

Impact of Financial Literacy on Investment Decisions: The Mediating Effect of Big-Five Personality Traits Model

Nasrullah Hamza
Government College, Gulzar-e-Hijri, Karachi, Pakistan

Imtiaz Arif¹
Iqra University, Karachi, Pakistan

Abstract

The study examines the impact of financial literacy on investment decisions with the mediating effect of personality traits based on the big-five model. A total of 235 responses from Karachi were collected using the convenience sampling technique. The five-point Likert scale questionnaire was used alongside the Smart-PLS software for data analysis. The results suggest that financial literacy did not have a significant effect on investment decisions through agreeableness, conscientiousness and extraversion. However, financial literacy has a significant negative impact on investment decisions through openness to experience and a significant positive impact through neuroticism. The study helps improve our understanding of investor behavior by considering the mediating role of big five personality traits on the relationship between financial literacy and investment decisions. It is recommended that financial institutions should provide investment counseling services to prospective investors using the consumer profile technique.

Keywords: *Financial literacy, big-five model, investment decisions, PLS-SEM, Pakistan.*

Introduction

Behavioral finance suggests that individuals exhibit cognitive and affective behavior which leads to deviation from rational behavior. The field of behavioral finance is based on the application of human psychology in finance. In the past, finance researchers did not consider how individual and environmental factors could affect investor decision making (Xiao & Porto, 2017; Sivaramakrishnan, Srivastava, & Rastogi, 2017). Therefore, this

¹Corresponding Author: Dr. Imtiaz Arif; Email: arif.i@iuk.edu.pk

study focuses on the variables which impact the investment decision making criteria of an individual. The study uses investment decisions as the dependent variable. In addition, financial literacy is the independent variable, while personality traits are used as mediating variables. Past studies suggest that individuals do not always behave rationally. The behavioral finance literature explores a number of factors that affect the financial decisions of an individual (Davis & Runyan, 2016; Dinç Aydemir & Aren, 2017).

Financial products such as mortgages, leasing, credit cards, business loans are now conveniently available to all investors. Financial development requires that resources are used sensibly so that the maximum benefit can be derived (Lusardi & Mitchell, 2014). Poor quality financial information complicates the decision making process and increases the uncertainty in financial markets (Cox, Brounen, & Neuteboom, 2015). Financial literacy supports efficient management of financial resources. Past studies suggest that investors that have low financial literacy tend to make investment decisions that are not favorable. It has been observed that investors with low financial literacy avoid participation in the stock markets and hold less diversified portfolios (Fedorova, Nekhaenko, & Dovzhenko, 2015). In a changing world, financial products are becoming increasingly complicated which requires investors to remain updated with the latest financial information (Garg & Singh, 2018). Therefore, the study investigates the impact of financial literacy on investment decisions with the mediating effect of personality traits based on the big-five model.

Literature Review

Lubis et al., (2015) examined the psychological factors which impact investment decisions. The study discusses the criteria for investment decisions from three dimensions, i.e. corporate data, risk and repay. The study also considers the effect of personality traits, defense mechanisms, financial literacy and emotional intelligence on investment decisions. A total of 320 respondents were surveyed for data collection. The results suggest that all the independent variables influence investment decisions except emotional intelligence.

Fedorova et al., (2015) examined the influence of financial literacy on the stock market. The study uses data from 1,006 participants. The survey instrument was used to collect data from the respondents. Demographic information such as, income, age, gender, education, job designation was sought from the respondents. The findings of the study suggest that financially literate investors participate proactively in the stock market. Kourtidis, Chatzoglou, & Sevic (2017) examined whether the personality traits of investors affect their trading behavior in the market. The study used structural equation modeling for analyzing the data collected from 345 Greek investors. The findings of the study suggests that the trading behavior and performance of Greek investors are influenced by their personality traits. The results indicate that trading volume has a positive effect on trading frequency.

In addition, the study finds that professional investors have a higher trading frequency as compared to other investors.

Sivaramakrishnan et al., (2017) examined the effect of financial literacy on investment decisions in the stock market. The study adopts the theory of planned behavior to explain investor participation in the stock market of India. The theory of planned behavior conceptualizes consumer financial literacy as a part of perceived behavioral controls (Ajzen, 1991). Structural equation modelling was used for data analysis. The results of the study suggest that the intention to invest in the stock market was positively affected by both subjective and objective financial literacy, whereas behavior was only influenced by objective financial literacy. The study also suggests that financial well-being positively influence investor behavior.

Bongomin, Munene, Ntayi & Malinga (2018) focused on testing the association between financial inclusion and financial literacy of the lower class in rural Uganda. The study has a cross-sectional quantitative research design. The Baron & Kenney (1986) approach was used to investigate whether cognition moderates the association between financial inclusion and financial literacy of lower class in rural areas of Uganda. The results indicate that cognition positively moderates the association between financial inclusion and financial literacy of lower class in rural areas of Uganda. In addition, the study found that financial inclusion of the lower class in rural areas of Uganda is influenced by financial literacy and cognition.

Adam et al., (2018) investigated gender inequality in financial literacy of retired individuals of Cape Coast, Ghana. The study used data from a total of 334 retired individuals comprising 151 females and 183 males. The survey instrument was used to assess the respondent's understanding of budgeting, use of automated teller machines (ATMs), concept of time value of money, types of bank accounts, use of cheques and insurance facilities. The data was analyzed through the independent t-test and Pearson correlations. The results of the study indicate that male respondents were more financially literate as compared to female respondents. The study anticipates that gender differences in financial literacy are likely to diminish in the future due to a change in social trends. On the other hand, Potrich & Vieira (2018) analyzed the financial literacy of respondents residing in different cities of Brazil. The results suggest that financial literacy had a direct impact on compulsive buying behavior of respondents.

Conceptual Framework

Figure 1 shows the conceptual framework. The conceptual framework is based on three theories, i.e. theory of planned behavior (Ajzen, 1985), prospect theory (Kahneman &

Tversky, 1979) and five-factor personality model (Digman, 1990).

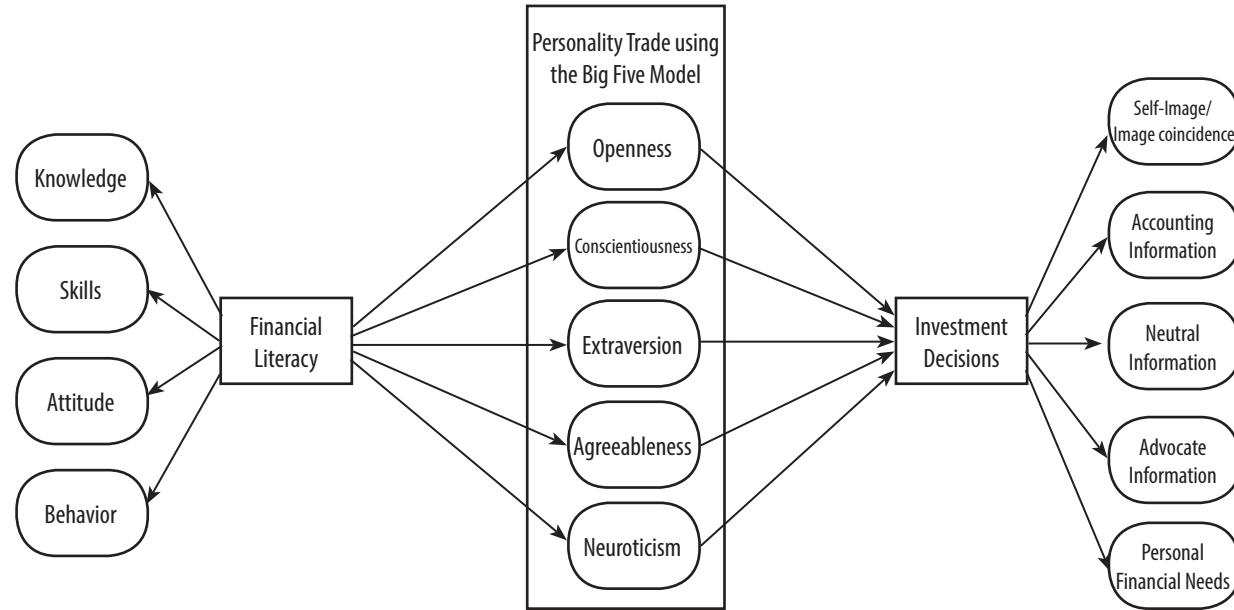


Figure 1: Conceptual Framework

According to the theory of planned behavior, individuals behavior depends on their on behavioral intentions. Behavioral intentions depend on internal and external factors (Ajzen, 2002). On the other hand, prospect theory suggests that individuals are generally risk-averse and take decisions that reflect this attitude towards risk. Prospect theory focuses on the cognitive behavior of individuals and their desire to avoid risk for gaining particular objectives and outcomes (Kahneman & Tversky, 1979). In addition, the five-factor model suggests that an individual's behavior is dependent upon his personality traits, i.e. openness, conscientiousness, extraversion, agreeableness and neuroticism (Digman, 1990).

Methodology

Sample

The study uses data that was collected from Karachi, Pakistan. A total of 300 questionnaires were distributed to the respondents using convenience sampling while 255 questionnaires were filled and returned. After excluding 11 un-useable questionnaires the remaining 244

cases were used for empirical analysis. Thus, the response rate was approximately 81.3%.

Measures

All the variables of the study were measured using scales adapted from the previous literature. The scales for knowledge, skills, attitude and behavior were adapted from Bongomin et al., (2018). In addition, the scales for personality traits i.e. openness, extraversion, conscientiousness, agreeableness and neuroticism were adapted from John & Srivastava (1999). Finally, the scales of firm-image coincidence, accounting information, neutral information, advocate information and personal financial needs were adapted from Hassan Al-Tamimi & Anood Bin Kalli (2009).

Data Analysis

Henseler, Ringle, and Sarstedt (2015) suggest that PLS-SEM has smaller size requirements as compared to CB-SEM. Therefore, PLS-SEM was applied in this research.

Results and Findings

Pre-testing

Prior to administering the questionnaire a pilot test was undertaken to ascertain the reliability of constructs used in the study. The Cronbach's Alpha values for all variables were above 0.70, indicating acceptable internal consistency (Nunally & Bernstein, 1994).

Data screening

The authors have screened the data for both univariate outliers and multivariate outliers. For univariate outliers, standardized values (z-scores) were estimated, whereas, for multivariate outliers, Mahalanobis Distance (D2) had been estimated. The cut-off values for univariate outliers were ± 3.29 , whereas, $D2 < 0.001$ was used for multivariate outliers (Tabachnick, Fidell, & Osterlind, 2001). The responses exceeding the cut-off values were deleted from the data. A total of seven univariate outliers and two multivariate outliers were detected and dropped. Therefore, the final dataset for empirical analysis consisted of 235 responses.

Demographic Profile of the Respondents

Table 1 provides the demographic profile of the respondents of the study.

Table 1: Demographic Profile (n = 235)

		Frequency	Percent
Age Group	18 years to 25 years	66	28.1
	26 years to 35 years	46	19.6
	36 years to 45 years	61	26.0
	46 years to 55 years	40	17.0
	56 years to 65 years	22	9.4
Gender	Female	166	70.6
	Male	69	29.4
Employment Status	Full-time	62	26.4
	Part-time	54	23.0
	Self-employed	37	15.7
	Unemployed	31	13.2
	Student	33	14.0
	Retired	18	7.7
Monthly Income	10,000 or less	62	26.4
	10,001 to 25,000	98	41.7
	25,001 to 40,000	54	23.0
	40,001 to 65,000	21	8.9
Academic Qualification	Intermediate	13	5.5
	Undergraduate	100	42.6
	Graduate	58	24.7
	Post-Graduate	64	27.2

Measurement Model

Table 2 shows the composite reliability, average variance explained and factor loadings.

Table 2 Measurement Model

Second Order	First Order	Items	Factor Loadings	CR	AVE
Financial Literacy	Attitude	4	0.653-0.901	0.862	0.614
	Behavior	3	0.897-0.973	0.956	0.880
	Knowledge	4	0.690-0.893	0.868	0.624
	Skills	3	0.752-0.900	0.873	0.697
Five Factor Model	Agreeableness	3	0.883-0.935	0.938	0.834
	Conscientiousness	2	0.754-0.896	0.812	0.685
	Extraversion	5	0.559-0.946	0.866	0.573
	Openness	4	0.797-0.935	0.771	0.541
Investment Decisions	Neuroticism	3	0.573-0.931	0.922	0.747
	Neutral Information	4	0.860-0.935	0.908	0.713
	Personal Financial Needs	3	0.852-0.938	0.837	0.563
	Self/Firm Image	2	0.983-0.985	0.942	0.902
	Accounting Information	4	0.734-0.911	0.943	0.846
	Advocate Information	4	0.717-0.815	0.984	0.968

The results show that the factor loadings for most of the variables are greater than 0.6. Moreover, composite reliability and AVE are greater than 0.70 and 0.50 respectively, in most cases. Thus, it can be inferred that the variables fulfill the requirements of construct validity (Hair, 2010; Fornell & Larcker, 1981).

Discriminant Validity

Table 3 provides the Heterotrait-Monotrait (HTMT) ratio for assessing discriminant validity.

Table 3: Discriminant Validity using HTMT Ratio

	AI	ADV	AGREE	ATT BEHAVE	CONSC	EXTRA	KNOW	NEURO	NEUTRAL	OPEN	PFN	SI	Skills
Accounting Information													
Advocate Information	0.696												
Agreeableness	0.324	0.219											
Attitudes	0.691	0.683	0.156										
Behavior	0.943	0.690	0.083	0.712									
Conscientiousness	0.571	0.361	0.953	0.347	0.126								
Extraversion	0.248	0.447	0.547	0.312	0.330	0.537							
Knowledge	0.882	0.811	0.200	0.825	0.961	0.378	0.284						
Neuroticism	0.300	0.413	0.843	0.609	0.425	0.771	0.675	0.572					
Neutral Information	0.677	0.919	0.064	0.775	0.914	0.195	0.256	0.892	0.489				
Openness	0.224	0.201	0.076	0.253	0.214	0.373	0.204	0.240	0.291	0.170			
Personal Financial Needs	0.605	0.951	0.082	0.857	0.652	0.187	0.296	0.854	0.559	0.776	0.142		
Self-Image	0.947	0.629	0.197	0.796	0.787	0.346	0.349	0.755	0.484	0.570	0.090	0.753	
Skills	0.840	0.901	0.188	0.591	0.981	0.300	0.330	0.818	0.449	0.956	0.173	0.696	0.635

The HTMT ratio was used to assess discriminant validity of the constructs. The HTMT ratio should be less than 1.00 for acceptable discriminant validity (Hair et al., 2012; Clark & Watson, 1995; Henseler et al., 2015; Kline, 2015). Table 5 suggests that the HTMT ratio is less than 1 for all the constructs and therefore, they have acceptable discriminant validity.

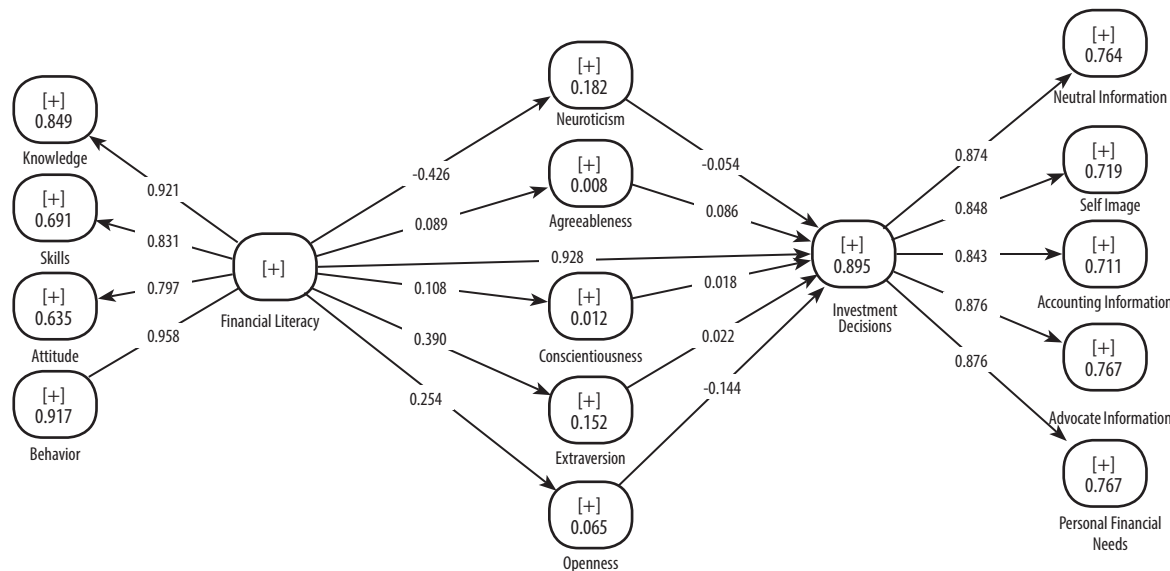


Figure 2: Measurement Model

Statistical Results

Tables 4 and 5 provides the statistical results from PLS-SEM.

Table 4: 2nd-Order Reflective Construct (Financial Literacy)

	Estimates	Std. Error	T-Stats	Prob.
Financial Literacy → Attitudes	0.797	0.023	34.686	0.000
Financial Literacy → Behavior	0.958	0.004	227.511	0.000
Financial Literacy → Knowledge	0.921	0.008	111.724	0.000
Financial Literacy → Skills	0.831	0.023	35.650	0.000

Table 4 suggests that financial literacy has a positive and significant effect on attitudes (0.797, p<0.000), behavior (0.958, p<0.001), knowledge (0.921, p<0.000) and skills (0.831, p<0.000).

Table 5: 2nd-Order Reflective Construct (Investment Decision)

	Estimates	Std. Error	T-Stats	Prob.
Investment Decision → Accounting Information	0.843	0.023	35.982	0.000
Investment Decision → Advocate Information	0.876	0.010	85.336	0.000
Investment Decision → Neutral Information	0.874	0.014	62.090	0.000
Investment Decision → Personal Financial Needs	0.876	0.010	91.825	0.000
Investment Decision → Self-Image	0.848	0.020	42.533	0.000

Table 5 suggests that investment decisions have a positive and significant effect on accounting information (0.843, p<0.001), advocate information (0.876, p<0.000), neutral information (0.874, p<0.000), personal financial needs (0.876, p<0.000) and self-image (0.848, p<0.000).

Path Analysis

Table 6 provides the results of direct effect of the developed hypotheses.

Table 6: Direct Effect Path Analysis for Hypothesis-Testing

	Estimates	Std. Error	T-Stats	Prob.
Financial Literacy → Agreeableness	0.089	0.064	1.388	0.083
Financial Literacy → Conscientiousness	0.108	0.086	1.253	0.105
Financial Literacy → Extraversion	0.390	0.056	6.966	0.000
Financial Literacy → Neuroticism	-0.426	0.040	10.701	0.000
Financial Literacy → Openness	0.254	0.059	4.299	0.000
Financial Literacy → Investment Decision	0.928	0.027	33.741	0.000
Agreeableness → Investment Decision	0.086	0.041	2.122	0.017
Conscientiousness → Investment Decision	0.018	0.043	0.430	0.334
Extraversion → Investment Decision	0.022	0.031	0.690	0.245
Neuroticism → Investment Decision	-0.054	0.039	1.367	0.086
Openness → Investment Decision	-0.144	0.026	5.589	0.000

The direct path analysis results reported in Table 6 suggests that agreeableness (0.089, $p < 0.10$), extraversion (0.390, $p < 0.001$), and openness to experience (0.254, $p < 0.001$) are significantly and positively affected by financial literacy. On the other hand, neuroticism (-0.426, $p < 0.001$) was negatively affected by financial literacy while conscientiousness (0.108, $p > 0.10$) was not significantly affected by financial literacy. Similarly, agreeableness (0.086, $p < 0.05$) has significant positive impact on investment decisions while neuroticism (-0.054, $p < 0.10$) and openness to experience (-0.144, $p < 0.001$) have a significant negative impact on investment decisions. However, conscientiousness (0.018, $p > 0.10$) and extraversion (0.022, $p > 0.10$) have been found positive but statistically insignificant in relation to investment decisions.

Indirect Effects

Table 7 shows the indirect effect of the hypotheses.

Table 7: Indirect Effect Path Analysis for Hypothesis-Testing

	Estimates	Std. Error	T-Stats	Prob.
Financial Literacy → Agreeableness → Investment Decisions	0.008	0.007	1.080	0.140
Financial Literacy → Conscientiousness → Investment Decisions	0.002	0.006	0.340	0.367
Financial Literacy → Extraversion → Investment Decisions	0.008	0.013	0.654	0.256
Financial Literacy → Neuroticism → Investment Decisions	0.023	0.017	1.359	0.087
Financial Literacy → Openness → Investment Decisions	-0.037	0.009	4.080	0.000

The results show that openness mediates financial literacy and investment decisions relationship. Moreover, the results show that the mediating roles of agreeableness, conscientiousness, extraversion and neuroticism are insignificant.

Predictive Relevance

Table 8 provides the predictive relevance of the variables in the structural model.

Table 8: Predictive Relevance

	R-Squared	Adjusted R Squared	Q Square
Agreeableness	0.008	0.004	0.005
Conscientiousness	0.012	0.007	0.006
Extraversion	0.152	0.148	0.030
Openness	0.065	0.061	0.025
Neuroticism	0.182	0.178	0.091
Investment Decisions	0.895	0.893	0.462

Table 8 suggests that financial literacy can explain agreeableness by 0.8 percent,

conscientiousness by 1.2 percent, extraversion by 15.2 percent, openness to experience by 6.5 percent and neuroticism by 18.2 percent. However, financial literacy and all five mediators including agreeableness, conscientiousness, extraversion, openness to experience and neuroticism can predict investment decisions by 89.5 percent. In addition, all the Q-square coefficients are also greater than zero. Therefore, predictive relevance has been achieved for the structural model.

Conclusion

The results of direct relationships suggests that financial literacy has a positive and significant impact on agreeableness, extraversion, openness and investment decisions. However, financial literacy has a negative and significant impact on neuroticism. On the other hand, financial literacy does not have a significant influence on conscientiousness. The effect of neuroticism and openness on investment decisions is significant and negative, whereas the impact of agreeableness on investment decisions is positive and significant. On the other hand, the impact of conscientiousness and extraversion on investment decisions are insignificant. The results also suggest that neuroticism and openness mediate the relationship between financial literacy and investment decisions. On the Contrary, agreeableness, conscientiousness and extraversion do not have a significant mediating role on financial literacy and investment decisions. Hence, the findings suggest that financial literacy and big five personality traits help investors in taking rational investment decisions.

The development of financial education programs enhance the financial knowledge of employees, investors and policymakers. Many organizations are introducing financial literacy programs which help managers to enhance their financial knowledge. On the other hand, many companies are also providing financial counselling services to investors after assessing their profile and attitude towards risk. The results of the study imply that policymakers and managers need to focus on profiling investors based on their personality traits. This way of profiling will help attract new investors and help increase the total financial investment in the market. Future studies may examine the impact of financial literacy on investment decisions in a cross country setting. In addition, other variables such as risk adjusted performance and portfolio performance may also be included to investigate their effect on investment decisions.

Annexure 1

Constructs and Items in the Questionnaire

Financial Literacy

Knowledge

In this household, members are Knowledgeable about financial risks

In this household, members are knowledgeable about costs associated with financial products/services

In this household, members can easily compute interest rates

In this household, members can easily understand simple financial terms

In this household, members have knowledge of key features of financial products/services

Skills

Members of my household have the ability to prepare a personal budget

In this household, members have the ability to decide what financial services to choose

In this household, members have the ability to accurately determine benefits from financial dealings

In this household, members have the ability to accurately determine costs from financial dealings

In this household, members are capable of evaluating the different financial products and services

Attitudes

Members of this household have good attitude towards saving money

Members of this household have good attitude towards spending money responsibly

In this household, members find it easy to save money

In this household, members enjoy spending money

Members of this household are always organized in regards to managing money

Behavior

In this household, we always read the terms and conditions on use of financial products/services

In this household, members always look to saving money

In this household, members always look to spending money

Members of this household always keep aside some money for their future use

Members of this household always choose financial products that suits their needs and conditions

Five-Factor Model Of Personality Traits

Extraversion

I see myself as someone who is talkative

I see myself as someone who is friendly

I see myself as someone who is full of energy

I see myself as someone who generates a lot of enthusiasm

I see myself as someone who tends to be communicative

Agreeableness

I see myself as someone who tends to find care for others

I see myself as someone who is helpful and unselfish with others

I see myself as someone who starts agreement with others

I see myself as someone who has a forgiving nature

I see myself as someone who is generally trusting

Conscientiousness

I see myself as someone who does a thorough job

I see myself as someone who is caring

I see myself as someone who is a reliable worker

I see myself as someone who tends to be organized

I see myself as someone who tends to be active

Neuroticism (Emotional Instability)

I see myself as someone who is depressed, blue

I see myself as someone who is intolerant, cannot handles stress

I see myself as someone who can be tense

I see myself as someone who worries a lot

I see myself as someone who is emotionally instable, easily upset

Openness

I see myself as someone who is original, comes up with new ideas

I see myself as someone who is curious about many different things

I see myself as someone who is ingenious, a deep thinker

I see myself as someone who has an active imagination

I see myself as someone who is inventive

Investment Decisions

Self-image/firm image coincidence

Religious reasons

Feelings for a firm's products and services

Reputation of the firm's board members

"Get rich quick"

Firm status in industry

Accounting information

Past performance of the firm's stock

Expected bonus shares

The results of technical analysis

Stock marketability

Expected corporate earnings

Neutral information

Government holdings

Fluctuation/developments in the stock index

Coverage in the press

Statements from government officials

Current economic indicators

Advocate information

Broker recommendation

Family member opinions

Friend recommendations

Opinions of the firm's majority stockholders

Financial advisors and analysts' recommendation

Personal financial needs

Diversification purpose

Dividends paid

Expected dividends

Ease of obtaining borrowed funds

Minimizing risk

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