The relation between behavioral finance cognitive biases, age and gender and problem gambling among stock investors in Iran

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Abstract
This study examines whether problem gambling and behavioral financial cognitive biases can help explain frequent trading in a sample of active investors, suggesting that frequent trading is partly driven by a behavioral addiction to gambling-like activities. of 400 people (M=280, F=120) who reported trading at least once a month. We examined whether gambling and problem gambling were reliable predictors of reported trading intensity. Results showed that rates of gambling and problem gambling were highest among those who reported that stock trading activities were significantly related to measures of stock trading intensity based on time spent per day, the number of transactions, and the amount of money spent. Future research should examine whether gambling history and participation affect how people manage their stock market investments, including their propensity to make riskier decisions and experience more negative outcomes. So far, the relationship between structural characteristics and behavior in an Iranian stock market environment has not been explored. The present study examined the association between structural characteristics and stock market behavior in an environmentally responsible context, using data from real traders. This study supports the hypothesis that behavioral addiction to gambling-like activities is associated with frequent trading of the stock market.
Keywords: Behavioral finance, Gambling, Stock market.

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1. Introduction

"The subject of gambling is all encompassing. It combines man's natural play instinct with his desire to know about his fate and his future."

-Franz Rosenthal

People want to gamble (KUMAR, 2009). The fascination with gambling has long been studied by psychologists, social scientists, economists, and neuroscientists. Recent studies have uncovered gambling-motivated investment preferences in financial markets, where investors seek lottery-like payouts from financial assets. Pathological gambling is considered an impulse control disorder characterized by the individual's urge to gamble and the many difficulties in limiting it despite the harmful negative consequences, followed by significant personal, family, and/or social deterioration. The persistence of gambling and the negative desire to quit brings with it many problems, such as unemployment (absences are common to gambling and consequently layoffs often occur), non-payment of debts, family relationships, the pursuit of money by illegal means (probably antisocial behavior to get money for more bets) and many psychological or even physical problems (drug abuse, anxiety disorders, depression, etc.). Although these individuals may recognize that their attitude towards gambling is the main reason for their problems, they have no control over their impulses to gamble and are very concerned about ways to get money to play with and clear rejection. of the other usual. behaviors. (Barberis, N., and A. Shleifer, 2003), for example, argue that investors with a particular preference have a synergistic effect when trading, which can lead to non-fundamental co-movement in stock price. (Chan, 2016) document that investors in the Hong Kong stock market have a strong preference for gambling and that investors' attitudes towards gambling are one of the driving forces affecting the stock price movement. Affected by gambling preferences, investors prefer stocks with stronger lottery characteristics. The trading behavior of investors driven by gambling preferences is monotonous, and the profits from these trades are almost short-term bid-ask spreads. Frequent trading can exacerbate market volatility and promote the occurrence of volatility anomalies, as evidenced by the annual turnover rate of up to 500% in the A-share market over the past 10 years. Furthermore, investors with betting preferences have a synergistic effect in trading, usually causing the stock price to deviate from its fundamental value in the short term, causing a price bubble. It also contributed to price formation and value deviations. Investors' gaming preferences also play an essential role in shaping the share price in a more general sense. The classical financial theory holds that investors make decisions based on utility maximization and that investors' preference for risk is inextricably intertwined with a utility function. Gambling preference reveals investors' preference for assets with a low probability of a high return and essentially represents the risk-seeking behavior of investors. Therefore, if such investors stopped betting, the risk-free return they needed would be even higher than risk-averse and risk-neutral investors. However, as trade disputes intensify and the economic downturn, Iranian capital markets cannot offer higher risk-free returns to capture the attention of gambling investors. The extent of problem gambling can have serious negative consequences. For example, it can cause financial problems due to debt overload (Boroumand Moghaddam A, 2015). The stock market is a unique type of casino, which allows most investors to win over time (Graham, 2003). This research contributes to previous research on investing and gambling in two ways. This study found that gambling problems were associated with expensive investment behaviors (trading frequency), even at much lower investment engagement levels than found in previous literature. This study, therefore, suggests that more attention should be paid to the hypothesis that a behavioral addiction to gambling-like activities contributes to suboptimal investment behavior in a significant number of investors overall. Furthermore, the study also suggests that gambling prevalence surveys should also ask

questions about investments, as a recent Canadian study did (Williams SN, Dienes KA, 2021). Furthermore, these findings may also have conceptual connections with what has previously been found in gambling. Some investors overestimate their level of financial literacy (Sam William B. Allgood Walstad, 2015), similar to how some players have false confidence in their understanding of gambling, for example, due to cognitive biases such as the illusion of control (C Leonard, R Williams, D McGrath, 2021). Therefore, these findings may contribute to a better understanding of suboptimal decision-making in multiple high-risk domains. Previous research has also linked frequent traffic and arrogance to the male gender, which was not found in the current study (B Barber, T Odean, 2001). Previous gambling research has also linked problem gambling and the male gender (T Afifi, B Cox, P Martens, J Sareen, M Enns, 2010), which the current study also failed to find. Behavioral economics provides frameworks and tools for examining gambling-related behaviors and inferring preventive measures (Matteo M. Galizzi, Daniel Wiesen, 2017). The magnitude of a return on assets is determined by growth prospects over time and varying degrees of economic uncertainty in the economy (Ravi Bansal, Amir Yaron , 2004). Most forms of investment (e.g., stocks and bonds) typically offer positive expected returns over time (Douglas W. Diamond, Raghuram G. Rajan, 2000). Using stocks as an example, stock ownership is considered a "positive-sum game" where investors can expect to earn more than they spend on average (K.L. Fisher, Meir Statman, 2000). According to an analysis of historical data in the United States over the past century, the average annual return on stock market transactions was around 7.9% (Mehra, 2006). As a result, investors were more likely to make money than lose over the period. In contrast, the game is generally random, with outcomes determined mathematically by the laws of probability (Binde, Per, Romild, Ulla, Volberg, Rachel A, 2017). To generate a profit for the gambling industry, almost all commercial forms of gambling (e.g. lotteries and casino table games) are designed to generate negative mathematically expected returns for players over time (Jennifer N. Arthur, Robert Williams, Paul Delfabbro, 2016). Take the example of lotteries. Buying lottery tickets is a "negative-sum game" (Meir Statman, Kenneth L. Fisher, 2002). The expected payment of a ticket price is less than the purchase price because a significant portion of the money goes to the government (Lisa Farrell, Edgar Morgenroth, Ian Walker, 1999). Consequently, gambling leads to losses rather than gains. All in all, gambling generally has a lower chance of a positive expected return than investment. This suggests a lower chance of winning gambling than investing. To demonstrate this, we Google searched four pairs of words "gamble + profit", "gamble + loss", "investment + profit" and "investment + loss". The present study aims to investigate the relationship between gambling, problem gambling, and the intensity of stock exchange trading. The study focused more specifically on regular or monthly gambling, considered to be the closest form of gambling to trading on the stock exchange. This study, therefore, examined the following pre-recorded hypotheses:

H1: Is problem gambling associated with an increase in the self-reported frequency of relative portfolio turnover?

H2: Is a hypothetical association in H1 robust to the addition of controls for measures of cognitive behavioral finance biases, age and gender?

2. Literature Review
2.1. Loss Aversion
Loss aversion is a cognitive bias that explains why the pain of loss has twice as much psychological impact as the joy of winning. Losing money or anything else of value feels worse than gaining the same. (Hofstede, 2001) describes people's aversion to unclear and uncertain

situations. It makes sense that this is also a factor in the decision to enter the stock market: a dark and uncertain area where returns are unpredictable and investment options are numerous and frighteningly complicated for the uninitiated. This has already been demonstrated in the difference between local and foreign equities: foreign equities appear less predictable and more opaque, so overseas propensity is stronger where the UAI is highest (Sjoerd Beugelsdijk, Bart Frijns, 2010). The effect is robust even when controlling for standard control variables and the aversion to ambiguity previously believed to be related to the equity premium (Gollier, 2011); (Marc Oliver Rieger, Mei Wang, Thorsten Hens, 2017).

2.1.1. Endowment Effect
The endowment effect describes how people tend to value owned items more than if they don't own them. This means that sellers often try to charge more for their items than the price elsewhere. (Weaver Ray, Frederick Shane, 2012) offer a related narrative that the endowment effect arises when people's valuations are lower than an object's reference price (because an object's reference price is often its price steps). When sellers adjust their selling prices to high benchmark prices, their valuations no longer reflect solely their underlying estimates of the property's value. See Weaver and Frederick (2012) offer a related narrative that the endowment effect arises when people's valuations are lower than an object's reference price (because an object's reference price is often its price steps). When sellers adjust their selling prices to high reference prices, their valuations no longer reflect just their underlying estimates of the property's value. Weaver and Frederick (2012) report result consistent with this hypothesis.

2.1.2. Familiarity Bias
Tendency to make investment decisions based on: Familiar with investment options. Familiarity bias refers to the preference of individual investors to invest in shares of companies they know (Victor Ricciardi, H. Kent Baker, 2014); (Gustavo Grullon, George Kanatas, James P. Weston, 2004); (Speidell, 2009). When presented with two alternatives, individuals generally prefer the alternative with which they are more familiar than the unknown. According to (Craig R. Fox and Amos Tversky, 1995), this preference is also reflected in the selection of securities for investment purposes. The tendency to the familiar and the aversion or fear of the unknown culminates in the basic assertion that investors simply prefer to invest in securities that are familiar to them (Huberman, 2015). It seems that the behavior of investors in the financial market is closely related to the behavior of consumers in the commodity market. According to (Inga Chira, Michael Adams, 2011), the perception of brands by individuals is influenced by their degree of familiarity with the products associated with these particular brands.

2.1.3. Status Quo Bias
Status quo bias is a type of cognitive bias in which people tend to prefer the status quo or to maintain the status quo. While this prejudice can influence human behavior, it is also a topic of interest in other fields such as sociology, political science, and economics. Studies by (Zulia Gubaydullina, Oliver Hein, Markus Spiwoks, 2011) have provided the first indications that forecasters may systematically underestimate the magnitude of future interest rate changes. The reasons for this behavioral deviation are believed to be related to the reliance on the reference point of individual decision-making processes (Daniel Kahneman and Amos Tversky, 1979). Potential losses that can be related to a change are weighted higher than possible gains. Furthermore, a loss that occurs as a result of an active decision is perceived more clearly than a loss caused by inactivity (LANDMAN, 1987). This cultivates a preference for the status quo. For example, if individuals are affected by the status quo distortion, they will not (or at least

not sufficiently) adjust a portfolio of stocks they have inherited to their risk profile and investment preferences. In this way, investors can keep a portfolio that they would not have chosen to build had they inherited a sum of money. The distortion of the status quo is also present when an investor buys an unprofitable stock just because he has already bought stock in the same company in the past.

2.1.4. Bandwagon Effect
A bandwagon effect is a well-documented form of groupthink in the behavioral sciences. Consumer beliefs are spreading among people as fads and trends lead everyone to take over. The tendency to follow the actions or beliefs of others may arise because individuals directly prefer to conform or because individuals derive information from others. The bandwagon is a situation where an individual wants the same item that a group of people wants because they want to be part of fashion and ignore their personal choices (Choi, 2015). Not only does the training effect have to be positive, but when the image of a particular brand is expressed negatively, it is carried away by others. (Dr. Irfan Sabir, Ashna Azam, Muhammad Bilal Majid, Dr. Mohd Sadad bin Mahmud, Naila Sabir, 2020).

2.1.5. Sunk Cost Fallacy
The sunk cost fallacy describes the tendency to keep trying after having already invested time, effort, or money, regardless of whether the current costs outweigh the benefits. Sunk Cost Fallacy (Marijke van Putten, Marcel Zeelenberg, Eric van Dijk, 2010) argue regarding this scenario that "people regularly use sunk costs to justify further investment in many decisions, ranging from the decision to eat a dessert for which one has already paid (Thaler, 1985) for the decision to continue the research and development of products that have already achieved better performances (Arkes, 1985).

2.2. Problem Gambling
Several studies have shown that problem gamblers tend to score higher on a group of traits related to the dimensions of impulsivity and negative emotionality (R. Michael Bagby, David D Vachon, Eric L. Bulmash, 2007) (Wendy S Slutske, Avshalom Caspi, Terrie E Moffitt, Richie Poulton, 2005). However, this general profile can obscure some important differences based on preferred gaming activities. For example, it has been stated that problem gamblers can be classified into subgroups based on their approach to arousal: a subgroup that uses gambling as a means of increasing arousal and a subgroup that uses gambling as a means of reducing arousal (Lia Nower, Alex Blaszczynski, 2002). Gambling activities clearly differ in this respect; some are simple and solitary (slots, for example) and promote dissociative states that can serve to reduce arousal. Others are more complex and social (e.g. craps) and can serve to increase arousal.

2.2.1. Age and Gambling
The relationship between gambling and age has been studied in different jurisdictions and some studies have found that gambling and problem gambling are more prevalent among those in the younger age group (Stitt G. B., Giacopassi D., Nichols M, 2003), (Desai R. A., Maciejewski P. K., Dausey D. J., Caldarone B. J., Potenza M. N, 2004).
The legalization of state-sanctioned gambling facilities and the proliferation of casinos around the world have led to greater social acceptance of gambling as a pastime among the elderly (Boreham P., Laffan W., Johnston J., Southwell J., Tighe M., 2006) (Levens S., Dyer A. M., Zubritsky C., Knott K., Oslin D. W, 2005).

2.2.2. Gender and Gambling
(Strachan, M. L., & Custer, R. L, 1993) studied the profile of 52 players in Las Vegas G.A. in 1989, but no comparison with men was given. The few studies that examine issues related to gender differences were unsystematic and provided limited information. The study by (Christine Savoye, Claudine Laurent. Stéphane Amadeo, Francis Gheysen, Marion Leboyer, Jean Lejeune, Edouard Zarifian, Jacques Mallet, 1998) is interesting and found a more significant genetic association when only female players were included in DNA analysis of the D4 receptor gene. The combination of such facts may have attracted women to the game of bingo, without the characteristics of other types of games, which many cultures consider to be the "masculine" domain (Lesieur, Henry R., Mark, Marie E., 1992).

3. Methodology
3.1. Participants and procedure
This survey involved 400 participants who reported trading on the stock exchange at least once a month in the previous year. Table 1 summarizes the demographic characteristics for the three groups and shows that the sample was predominantly male and under the age of 30. A small number of cases (around 30) were excluded because they did not answer the validity or focus questions; completed the survey too quickly; or gave incomplete answers.

3.2. Measures
Participants were asked to answer a series of questions about their gambling habits and how they traded on the stock market.

3.3. Demographic Characteristics
This sample was part of a larger sample of 400 respondents, which also included some people trading stocks.

Table 1. Demographic characteristics

	Stock Market N=400	X2
Gender		
Male	280(70)	
Female	120(30)	Ns
Age		
18-30	164(41)	
31-40	149(37.25)	
41-50	46(11.5)	
51-60	23(5.75)	
61+	18(4.5)	22.0

3.4. Data Analysis
Ordinary least squares (OLS) regression was used for all analyses. The primary outcome measure was trading volume relative to portfolio size, known as relative turnover. For this variable, we added the total value of security purchases to the total value of security sales to

obtain a measure of absolute turnover. For the individual characteristics scale, we counted the number of questions answered correctly. These were then standardized to a range of 0 to 1. Table 2 shows some descriptive statistics of the main variables of this study.

Table 2. Descriptive Statistics

	Mean (1)	Std. Dev. (2)
Trading Outcomes		
Value Purchase	46,375	378,260
Value Sales	39,263	284,298
Value Portfolio	89,264	531,831
Relative Turnover	1,349	0.954
Individual Characteristics		
Problem Gambling	0.2298	0.1845
Age	28.57	12.72
Loss Aversion	0.7012	0.2451
Endowment Effect	0.6109	0.2269
Familiarity Bias	0.5981	0.1927
Status Quo Bias	0.7298	0.2681
Bandwagon Effect	0.7891	0.2915
Sunk cost fallacy	0.5216	0.1763

Note: This table provides descriptive statistics in the reduced sample (dropping missing data and outliers) for the study's variables.

4. Results

The hierarchical nature of Hypotheses 1-2 means that we chose the hierarchical regression approach, showing all the results in Table 3. Column 1 shows the estimates associated with Hypothesis 1. Columns 2 and 3 are related to Hypothesis 2. The single estimate in column 1 of Table 3 was statistically significant ($P < 0.001$) and the estimate was positive, indicating support for hypothesis 1. As measures of cognitive bias in behavioral finance are standardized, an estimated coefficient of 1.251 in column 1 suggests that a 1-unit increase in gambling addiction is associated with a 1.251 increase in relative turnover. With hypothesis 1 supported, we ran additional models to see if this association remained important when controlling for established determinants of gambling and investing behavior. Therefore, this supports hypothesis 2. Furthermore, the direction of the association between cognitive biases in financial behavior and the relative frequency of transactions was as expected. This suggests that an increase in the variable is associated with an increase in relative portfolio turnover. However, of the two, only behavioral finance cognitive biases were statistically significant (p-value > 0.001 in all models. The results of our study do agree with this finding. Indeed, the effects of age become significant ($P < 0.001$ in Table 3). Contrary to Barber and Odean (2001), we find that women also tend to be more arrogant than men. Additionally, males tend to be older and more financially and cognitively biased in behavior. Interestingly, we find no gender difference in the severity of problem gambling. When all these other factors are taken into account, the effects of gender become non-significant ($P \geq 0.473$ in Table 2). We perform a series of checks to ensure the robustness of our results. In our main analysis, we eliminate the data points with the lowest and highest 5% of the relative revenue measurements of our dependent variable. However, due to the much greater volatility in the larger sample, the strength of the relationships drops dramatically. To ensure that our results are not affected by the asymmetry of the dependent variable, we perform the same analysis by taking the logarithm of our measure of relative sales.

In both analyses, the main results proposed in this article (which confirm hypothesis 1 and hypothesis 2) remain in all specifications.

Table 3. Results of hierarchical regressions relevant to Hypotheses 1–2

	(1) $Rel.Turn.$	(2) $Rel.Turn$	(3) $Rel.Turn$
Problem Gambling	1.251 (< 0.001)	1.010 (< 0.001)	0.796 (< 0.001)
Behavioral Finance Cognitive Biases		−0.0528 (< 0.001)	−0.0683 (< 0.001)
Gender (Female)			0.0412 (0.473)
Age			−0.0128 (< 0.001)
N	400	400	400

Notes: Outliers above the 5th and 95th percentiles of the dependent variable's distribution were excluded. Each cell displays the estimated coefficient for each independent variable, with the associated P-value shown in brackets immediately below.

4.1. Descriptive details of gambling and trading habits

Table 4 provides descriptive information on the trading habits of the stock sample. About a third of the sample traded on the stock exchange at least weekly and the rest 1-3 times a month. The average trade value was $ 150, but some spent more than $ 5,000 per trade. ($n = 400$).

Table 4. Descriptive Information

	$M(SD)$	Range
Trades per day	4.2(4.60)	0 − 25
Individual trade value	(Md = 3)	$1 − $5,000
	$410.8(267.37)	0 − 90 +
Monitoring events per day	(Md = $150)	0 − 15
	21.7(19.54)	
Hours per day	(Md = 2.0)	
	1.7(1.93)	
	Md = 2.0	
Frequency	N(%)	
Once per month		
2 − 3 times per month	95(27.2)	

	$M(SD)$	Range
Weekly	64(21.8)	
$2 - 3$ times per week	21(7.0)	
Daily	34(17.9)	

Md = Median. About an hour a day (regular he equates to about an hour a day) and in stock market activity he is about two hours a day.

4.2. Multiple regression

To identify the predictors of the intensity of stock market behavior, a multiple regression by backward elimination was applied. This method uses tolerance bounds to remove redundant and collinear predictors. Only those that explain a significant fraction of the variance of the dependent measure are retained. Table 5 summarizes the variables retained in the models according to the different measures of the intensity of the behavior.

Table 5. Variables Information

	Stock Market N=400 N (%)
Loss Aversion	169(42.25)
Endowment Effect	210(52.5)
Familiarity Bias	153(38.25)
Status Quo Bias	172(42)
Bandwagon Effect	244(61)
Sunk cost fallacy	97(24.25)
Non-problem	40(10)
Low Risk	50(12.5)
Moderate Risk	190(47.5)
Problem Gmabling	120(30)
Stock Trading (Monthly +)	373(93.25)

5. Conclusion

There are significant characteristics of gaming preferences in the Iranian A-share market and the gaming preferences index compiled in this article perfectly summarizes four betting speculations. Furthermore, we find that as the gambling preference index strengthens, the portfolio return shows a significant downward trend. The high gambling preference corresponding to lower equity returns confirms the empirical picture of "ten bets and nine losses". We find that behavioral finance cognitive biases and age were statistically significant and also gender is not significant. The stock market investor is generally considered to be

someone with expertise, a solid understanding of economics, and the ability to understand the workings of a complex and organized entity like the stock market. This finding suggests that factors associated with gambling behaviors related to psychological distress and personality traits were common regardless of the type of problem gambling. We believe this association occurs due to underlying structural similarities shared between commerce and gambling, but also due to some similarities in the populations involved in the two activities. The results should not be taken as a statement that the stock market is a harmful and unprofitable business for some people, but that the risk may be greater if undertaken by people who also gamble and therefore can get close to both.

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