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Informed and uninformed investors in Iran: Evidence from the Tehran Stock Exchange

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ABSTRACT

The financial markets of the Islamic Republic of Iran, mainly represented by the Tehran Stock Exchange (TSE), remain one of the least studied of major emerging stock markets. We have collected a large data set on investment behavior of informed and uninformed investors at the Tehran Stock Exchange (TSE). Using exploratory factor analysis and structural equation modeling of latent variables, we find that investors in Iran are not homogenous, exhibiting different behavior across demographic, psychological, and economic variables. Informed investors' behavior is consistent with the general recommendations of the economic theory. They view investment knowledge and economic-related variables more importantly than uninformed investors who are more influenced by behavioral variables such as sentiment and personality. Such behavioral differences have also been observed in other studies analyzing the relationship between investment performance variation and investors' type in emerging stock markets. From a public policy perspective and given Iran's emerging economic opportunity, our findings emphasize the need for more effective regulation of investment products, sales, and advisory services, coupled with some basic financial literacy education both at pre-and-post-secondary levels in Iran. Such steps will improve the quality of individual investors' decisions, increase investor confidence and participation in capital markets, provide companies with better access to cheaper source of risk capital, and, ultimately, advance the overall economy in Iran.

1. Introduction

Recently, there has been a renewed interest in understanding investors' behavior in emerging stock markets. The surge in interest basically reflects the stronger regional economic growth, continuing capital market development, and opportunities for global diversification (Luong & Ha, 2011; Ady, Sudarma, Salim, & Aisyah, 2013; Chang & Lin, 2015; Chandra, 2008; Lee, Huang, Chang, & Cheng, 2011; Hassan Al-Tamimi, 2006). The financial markets of the Islamic Republic of Iran, mainly represented by the Tehran Stock Exchange (TSE), remain one of the least studied of major emerging stock markets. The recent agreement between Iran and leading global economies has drastically reduced restrictive barriers that have retarded the country's economic progress in recent years. As Iran's overall economic prospects show signs of improvement, there has

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Table 1
Tehran Stock Exchange (TSE): market overview, 2013–2016*.

Market Items		2013	2014	2015	2016	2013–2014 (%)	2014–2015 (%)	2015–2016 (%)
Market caps		346	116	89.43	108.80	(66)	(22)	22
Total trading value		47	25	8.45	18.69	(47)	(66)	122
Trading days		241	241	240	241	–	–	–
Main index (TEDPIX)	(Year-end)	87,452	68,973	61,691	79,486.60	(21)	(10)	29
	(Highest)	88,191	89,501	70,843	81,536.90	1.5	(21)	15
	(Lowest)	36,447	68,973	61,163	61,710	89	(11)	0.9

* All figures are in billion U.S. dollars.

been an increasing demand for understanding its financial markets and investor behavior. This emerging interest reflects both the existence of opportunities for global diversification and partnerships and, domestically, the need to provide greater and cheaper access to long-term risk capital to increase private sector investment.

Economic theory posits that investors act rationally in making financial decisions (Farlin, 2006; Bolhuis, 2005; Kim & Nofsinger, 2008). However, the concept of rationality is at best unclear and ambiguous, and financial decisions by investors often deviate from standard assumptions of economic theory (Bolhuis, 2005). Behavioral economists have shown that psychological factors (taste, personality, sentiments), environmental effects (culture, traditions) and demographic attributes (age, gender, race) may, in some cases, lead to decisions that deviate from rational financial predictions (Dufwenberg, 2002; Statman, 2004; Shiv, Loewenstein, & Bechara, 2005; Sundali, Stone, & Guerrero, 2012; Brundin & Gustafsson, 2013; Lin, 2009; Beracha, Fedenia, & Skiba, 2014; Bali, Demirtas, Levy, & Wolf, 2009; Roberts, Wood, & Smith, 2005; Kajisa & Palanichamy, 2010; Alderman & King, 1998). Further, the focus on average individual investors may obscure the tremendous variation in investment performance which may be traced to investors' type represented by investment skills, cognitive abilities, and behavioral patterns. Overall, informed investors' behavior is expected to conform more closely with the expectations of economic theory and to be less responsive to behavioral patterns of decision making (Brockman & Chung, 2003; Firoozi, Jalilvand, & Lien, Forthcoming; Coval, Hirshleifer, & Shumway, 2005; Barber, Lee, Liu, & Odean, 2011; Venezia & Shapira, 2007).

In this study, we contribute to the behavioral economics literature and its role in developing emerging countries' financial markets in three main areas. First, we provide timely and comprehensive information on the behavioral characteristics of investors at the Tehran Stock Exchange (TSE) at a crucial time when the international community has begun relaxing its long-standing restrictive trade and regulatory sanctions. Beginning modestly with only six companies listed in 1967, the TSE has evolved into a leading emerging market stock exchange among the Middle East and North African (MENA) countries (Yahyazadehfar, Zali, & Shahabi, 2009). With a three-year (2013–2016) average market capitalization of over $US 140 billion, TSE ranks 36th in the world[1]. Some representative features of the TSE during the period 2011–2016 are reported in Table 1.

Second, we use a unique data set that permits us to investigate the differences between informed and uninformed investors in Iran. As informed and uninformed investors exhibit different risk tolerance, sentiments, sophistication, and knowledge, we have an interesting opportunity to examine the implications of the investors' type and the non-homogenous nature of investor population for understanding investors' behavior in Iran. We are also avoiding previous studies' potential confounding problems resulting from the use of non-homogenous samples of investors, both in terms of availability and utilization of private information. Third, we recommend economic and regulatory options to increase investor participation in the securities markets, further enhancing Iranian firms' access to long-term risk capital, reducing financial risk, and, ultimately, creating increased economic growth.

Using exploratory factor analytic and structural equation modeling of latent variables, we find that investors in Iran are not homogenous. Informed investors' behavior is more consistent with the general recommendations of the economic theory. On the other hand, uninformed investors are more influenced by behavioral variables such as sentiments and personality, also observed in average individual investors in other emerging stock markets (Luong & Ha, 2011; Ady et al., 2013; Chang & Lin, 2015Chandra, 2008; Lee et al., 2011; Hassan Al-Tamimi, 2006). Our results for informed investors in Iran parallel those obtained by previous studies of the relationship between investors' type and variation in investment performance in different emerging stock markets (Brockman & Chung, 2003; Firoozi et al., Forthcoming; Coval et al., 2005; Barber et al., 2011; Venezia & Shapira, 2007). Taking full advantage of the removal of international sanctions, we also contend that Iran needs to develop policies to rapidly improve its low global standing in investors' financial literacy, thus improving the quality of individual investors' decisions. It further needs to enact more transparent regulatory and securities standards to strengthen investor confidence to increase participation in capital markets.

Our paper is organized in five sections. A review of the literature and rationale for selecting representative variables influencing investors' behavior are presented in section two. Our empirical model, sample, and variable definition are discussed in section three. Basic results are discussed in section four. Concluding remarks and policy recommendations are presented in section five.

[1] There are over 420 companies at the TSE representing more than 40 industries including automotive, telecommunication, agriculture, petrochemical, mining, steel, iron, copper, banking, and insurance.

Table 2
Descriptive evidence: preliminary investors' sample.

	Frequency	Percentage
Gender		
Male	345	95.00
Female	18	05.00
Age		
20–24	8	02.20
25–29	54	14.90
30–34	127	35.00
35–39	109	30.00
40 or above	65	17.90
Education		
Diploma	73	20.10
Associate degree	62	17.10
Bachelor	175	48.20
Master	49	13.50
Ph.D.	4	01.10
Investing experience		
<6 Months	11	03.00
6–12	29	08.00
12–24	47	12.90
24–48	66	18.20
>48 months	210	57.90
Income (Rials)		
<2000,000	25	06.90
2000,000–4000,000	40	11.00
4000,000–6000,000	51	14.00
6000,000–8000,000	83	22.90
8000,000–10,000,000	58	16.00
>10,000,000	106	29.20

2. Factors affecting investors' behavior in Iran

Because active individual investing is a recent phenomenon in the Iranian securities markets, we have triangulated two separate data sources to identify possible factors influencing investors' decisions. First, we conducted a survey for a sample of 400 randomly selected investors provided by the Tehran Stock Exchange. Investors were asked to prioritize a long list of possible factors influencing their decisions. Overall, the survey resulted in 377 completed questionnaires, out of which a total of 363 were useable. Descriptive demographic information on this sample is reported in Table 2.

Second, we searched the previous literature in behavioral economics for identifying representative and frequently used variables influencing investors' behavior. Triangulating the information obtained both from the investors' survey and the review of the previous literature, a total of eleven variables (six behavioral factors, two economic factors, and three "other factors" (not classified as either behavioral or economic ones)) were identified. The investors' behavioral factors are represented by sentiment (IS), weekend effect (W), gender (IG), age (IA), personality (IP), and culture (IC). The economic factors are designated by profitability (IPr) and liquidity (IL). Finally, other factors are represented by knowledge (IK), company brand (CB), and company marketing (CM). A review of the literature for the selected variables is reported in Table 3. More specifically, our empirical hypotheses for the six behavioral factors are presented as follows:

H1. Investors' decisions are affected by their sentiments

H2. Investors' decisions are influenced by the weekend effect.

H3. Investors' decisions are affected by their gender.

H4. Investors' decisions are affected by their age.

H5. Investors' decisions are affected by their personality characteristics.

H6. Investors' decisions are affected by their cultural characteristics.

The empirical hypotheses for the economic factors are presented as follows:

H7. Investors' decisions are affected by company profitability.

H8. Investors' decisions are affected by company liquidity.

Finally, the empirical hypotheses for the other factors are presented as follows:

H9. Investors' decisions are affected by their financial and market knowledge.

H10. Investors' decisions are affected by a company's brand.

Table 3
Review of the literature on selected latent variables and hypothesized effect on investors' decisions.

Categories	Factors	Previous studies' key finding	Our hypotheses
Behavioral Factors	Sentiment	Attitudes and feelings associated with behavioral interactions can act as contributing factors in investment decisions (Ashkanasy, Hartel, & Daus, 2002; Dufwenberg, 2002; Shiv et al., 2005; Sundali et al., 2012; Brundin & Gustafsson, 2013). Welpe, Spörrle, Grichnik, Michl, and Audretsch (2012) concluded that fear reduces the tendency to invest and happiness and anger will increase the propensity to make such decisions (Van Kleef, De Dreu, & Manstead, 2010)	H1
	Weekend effect	Lakonishok and Maberly (1990) found that NYSE trading volume on Monday is lower than that other days of the week. They further contend that the increase in activity by investors on Monday is not symmetric for buy and sell transactions. Lakonishok and Levi (1982) find that settlement and clearing hypothesis provides a partial explanation for the weekend effect. Further, the results may vary between emerging and developed markets (Barone, 1990; Venezia and Shapira, 2007). Ritter and Chopra (1989) proposed that the "January effect" is caused by the buying and selling behavior of individual investors. Venezia and Shapira (2007) compare the trading patterns of amateur and professional investors during the days following the weekend in a major brokerage house in Israel from 1994 to 1998. They find that weekends influence both amateurs and professional investors; however, they affect them in opposite directions	H2
	Gender	Barber and Odean (2001) concluded that men are more over-confident than women. Men, on average, traded 45% more than women. Feng and Seasholes (2008) found that men and women invest similarly in newly organized stock markets, as opposed to developed ones. However, men tend to trade more often than women do, and both men and women experience similar "home bias" effect. Gender differences could also impact investment strategy, risk tolerance, and confidence (Felton, Gibson, & Sanbonmatsu, 2003; Lewellen, Lease, & Schlarbaum, 1977; Graham, Stendardi, Myers, & Graham, 2002; Lascu, Babb, & Phillips, 1997; Bogan, Just, & Dev, 2013)	H3
	Age	Motivated by the observation that cognitive abilities decline with age, Korniotis and Kumar (2009) predict and find evidence to support the notion that investment performance declines with age. Summers, Duxbury, Hudson, and Keasey (2006) find attitudinal differences among investors of different ages. Lewellen et al. (1977) also show a significant relationship between preferences of investors and their ages	H4
	Personality	Personality type has a significant effect on investment behavior (Farlin, 2006; Nichelson, Soane, Fenton, & Willman, 2005). Filbeck, Hatfield, and Horvath (2005) and Carducci and Wong (1998) showed that type A personality investors are more likely to engage in riskier investments	H5
	Culture	Using Hofstede's (2001) multi-dimensional intercultural framework, Grinblatt and Keloharju (2001) and Chui, Titman, and John John Wei (2003) find that cultural differences influence momentum-based portfolio strategies. Other studies find cultural dimensions influence foreign portfolio choices (Aggarwal, Kearney, & Lucey, 2012), mergers and acquisitions (Ahern Kenneth, Daminelli, & Fracassi, 2015), and trading frequencies (Beracha et al., 2014)	H6
Economic factors	Profitability	Profitability and other accounting based measures of performance have consistently positively influenced investors' decisions (Baker and Haslem, 1974; Hassan Al-Tamimi, 2006). In the Taiwan Stock Exchange, Lee et al. (2011) find that profitability is the most important variable affecting investment decisions, followed by growth, and trading volume	H7
	Liquidity	Liquidity and other cash flow-based measures of performance have a systematic and positive effect on investment decisions (Brockman, Howe, & Mortal, 2008; Byrne, 2005; Shim, Lee, & Kim, 2008)	H8
Other factors	Knowledge	Ivković, Sialm, and Weisbenner (2008) show that informed and knowledgeable investors tend to concentrate their portfolios in the stocks for which they hold an informational advantage which outperform diversified portfolios by 16 bps per month. Using data from Finland, Grinblatt, Keloharju, and Linnainmaa (2011) provide convincing statistical evidence that high-IQ investors make better trades than low-IQ investors. Other evidence in support of investors' knowledge: Clark-Murphy and Soutar (2004), Frieder and Subrahmanyam (2005), and Garmaise (2009)	H9
	Company brand	Corporate identity and brand are drivers of investment behavior (Hatch & Schultz, 2003; Clark-Murphy & Soutar, 2004; Frieder & Subrahmanyam, 2005; Garmaise, 2009)	H10
	Company marketing	Marketing approaches are shown to affect investors' preferences and decisions (Statman, 2004; Clark-Murphy & Soutar, 2004; Fama & French, 2007; Garmaise, 2009). Some investors may have preferences that go beyond financial returns and investment risk (Fisher & Statman, 1997)	H11

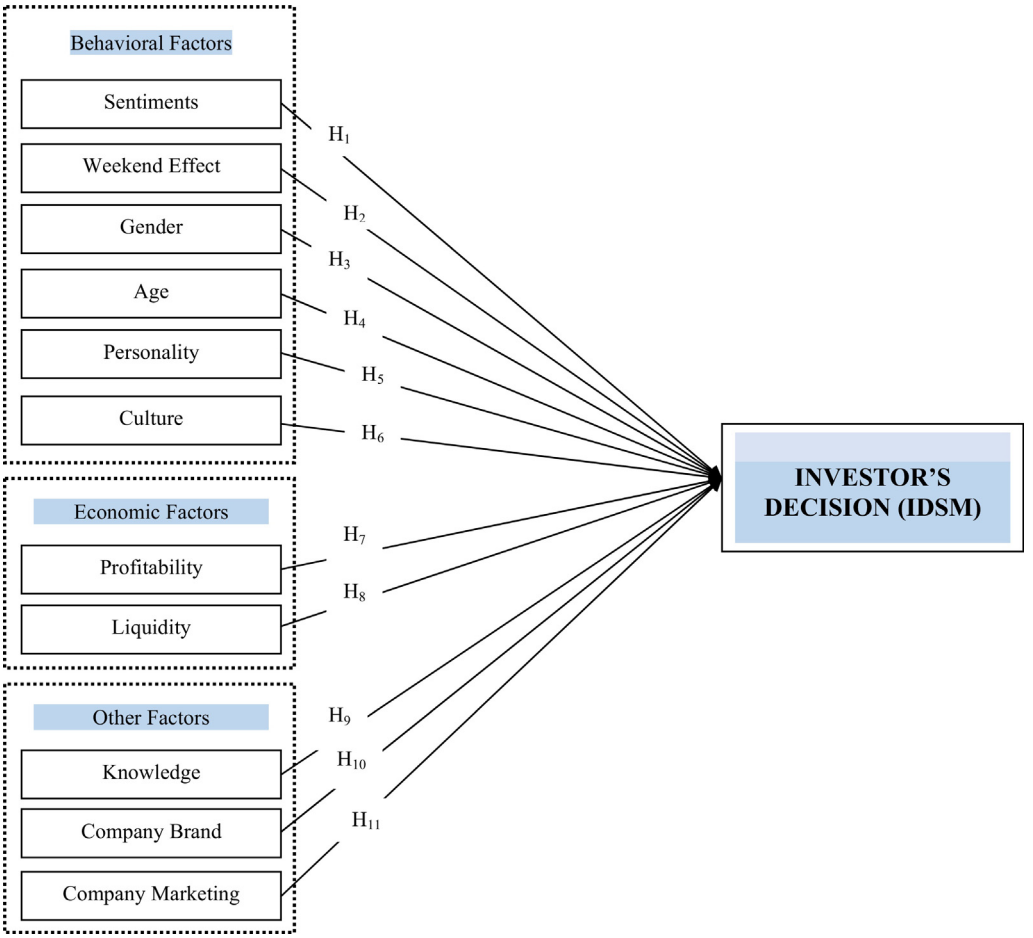

Fig. 1. Conceptual model of investor's behavior.

H11. Investors' decisions are affected by a company's marketing.

3. Conceptual model, data, and sample

We use a structural equation model of latent variables to explain the overall "causal" relationship between latent variables and investors' decisions. The overall process is likely to be endogenously determined. As a result, in the social sciences, and increasingly in biomedical, public health, and financial economics, latent variable structural modeling has become an indispensable tool to examine complex interrelated system of behavioral situations. (Bagozzi, 1994; Baumgartner & Homburg, 1996; Bollen, 1989, 1996; Lee & Wang, 1996; Steenkamp & van Trijp, 1991). The model is graphically depicted in Fig. 1.

The model is estimated by LISREL 8 which is specifically equipped to deal with a wide variety of structural equations for the analysis of latent variables, including possible sources of endogeneity among the investors' decision and the latent variables[2]. The estimated coefficients of the structural equation model represent the theoretical cause-and-effect relationships among the latent variables and investors' decisions. A comprehensive questionnaire was sent to a random sample of investors including both individual (uninformed) and professional (informed) investors. The latter category included both investment professionals at mutual funds and stockbrokers at the TSE. Professional investors were specifically asked to comment on their personal investment transactions as opposed to those rendered on behalf of institutional clients. The TSE provided a random sample of 442 individual investors. Separately, we contacted 245 professionals at major mutual funds and stockbrokers at the TSE.

[2] We thank one of our reviewers for raising the potential issue of endogeneity among variables.

Overall, the questionnaire consisted of two parts. The first part covered demographic questions. The second part related to eleven latent variables representing behavioral, economic, and other related factors influencing investors' decision as reported in Table 3. Each latent variable is explained by a set of explanatory questions selected from the literature covered in Table 3. Investors' decision to buy and sell stocks is also represented by a separate explanatory question. To assess the validity of the questions representing each latent variable, exploratory factor analysis (EFA) technique (with Varimax) was used to rate the convergence of included questions (Fabrigar, Wegener, MacCallum, & Strahan, 1999)[3]. For our study, we only considered questions with factor loadings greater than or equal to 0.5. Factor loadings of less than 0.5 reflect weak associations between the questions and latent variables[4]. The final questionnaire and factor loadings for individual explanatory questions are reported in Table 4. Overall, 590 questionnaires were returned, of which a total of 561 were usable representing a high response rate of over 80%. TSE's overall support of our study was instrumental in securing this high response rate. As a policy, the exchange has routinely made its market and microstructure data bases available to researchers examining the behavior of capital markets and investors in Iran. The sample distribution is reported in Table 5.

4. Results

Descriptive evidence for the full, informed, and uninformed samples of investors is reported in Table 6. Overall, the demographic characteristics are basically similar across all samples of investors. The gender distribution of the respondents is heavily male dominated. In the full sample, out of the 561 respondents, 502 (89.48%) are male and 59 (10.52%) are female. The investors' age is more evenly distributed. Overall, the age categories of 20–24 and 30–34 accounted for the fewest and the largest number of respondents in all samples. Investors with four or more years of transactional experience were the largest among other categories of investing experience. Finally, investment income in the range of 6000,000 to 8000,000 Rials related to the largest number of investors in the full and uninformed samples of investors[5]. For informed investors, the sub-category of investment income of over 10 million Rials related to the largest number of investors.

Overall, the model fits the data quite well for the pooled sample and, separately, for the sub-samples of informed and uninformed investors. The results are reported in three separate panels for the full and the sub-samples in Table 7. The Chi Square tests of the models across all samples are statistically significant at the 3% level or better. We also calculated the Root Mean Square Error of Approximation (RMSEA) for the models across all samples. In all cases, the calculated RMSEA values were less than 0.05, representing a strong fit for the model[6].

Conceptually, the use of the structural equation modeling of latent variables may be questioned for its ex-ante specification. Put differently, one may wonder whether our results are dependent on the structure of the model and the latent variables used. To address this concern, we partitioned the latent variables into three categories: behavioral, economic, and others. Multiple regression was then performed on each set of variables for the entire sample of 561 respondents. The coefficients of the latent variables in each sub-sample are still statistically significant and positive. Coefficient sizes have also remained relatively stable. The additional empirical results provide support for the validity and stability of our conceptual model with respect to the choice of the latent variables[7].

The results in Table 7, panel (A), systematically support all the proposed hypotheses for the full sample. The estimated coefficients of all behavioral, economic, and other variables are positive and statistically significant at the 5% level or better[8]. To examine the relative importance of the variables, we ranked them based on the size of their estimated coefficients. The results are reported in Table 8. Friedman's non-parametric test of differences in treatments across multiple attempts was used to test the statistical significance of the latent variables' ranking[9]. Friedman's Chi-square test shows that differences in variables' rankings are statistically significant at the 1% level or better. Overall, investors in Iran appear to be more significantly influenced by economic variables relative to behavioral ones. Specifically, sentiment (6th), personality (7th), gender (9th), culture (10th), and age (11th) are significantly less influential on investors' decisions than profitability (1st), weekend-effect (2nd), knowledge (4th), and liquidity (5th). The relatively lower importance of behavioral variables to economic ones is surprising and contrary to the results of previous studies of the exchanges in Vietnam (Luong & Ha, 2011), Indonesia (Ady

[3] Exploratory Factor Analysis(EFA) is a statistical method used to uncover the underlying structure of a relatively large set of variables (Fabrigar et al., 1999). By using the EFA approach, we identify the underlying relationships between latent variables, explanatory questions, and the decision to invest. Varimax rotation is used to simplify the expression of a particular sub-space in terms of just a few major items. Varimax maximizes the sum of the variances of the squared loadings (squared correlations between variables and factors) to preserve orthogonality.

[4] We initially employed 60 separate questions which were reduced to the final set of 39 questions based on factor loadings of 0.5 or better, Table 4.

[5] For the month of May 2017, one U.S. dollar was, on average, exchanged for 32,400 Iranian Rials.

[6] The root mean square error of approximation (RMSEA) is one of the most widely reported measures of fit/misfit in applications of structural equation modeling. It avoids issues of sample size by analyzing the discrepancy between the hypothesized model, with optimally chosen parameter estimates, and the population covariance matrix. The RMSEA ranges from 0 to 1, with smaller values indicating better model fit.

[7] Alternatively, one could partition the sample based on demographic attributes, such as age or gender, estimate the model separately and compare the results. We have left such an examination for future research. We thank one of our reviewer for raising this issue.

[8] One reviewer raised the possibility that an aggregation bias may have been introduced by combining stock brokers at the TSE and investment professionals at mutual funds. We removed the stock brokers' responses and re-estimated the model both for investment professionals and for the full sample. The results remained basically the same.

[9] The Friedman test is a non-parametric statistical test, similar to the parametric repeated measure ANOVA, it is used to detect differences in treatments across multiple test attempts (Daniel, 1990).

Table 4
Exploratory factor analysis (EPA) and internal questionnaire reliability.

Latent variables	Factor loading	α[a]
Investors' sentiment (IS)		
To what extent does "confidence" influence your trading behavior?	0.895	0.869
To what extent does "hope" influence your trading behavior?	0.830	
To what extent does "joy and (or) anger" influence your trading behavior?	0.894	
To what extent does overall temperament influence your trading behavior?	0.770	
Weekend-effect (W)		
To what extent are you interested in purchasing shares during the first part of the week?	0.759	0.793
To what extent are you interested in purchasing shares during the last part of the week?	0.822	
To what extent issuing shares on the first day of the week reflect common practice?	0.759	
To what extent do you agree with the statement that returns on the first part of the week are lower than those in other days?	0.822	
To what extent do you agree with this statement that returns in the first part of the week are different from those in the last part of the week?	0.672	
Gender (IG)		
To what extent do you believe that gender influences trading behavior?	0.874	0.831
To what extent do you believe gender influences the size of the transactions?	0.845	
To what extent do you agree with this statement that men and women behave differently in selecting portfolios?	0.765	
To what extent do you believe gender influences your risk tolerance?	0.768	
Age (IA)		
To what extent do you believe Investors' preferences are influenced by their age?	0.892	0.740
To what extent do you believe investors' perception of trading behavior vary with their age?	0.892	
Personality (IP)		
How fast do you make trading decisions?	0.675	0.849
To what extent do you feel anxious and worried when making transactions?	0.857	
Given your character and personality, to what extent are you willing to take risk in making a transaction?	0.914	
To what extent are you stressful when doing a transaction?	0.857	
Culture (IC)		
To what extent do you prefer buying stocks in the domestic markets vs. foreign markets?	0.835	0.773
To what extent do you trust the information presented in the domestic stock market?	0.807	
A common language and culture encourage me to buy shares in the domestic market.	0.847	
Profitability (IPr)		
To what extent does a stock's expected rate of return influence your decision to trade?	0.887	0.728
To what extent do you trust company provided information on their profitability?	0.887	
Liquidity (IL)		
To what extent does market liquidity create a positive investment environment?	0.935	0.954
To what extent does market liquidity influence your willingness to invest?	0.873	
To what extent does volume and investment turnover are affected by market liquidity?	0.864	
Knowledge (IK)		
To what extent does awareness of the economic conditions affect your trading decisions?	0.738	0.961
To what extent does market research affect your decisions to trade?	0.738	
Company brand (CB)		
To what extent does company brand influence your decision to invest in the stock market?	0.883	0.856
Beyond financial outcomes, an overall understanding of a company's vision and strategies also influence my decision to invest.	0.891	
I think a company's brand is one of the most important criterion used by investors.	0.735	
To what extent does a company's position in the industry affect your decision to buy its stocks?	0.844	
To what extent does the alignment between a company's products and services with your image of that company affect your decision to buy its stocks?	0.866	
To what extent does the reputation of the company's key shareholders encourage you to buy its tocks?	0.852	
Company marketing (CM)		
To what extent does marketing and communication policies influence your investment preferences?	0.835	0.887
Marketing is an effective approach to reveal a company's identity.	0.824	
Do stock markets react to introduction and marketing of new products?	0.872	
Investor's decision (ID)		
To what extent do your behavioral preferences and economic factors convince you to invest?	0.708	

[a] Ronbach's alpha indicate the degree to which a set of items measures a single unidimensional latent construct and is thus known as an internal consistency estimate of reliability of test scores (Cronbach (1951)). $\alpha \geq 0.7$ supports the internal consistency of the set of questions underlying a given latent variable.

Table 5
Sample distribution: informed and uninformed investors.

	Questionnaires sent	Returned questionnaires	Unusable questionnaires	Usable questionnaires
Uninformed investors	442	387	17	370
Informed investors	245	203	12	191
Total	687	590	29	561

Table 6
Descriptive evidence on pooled, informed, and uninformed investors' samples.

		Individual investors		Institutional investors		Total	
Gender	Male	339	(91.62%)	163	(85.34%)	502	(89.48%)
	Female	31	(08.38%)	28	(14.66%)	59	(10.52%)
	Total	**370**		**191**		**561**	
Age	20–24	16	(04.32%)	0	(00.00%)	16	(02.85%)
	25–29	73	(19.73%)	26	(13.61%)	99	(17.64%)
	30–34	120	(32.43%)	87	(45.55%)	207	(36.90%)
	35–39	107	(28.92%)	45	(23.56%)	152	(27.09%)
	>40	54	(14.60%)	33	(17.28%)	87	(15.51%)
	Total	**370**		**191**		**561**	
Investing experience	<6 Months	21	(5.68%)	1	(00.52%)	22	(03.92%)
	6–12	39	(10.54%)	5	(02.62%)	44	(07.84%)
	13–24	53	(14.32%)	32	(16.75%)	85	(15.15%)
	25–48	75	(20.27%)	37	(19.38%)	112	(19.97%)
	>48 Months	182	(49.19)	116	(60.73%)	298	(53.12%)
	Total	**370**		**191**		**561**	
Monthly investment income (Rials)	<2000,000	43	(11.62%)	7	(03.67%)	50	(08.90%)
	2010,000–4000,000	52	(14.05%)	28	(14.66%)	80	(14.30%)
	4010,000–6000,000	87	(23.52%)	15	(07.85%)	102	(18.20%)
	6010,000–8000,000	109	(29.46%)	57	(29.84%)	166	(29.60%)
	8010,000–10,000,000	33	(08.92%)	26	(13.61%)	59	(10.50%)
	>10,000,000	46	(12.43%)	58	(30.34%)	104	(18.50%)
	Total	**370**		**191**		**561**	

Table 7
Structural equation model of latent variables (Fig. 1) is estimated by LISREL 8 which is specifically equipped to deal with possible sources of endogeneity among the investor's decision (dependent variable: IDSM) and the latent variables (sentiment (IS), weekend effect (W), gender (G), age (A), personality (P), culture (C), profitability (IPr), liquidity (IL), knowledge (IK), company brand (CB), and company marketing (CM)). The estimated coefficients of the structural equation model represent the theoretical cause-and-effect relationships among the latent variables and investor's decision for the full, the informed, and the uninformed samples.

	IS	W	IG	IA	IP	C	IPr	IL	IK	CB	CM
Pooled investor sample											
Coefficient	0.42**	0.79**	0.30*	0.33**	0.38*	0.32**	0.88*	0.54**	0.61**	0.67*	0.35*
Std. error	(0.17)	(0.23)	(0.11)	(0.13)	(0.17)	(0.12)	(0.14)	(0.17)	(0.23)	(0.22)	(0.16)
t-Statistics	2.47	3.43	2.72	2.53	2.23	2.67	6.28	3.17	2.65	3.05	2.18
$X^2 = 1012.09^{**}$											
Informed investor sample											
Coefficient	0.67**	0.93**	0.35*	0.58**	0.64**	0.43**	0.72*	0.81**	0.84**	0.42*	0.37*
Std. error	(0.11)	(0.13)	(0.16)	(0.17)	(0.22)	(0.14)	(0.15)	(0.19)	(0.19)	(0.11)	(0.15)
t-Statistics	6.09	7.15	2.18	3.41	2.90	3.07	4.80	4.26	4.42	3.81	2.46
$X^2 = 713.54^{**}$											
Uninformed investor sample											
coefficient	0.79**	0.64*	0.46**	0.51**	0.75**	0.49**	0.87*	0.63*	0.53**	0.78*	0.36**
Std. Error	(0.24)	(0.19)	(0.16)	(0.21)	(0.19)	(0.12)	(0.16)	(0.14)	(0.13)	(0.21)	(0.15)
t-Statistics	3.29	3.36	2.87	2.43	2.94	4.08	5.43	4.50	4.07	3.71	2.40
$X^2 = 910.11^{**}$											

$N = 561$.
* 5% significance level.
** 1% significance level.

et al., 2013), and India (Chandra, 2008), but similar to the results in the Taiwan's and the UAE's Exchanges (Lee et al., 2011; Hassan Al-Tamimi, 2006).

To offer further insight on the apparent differences between our results and those obtained for other emerging stock markets, we re-estimated the model separately for the informed and uninformed investors' sub-samples and compared the relative rankings of the behavioral, economic, and other related variables. As discussed earlier, informed and uninformed investors may exhibit different risk tolerance, sentiments, sophistication, and knowledge levels. Thus, one may expect to

Table 8
Latent variables' rank order, full sample, uninformed, and informed investors[a].

	Uninformed investor	Informed investor	Combined Sample
Sentiments	2	5	6
Weekend effect	5	1	2
Gender	10	11	9
Age	8	7	11
Personality	4	6	7
Culture	9	8	10
Profitability	1	4	1
Liquidity	6	3	5
Knowledge	7	2	4
Company brand	3	9	3
Marketing	11	10	8

[a] Friedman's non-parametric test of differences in treatments across multiple attempts is used to test the statistical significance of the latent variables' ranking (Daniel, 1990). The Friedman's Chi-square test shows that differences in variables' rankings are statistically significant at 1% level or better.

observe structural differences on the impact of latent variables between informed and uninformed investors. The results are reported in panels (B) and (C) in Table 7 for the informed and uninformed investors' sub-samples, respectively. As for the case of the full sample, all variables are positive and statistically significant at the 5% level or better in both sub-samples.

Variables' relative rankings established by the size of their estimated coefficient are reported for both sub-samples in Table 8. The rankings are statistically significant at the 1% level based on the Friedman test. However, there are major differences on the relative impact of individual latent variables on informed and uninformed investors' decisions. We applied the Friedman test to the latent variables' mean rank differences between informed and uninformed investors' sub-samples. As the sample size for the uninformed investors is larger than that of informed ones (370 vs. 148), a boot strapping approach was used to equalize the sample sizes. Specifically, 148 random responses relating to each latent variable were drawn from the uninformed investors' sample to equalize the sample sizes across informed and uninformed investors. The mean ranking differences between the two samples were then compared using the Friedman test. A total of 7 different random samples of latent variables' mean ranking differences were compared. Out of the total seven tests, six produced significant overall ranking differences between informed and uninformed investors at the 1% level or better.

The results clearly show that investors in Iran are not homogenous. Behavioral, economic, and other variables affect informed and uninformed investors differently in the Tehran Stock Exchange. Informed investors are less influenced by behavioral variables and view factors such as liquidity, the weekend effect, and investor's knowledge more importantly than are uninformed investors. Specifically, the most significant differences between informed and uninformed investors occur regarding the impact of the weekend effect (1st vs. 5th), investor's knowledge (2nd vs. 7th), sentiment (5th vs. 2nd), personality (6th vs. 4th), company brand (3rd vs. 9th), profitability (4th vs. 1st), and liquidity (3rd vs. 6th). The superior role of profitability (1st) vs. liquidity (6th) among uninformed investors is probably reflective of possible knowledge limitation in distinguishing between the merit of cash flow-based measures of performance (free cash flow, operating return on assets, etc.) against those based on accounting information (earnings per share, return on equity, etc.). Accounting measures of performance could be biased due to the application of different depreciation rules, and tax and regulatory policies. Both groups of investors appear to be similarly influenced by the remaining factors: culture, gender, age, and marketing.

Our results for informed investors in Iran parallel those obtained by previous studies of the relationship between investors' type and variation in investment performance in different emerging stock markets. We provide additional support for the earlier findings by Brockman and Chung (2003) showing that informed traders in the Hong Kong stock exchange submit buy and sell orders conditional on the good-vs.-bad news content of private information event. Uninformed traders are unaware of private information events and, therefore, do not observe this good-vs.-bad news content. Separately, find that uninformed crowd investors are not as resourceful and typically have less capital and less investing skills relative to informed investors. Coval et al. (2005) find that informed investors with strong past returns continue to earn strong returns. Barber et al. (2011) find that top day traders in Taiwan appear to earn gross abnormal returns at least sufficient to cover transaction costs. Venezia and Shapira (2007) find that weekends influence both amateurs and professional investors in Israel; but in opposite directions. Individuals increase both their buy and sell activities, and their propensity to sell rises more than their propensity to buy. Professionals, on the other hand, tend to perform fewer buy as well as sell trades after the weekend, and the drop in their activity is almost the same for buy trades and for sell trades.

Comparing the behavior of informed and uninformed investors provides us with two important insights. First, it reveals that the relative importance of the economic variables in the pooled sample may, in fact, be due to the influence of informed investors who are less concerned with behavioral attributes, viewing economic variables more importantly. Removing the impact of informed investors clearly shows that uninformed investors in Iran behave similarly to average individual investors in other emerging economies such as India, Vietnam and Indonesia. Further, the behavior of informed investors is consistent with the pattern observed in the previous studies of emerging stock markets on the relationship between investors' type and variation in investment performance. Second, behavioral differences between informed and uninformed

investors may call into question the results of the previous studies on investors' behavior. These studies may suffer from a confounding effect resulting from using non-homogenous samples of investors, both in terms of availability and utilization of private information. Whether such differential effects are present in investors' behavior in other emerging market is an open question left to future studies.

5. Concluding remarks and policy implications

We find investors in Iran are not homogenous regarding factors influencing their investment decisions. While basic demographic factors such as gender, age, and culture similarly affect both informed and uninformed investors, informed investors' behavior is more consistent with the general recommendations of the economic theory. Uninformed investors are more influenced by behavioral variables such as sentiment and personality. Uninformed investors may lack the required financial knowledge and skills to properly assess their investments' risk and profitability. Such an unbalanced reliance on behavioral drivers of investment will not likely lead to stable and growing public participation in the securities markets in Iran.

Our findings have important economic, regulatory, and educational policy implications for Iran and other emerging economies. The recent agreement between Iran and major global powers has drastically reduced restrictive barriers that have retarded the country's economic progress for decades. Iran is now facing an unprecedented momentum to encourage start-ups, increase public and private sector investment in key industries, and forge partnerships with major global industries. According to the Central Bank of Iran, real GDP grew at annual rate of 6.6% in 2016. The key contributing factors were the surge in oil production, relatively stable global oil prices, and further strengthening of non-oil sectors in the first three quarters of the 2016 fiscal year. According to the latest IMF report in February 2017, GDP growth is projected to stabilize at 4.5% over the medium term as oil production remains at the Organization of Petroleum Exporting Countries' (OPEC) target level.

For Iran, one of the key impediments to such an ambitious economic undertaking is individual investors' reluctance to participate in capital (equity and bond) markets and, as a result, their overindulgence in short-term bank certificates of deposit and real estate investment. In addition, the Iranian banking system currently faces a major liquidity crisis and painfully struggles to comply with the financial and risk management requirements set by the Basel Committee on Banking Supervision. Policy makers are concerned that investors' limited participation in capital markets will likely cause systemic bank failures, a real estate bubble, or both. Government and regulatory authorities are equally concerned about an increasing corporate default risk as capital sources supporting infrastructure investment and new growth opportunities are exclusively funded through high-cost revolving short-term bank loans instead of being supported by more stable lower-cost long-term equity and bond financing.

There is a serious need to improve financial literacy among individual investors in Iran. Financial literacy problems are not unique to Iran. It is indeed a major problem in emerging economies worldwide, exacerbated because of the recent financial crisis and markets' continuing volatility. In 2014, the Standard and Poor's (S&P) Rating Services conducted a global survey on financial literacy on 150,000 adults in 148 countries. For major advanced economies (Canada, France, Germany, Italy, United States, and United Kingdom), approximately 60% of adults aged 36 to 50 years old were found to be financially literate. On the other hand, for major emerging economies (Brazil, China, India, Russian Federation, and South Africa), approximately 30% of adults aged 36–50 years old were found to be financially literate. The 2014 overall financial literacy rate in Iran is about 20%.

From a public policy perspective, more effective regulation of products, sales, and advisory services are needed to organize, efficiently process, and protect the financial markets in Iran. Further, steps must be taken to create a long-term treasury bond market transitioning the current statutory bond rates established by the Central bank to ones determined by market forces. Equally important, there is a serious need to improve individual investors' financial literacy through educational programs both at pre-and-post-secondary levels to enhance the quality of individual investors' decisions and increase investor confidence and participation in capital markets. Together, such policies will provide companies with higher access to cheaper sources of risk capital, strengthen the private sector, attract foreign investors and, ultimately, advance the overall economy in Iran.

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