. Since all 10 poker players were matched in skill, all of the variation in their outcomes is random. That is, when a group of players are up against players of equal ability, the net outcome is random, and in the long run, only the casino wins.

Study 2

A second poker simulation was conducted where two more skilled poker players were introduced: (1) Tricky Dicky, a tight player who “slow” plays (i.e. checks acting as if he has a poor hand then raises, a strategy that is particularly effective against loose players), and (2) Advisor T., who plays “pump it or dump it” (i.e. if the hand isn't good enough to raise, he folds it, which is effective against tight players). Both of these players are tight, but they vary their strategy depending on circumstances. The roulette data is the same as the first simulation since skilled roulette play is not really possible.

For comparison, additional simulations for poker were conducted where the number of skilled players varied from 20% to 80%. Simulations were also run where even fewer skilled players were added to the mix.

Results

Figure 2 shows a comparison of the two games. The poker range is now very different from the roulette range. The two skilled players have scored large wins, while the remaining eight average-skilled players ("Igors") have racked up large losses. Since the eight average players were matched in skill, all of the variation between them is random. However, the difference between the average-skilled players and the two skilled players is not random but due to the superior playing ability of the two skilled players. What this simulation shows is that when skilled players are introduced into the mix, the average player may be better off playing a game of chance (e.g., roulette) than a game of skill, $t(16) = 3.3$, $p<.01$. As noted below, the actual outcome depends on a number of factors including the mix of players.

Interestingly, the skilled players did not come out ahead because they won more often. On the contrary, the skilled players won between 8,605 and 9,271 pots, while the eight average-skilled players won between 10,216 and 10,638 pots each. This illustrates an important rule in poker: skilled poker players are more selective, and therefore, enter fewer pots. They win less often, but are more likely to win the pots that they do enter. Average-skilled players tend to pursue more hands, and therefore, lose more when they do lose.

On average, these poker players played against an expected return (house edge) of –2.69%; however, when playing against skilled players the average return was –3.1% for the Igors, which is a relatively small house edge. The skilled players achieved an average return of +1.35%, approximately the same advantage card counters can achieve in blackjack.

Figure 3 shows the effect of adding additional skilled players to the game. When playing against eight skilled players, the expected return drops steadily for the average-skilled players to –7%. Interestingly, the expected return also drops for the skilled players, because they are playing against each other. In fact, according to this analysis, skilled poker players only have a positive expectation if the majority of their opponents are less skilled. If the final two Igors were replaced with skilled players, the outcome for the skilled players would be random — identical to the results of the first stimulation in which all players were of average ability.

As stated earlier, the profile/character used to represent an average player, Igor, was not a particularly bad player, just a little too loose and aggressive. Other profiles representing players that were much too loose, too tight, too aggressive or too passive were also tried. For example, when a very loose player and a very tight player were played against the Igors, the Igors had an average return of +1.6%.

The very loose player, G.A. Joe, achieved an average return of −22.3%, and the very tight player, Crusty Jack, played at a return of −10.1%. Against average players, these two particularly weak players played with an expected return that was worse than most slot machines. Alternatively, if Igor played against both weaker players and more skilled players, he tended to break even, more or less (+0.05%).

The point is that the outcome of play depends on the mix of players present; against equally matched players, the game results are random and have a return that is about the same as European roulette and somewhat better than most slots machines. However, against more skilled players, the player disadvantage for weak players can be extremely great. It should be noted that even though many average-skilled players face a negative return, they often do not have a gambling problem. They often play poker just to enjoy the game.

Study 3

A final simulation was conducted to illustrate that these findings are not restricted to poker but also apply to sports betting and other skills-based games. In sports betting the house edge averages at around 4.55%, and this is accomplished by a 9.09% vigorish or commission charged on all wins (see www.professionalgambler.com/vigorish.html for more information). For example, if an $11 bet is made, it pays $21 for a win (a bet of $11 plus a $10 win). The extra $1 is the commission.

The bookie sets a “line” for the teams that turn the sport game into a situation where the player has a 50% chance of winning. For example, if the line says that the Yankees will win by one and a half runs, then a player only wins the bet if the Yankees score two runs (more than another team). If the bookie places the line with 100% accuracy, the game is random; but since bookies are only human, there is usually some opportunity to win. In addition, a bookie sometimes has to shift the line to encourage bets on an underdog that isn't getting enough action. A skilled player has to out-think both the bookies and the other players and look for opportunities.

A relatively simply program was constructed to examine this situation. In this simulation, a situation was set up where all players had an equal chance of winning. The next simulation was conducted in which 20%, 40% or 60% of the players were 5% more likely to guess the winning team than the less skilled players; but the line was adjusted to maintain the 4.55% overall house edge. This program does not really take into account the skill of the bookie. But the skills of the bookie would simply add more random variation to the data and would not otherwise affect the results.

Results

Figure 4 illustrates what happens to the expected return of the less skilled bettors as the number of skilled bettors is increased. The results are nearly identical to the results obtained in the poker simulation.

Discussion

The results of this study illustrate two important aspects of playing a game of skill. Firstly, if all players are equally matched in skill, the outcome is random. Secondly, if highly skilled players are introduced into a game, the less skilled players are more likely to lose. These rules also apply to horse racing, sports betting and stock market investing. In each case, players can only make money if they have better information and strategies than other players do. If the information is shared and the strategies are the same, the outcome is random. Andrew Beyer (1983) describes how "speed handicapping" is no longer a sure-fire moneymaker. He states, "If [speed figures] have become somewhat less profitable than they used to be, it is only because so many bettors have discovered what a wonderful device they are (pg. 88)."

In sports and horse betting, players do not play directly against each other; a player's level of skill affects other players because pay-out odds in horse racing or the "line" in sports are adjusted based on the bets of other gamblers. A player's skill level is also affected by the skill of his or her bookie; a particularly good bookie will leave fewer opportunities for the astute player. Only those players who take the time to rationally evaluate all the information available, watch the races or games for subtle clues, look for games where the bookies and other bettors have underestimated horses' or teams' abilities can get an edge. "Trip handicapping" (Beyer, 1983) can help, but knowing that a second place horse from two weeks ago lost because it was "parked" in the fifth path around the last turn, and that its speed figures are underestimated, requires prodigious study and observation.

If all of the players are using the same information, no one can achieve any real long-term edge, and like roulette, in the long term, only the house (e.g., bookie, broker, casino) wins. However, some highly skilled players often have more information, and as a result, the average-skilled player in each of these games can be at a tremendous disadvantage.

Blackjack is perhaps the only game where skilled players do not immediately hurt the short-term success of less skilled players. However, the successes of card counters forced the casinos to change the rules and made it harder to win at blackjack (see Patterson, 1990; Thorpe, 1962).

In interviews with poker players, Horbay and Fritz (1998) found that poker players in treatment for gambling problems over-emphasized the luck element and under-emphasized the skill element. Successful skilled players (those that do not have a gambling problem), on the other hand, emphasized the skill factor — they see luck as having a minimal role.

Books by skilled gamblers (e.g., Warren, 1996) stress the importance of understanding the short-term influence of luck in contrast to the long-term influence of skill. This idea is key to both retaining emotional control during bad beats (e.g., losing what should have been a sure win) and keeping weaker players in the game. However, even players with problems do possess some skill. According to Browne (1989), many players have periods of problem ("tilt") and non-problematic play.

Are problem gamblers simply players who have a poor level of skill? Do they all suffer from false beliefs about their abilities? According to the data presented here, a person could be reasonably good, and yet, in the long term, still lose money. A problem gambling counsellor might conclude that a problem gambler has a distorted belief about his or her own skill, but the reality may be subtler. Moderately skilled gamblers may be caught in a rather odd net — they might know that they are above average players, and yet, may still lose money in spite of winning more often than not.

The counsellor may find that a slightly different approach is needed for such clients. Telling them, for example, that they cannot win because winning is random, would not sit well with clients who know they have the skills. Their self-appraisal may be, in fact, reasonably accurate. But they may not realize just how skilled they would have to be to beat the house edge and the edge of other players (especially in horse racing). However, if they focus instead on how the house rake and better players take their cuts, this may lead to an understanding. The point is that a counsellor should consider the game that a player frequents, and in the case of skilled games, help players understand how even skilled play does not guarantee winning in the long run.

There are a number of limitations to this study. In this simulation, skill was defined in terms of card playing skills (probabilities, pot odds and the ability to apply strategies). In real life, emotional upsets, fatigue and other psychological states also affect the outcome of a game of skill. The ability to read the non-verbal cues of other players while masking their own is also an important factor for skilled players. This simulation does not take into account these specific kinds of skills; however, for the purpose of the simulation, the specific type of skill doesn't really matter. What matters is the difference in skill between one group of players and another. Another limitation is that this simulation treats the two groups — skilled and less skilled — as if they were distinct. In reality, skills vary continuously between individuals. It is unlikely that a table exists where all players are matched in terms of skill.

In addition, the behaviour of the individuals in this simulation are fixed, whereas the behaviour of real players vary considerably. Real players with mediocre skills may become more skilled, drop out of play, play well on one occasion, or get too emotionally involved in a game on another occasion and play badly.

The goal of this simulation is not to show how an unskilled player would fair over the course of his or her life. Instead, the goal is to make a realistic estimate of their expected return (probable long-term outcomes over three years), given their current level of skill, and the mix of skilled and less skilled players at the table. The actual results would only apply to individuals who continued to play against skilled players without improving their own skills. These results, however, are consistent with observations of a player in treatment for poker related gambling problems (Horbay & Fritz, 1998), who lost $40,000 over a three-year period.

Part of the allure of poker and other games of skill is that players feel they can win in the long term. The results of this study show that this belief is often illusory, especially if the other players are more skilled. In a game of skill, the less skilled players can be at a greater disadvantage since they are playing against both the house edge (the rake) and the skilled players' edge. It should be noted that many social players who play for fun rather than money are unlikely to develop gambling problems, even if the odds are stacked against them.

However, consider the plight of the average horse race bettor. The house edge at the track is at least 17% (see Beyer, 1983) and actually higher for some of the more exotic bets (e.g., exactas). Apparently, there are horse bettors who win and have a positive expected return (see Beyer, 1983). This means that the remaining horse bettors are not only up against a 17% house take but also contribute to the 1% or 2% positive return that the expert horse bettors take home. If 10% of the horse bettors are bringing home a positive return of 1%, then the average loss of the remaining players has to drop to around –19% to accommodate this 1% profit. Up against 17%, it would take a fair amount of skill to achieve a return of –10%. This explains why even very skilled horse bettors may end up losing money. Today, perhaps only 1% or 2% of horse bettors make money. Consequently, when a player from a game of skill reports losing consistently, it does not necessarily indicate a lack of ability, but rather that the player has played against the house edge and the edge of more highly skilled players.

This study also has implications for prevention. The types of simulations used in this paper may have a practical application. Showing gamblers how dismal their long-term prospects are may facilitate a re-evaluation of gambling as an activity. Simulations could be used to teach various games as a form of harm reduction. Finally, simulations could also be used to correct such erroneous expectations as the belief that one is due to win.

In summary, this paper shows that an unskilled player is sometimes financially better off in a game of chance than in a game of skill. However, it should be noted that many people play poker not because they expect to make a fortune but because they enjoy playing the game. As long as there are no serious financial consequences, they will continue to play even though they may lose less money at games of chance.

References

Beyer, A.. (1983). *The Winning Horseplayer: An Advanced Approach to Thoroughbred Handicapping and Betting*. Boston: Houghton Mifflin company.

Browne, B.R.. (1989). Going on tilt: Frequent poker players and control. *Journal of Gambling Behavior*, 5(1), 3-21.

Cardoza, A.. (1997). *How to Win at Gambling*. New York: Cardoza Publishing.

Gadboury, A.. Ladouceur, R.. (1989). Erroneous perceptions in gambling. *Journal of Social Behavior and Personality*, 4(4), 411-420.

Horbay, R.. Fritz, B.. (1998, June). *Factors related to problem gambling in poker players*. Paper presented at the 12th Annul Conference of the National Council on Problem Gambling, Las Vegas, Nevada.

Kelly, J.. Skinner, W.. Turner, N.. Noonan, G.. Wiebe, J.. Falkowski-Ham, A.. (2001, April). Project Weathervane: Measuring gambling behaviours, knowledge, and attitudes in Ontario. Presentation given at the Conference of the Canadian Foundation on Compulsive Gambling, Toronto, Canada.

Patterson, J.L.. (1990). *Blackjack: A Winner's Handbook*. New York: Perigee Books.

Rush, B.R.. Shaw-Moxam, R.. (in press). *Treatment of Problem Gambling in Ontario: Service Utilization and Client Characteristics*. Toronto: Centre for Addiction and Mental Health.

Thorpe, E.O.. (1962). *Beat the Dealer: A Winning Strategy for the Game of Twenty-one*. New York: Vintage Books.

Toneatto, T.. Blitz-Miller, T.. Calderwood, K.. Dragonetti, R.. Tsanos, A.. (1997). Cognitive distortions in heavy gambling. *Journal of Gambling Studies*, 13(2), 253-266.

Turner, N.E.. (1998). Doubling vs. constant bets as strategies for gambling. *Journal of Gambling Studies*, 14(4), 413-429.

Warren, K.. (1996). *Winner's Guide to Texas Hold'em Poker*. New York: Cardoza Publishing.

Wong, S.. Spector, S.. (1996). *The Complete Idiots Guide to Gambling Like a Pro*. New York: Alpha books.

Figures

Figure 1: Distribution of outcome after 100,000 spins/hands of roulette and poker.

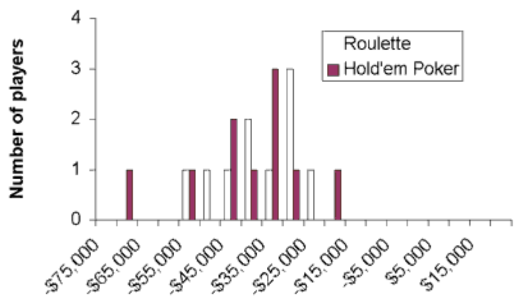


Figure 2: Effect on the distribution of outcomes after 100,000 spins/hands with 2 skilled poker players present.

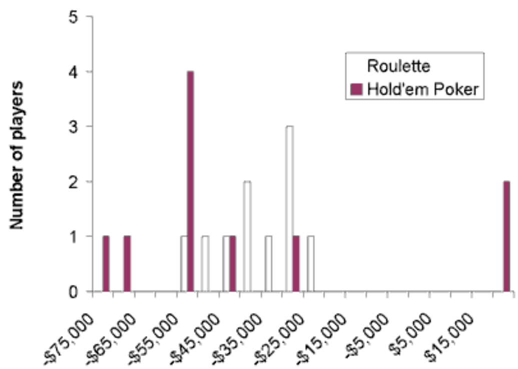


Figure 3: The expected return for skilled and unskilled players as the number of skilled players increases.

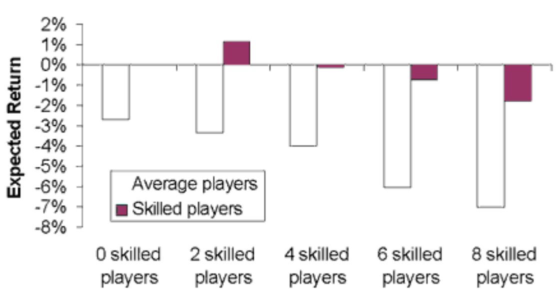
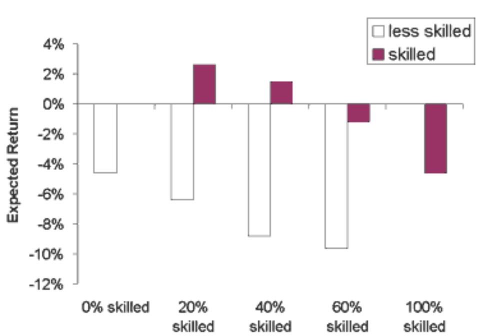


Figure 4: The expected return for skilled and unskilled sports bettors as the number of skilled bettors is increased



Article Categories:

- Research