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An Ordered Probit Approach for Exploring the Role of Self-Efficacy and Financial Literacy on Personal Finance Behavior

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The present study investigates the impact of financial self-efficacy on personal finance behavior. To this end, the data collected from the questionnaire have been employed. Once the validity and reliability of the questionnaire are confirmed, the relation between financial self-efficacy and the likelihood of holding a specific financial product is studied using the multivariate Probit model. Products are subsequently categorized into two distinct groups based on the type of relationship. Afterward, the relation between financial self-efficacy and the likelihood of holding the number of products in each category is evaluated using the ordered Probit model. In this study, the cluster random sampling method is employed. The results are indicative of a negative and significant relationship between financial self-efficacy and the likelihood of holding bank facilities as well as a positive and significant relationship between financial self-efficacy and the likelihood of holding time deposits, Qarz Al-Hassaneh savings account, insurance, and corporate bonds and stocks. Furthermore, it is inferred that financial self-efficacy has a positive and significant impact on desirable financial behavior and a negative and significant impact on undesirable financial behavior.

Keywords: Financial Self-Efficacy, Financial Behavior, Financial Risk Preferences, Financial Literacy.
JEL Classification: D03, D14

1 Introduction

Personal finance is an important part of every person's life. Financial success further improves the quality of other aspects of life, observing health and

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hygiene as well as social comfort and welfare. Moreover, one's competence in personal finance management enhances the economic well-being at both individual and community levels. Although numerous researches have addressed this issue by employing different approaches, it is still considered one of the novel financial fields to study. In the meantime, researchers have been more attentive to psychological characteristics as one of the influential factors on financial behavior over the last few decades.

Studies on financial literacy indicate that mere education does not suffice for proper financial behavior (OECD[1], 2013). People need to develop particular psychological and attitudinal traits, among which is the motivation to search and gain financial information as well as having confidence in one's individual abilities, in order to succeed in personal finance and financial behavior. In the psychological literature, the previously mentioned traits are referred to as financial self-efficacy. People need to decide on different financial products to be able to manage their money properly. In the study conducted by Farrell, Fry, and Reese (2016), it is assumed that making the choice between a variety of financial products, which improves the individual financial security leading to desirable financial outcomes, is an indicator of individuals' ability in personal financial management and planning the future. Moreover, the accumulation of different types of liabilities such as loans is a sign of individuals' low performance to plan and manage their personal finance.

In spite of the fact that the literature on personal finance behavior, and specifically the effects of financial self-efficacy, is becoming more extensive, it is still new in Iran and little research has been conducted on this issue. Therefore, considering the importance of identifying the influential factors on personal finance behavior for the policy-makers, we investigate the effect of financial self-efficacy on personal finance behavior. In this research, financial self-efficacy is measured through a standard questionnaire used in psychology. After the analysis of the results obtained from the distributed questionnaires, seemingly unrelated regressions with five Probit models are used to assess the influential factors on the likelihood of holding each one of the selected financial products; i.e. equity investment, corporate bonds, time deposits, Qarz Al-Hassaneh savings accounts, and insurance. Subsequently, the ordered Probit model is used to study the effect of financial self-efficacy on personal finance behavior.

[1] Organization for Economic Development and Cooperation

In the second section of this article, the related literature and the theoretical framework of the impact of self-efficacy on personal finance behavior are addressed. In the third section, research methodology including the questionnaire as well as probit and ordered probit models are briefly explained. The fourth section of the article is analyzing the results of the tests, associated with the analysis of the questionnaire, and the models' outcomes. Finally, in the fifth section, the conclusion is presented.

2 Theoretical Framework and Previous Studies

The literature on financial self-efficacy is based upon the social cognition theory used in psychology. Self-efficacy is defined as one's belief in one's ability to succeed. It is a theory by itself and, beyond that, is a construct of social cognitive theory (Bandura, 1994). The concept of self-efficacy has its roots in Bandura's social cognitive theory. In 1997, he proposed the concept of self-efficacy for the first time and identified the behaviors of people with self-efficacy.

Financial self-efficacy refers to an individual's self-confidence to carry out financial tasks, reflecting his/her personal skills (Lown, 2011). On the condition that we apply the concept of self-efficacy to the context of personal financial management, it is inferred that individuals with high self-confidence in their financial management capabilities are more likely to overcome the financial difficulties they encounter (Bandura, 1994).

Self-efficacy has been proposed in the theory of planned behavior as an essential determining factor of human behavior, that is, behavioral control (Ajzen, 1991). This concept is used in the transtheoretical model of behavior change as an index to measure the progress in behavior change (Prochaska, DiClemente, & Norcross, 1992).

In the framework of financial behaviors, individuals' positive perception of their financial capabilities, regardless of their real financial knowledge, could encourage them to make desirable financial choices. Financial self-efficacy is a subjective scale following the principals on the scale of subjective well-being, which has its roots in the main developed theory of self-efficacy (Bandura, 1982). Financial self-efficacy affects human behavior and is considered as a representative for real financial capabilities (Xiao et al., 2014). A sig nificant point is that financial self-efficacy is distinct from subjective)Danes & Haberman, 2007). Previous researches indicate that better decision-making by consumers of financial services and products is caused by their higher financial self-efficacy (based on individuals' belief in their ability to manage their personal finances effectively) (Remund, 2010). In view of that,

this ability is of particular importance in the field of financial decision-making, considering it affects people's behavioral changes (Bandura, 1977; Gecas, 1989).

Financial behavior is defined as any human behavior associated with money (cash) management. Common financial behaviors include behaviors related to saving, cash, and credit. Deciding on a suitable method to measure financial behavior depends on the purpose of the study. Direct observation is an ideal approach for collecting data to measure human behavior; however, it is rarely possible (Ajzen & Fishbein, 1980). In many cases, direct observation is unfeasible and thus self-report is employed instead. Self-report has the following advantages in comparison with direct observation (Xiao, 2008):

- It requires less time, money, and effort.
- It is applicable for collecting data in a particular field, for a particular purpose, or at a particular time.
- In some cases, it is a more credible method than observation.

This area of research in financial literacy is a novelty and little research has been conducted on this topic. An exploration of domestic studies points to merely one study investigating the effect of financial self-efficacy on personal finance behavior, conducted by Ranjkesh (2008), titled '*The Importance of Financial Self-Efficacy in the Behavioral Justification of the Investors in the Tehran Stock Exchange'*. In this research, it is concluded that individuals investing in corporate bonds and stocks possess high self-efficacy. However, there is no significant relationship between financial self-efficacy and investing in real properties, life and savings insurance, and long-term deposits as well as the amount of financing. In addition, there is a weak negative correlation between financial self-efficacy and financial literacy of the investors in the stock exchange.

Danes and Haberman (2007) have investigated the relationship between financial knowledge, self-efficacy, and financial behavior. Based on their study, financial self-efficacy is evaluated from two aspects – tendency (toward controlling financial future) and confidence (in making financial decisions). In the study conducted on high school students, the effect of gender difference on financial knowledge, self-efficacy, and behavior is investigated after a financial planning curriculum is taught. The findings of this research indicate that women gained more knowledge of credit, auto insurance, and investments after taking the course, whereas men had more knowledge than women prior to entering the course. Women believed that managing money would affect their future, but men felt more confident in making their money decisions.

Lown (2011) creates a financial self-efficacy scale after identifying two significant factors of self-efficacy in making financial decisions which had never been truly measured. The results of his study suggest that financial self-efficacy have a significant and positive relationship with rising age, higher education, and more training.

Chatterjee, Finke, and Harness (2011) study the impact of self-efficacy on wealth accumulation and portfolio choice. The findings of their research are indicative of self-efficacy as a predictive factor of investment in financial assets and of wealth accumulation over time. Individuals with a higher level of self-efficacy have more confidence in the positive outcomes of investment and keep a better diverse portfolio in the short run.

Farrell et al. (2016) investigate the significance of financial self-efficacy in light of individuals' engagement with financial products. They distinguish the significance of financial self-efficacy from that of financial literacy and specifically emphasize on women in their analysis. The researchers investigate the likelihood of using every financial instrument and the influential factors through a survey from Australian women and an ordered Probit regression model. The findings of their research imply that financial self-efficacy is one of the strongest predictors of the type and number of financial products for women. Women with higher financial self-efficacy are more capable of holding investment and savings, and less likely to keep debt-related products. In addition to other important factors such as education, financial risk preferences, age, and household income, the explanatory power of financial self-efficacy is found to be significant. In fact, their findings reveal that in addition to financial education programs, governments need to put an effort in improving women's financial self-efficacy in order to have effective financial education programs and to enhance the financial well-being of the society.

In this research, in accordance with the model used by Farrell et al. (2016), binary regression models are employed to measure the likelihood of using the financial products as well as the impact of self-efficacy on individuals' financial behavior.

3 Research Hypotheses

Major research hypothesis:

Financial self-efficacy has a significant and positive relationship with desirable financial behavior.

Subsidiary research hypotheses:

1) Financial self-efficacy has a significant and negative impact on the likelihood of using bank facilities.

2) Financial self-efficacy has a positive relationship with the likelihood of using savings accounts.
3) Financial self-efficacy has a positive relationship with the likelihood of using insurance.
4) Financial self-efficacy has a positive relationship with the likelihood of investing in time deposits.
5) Financial self-efficacy has a positive relationship with the likelihood of investing in the capital market.

4 Research Methodology

The questionnaire used in this research is from the study conducted by Farrell et. al. (2016). Three control variables are financial literacy, financial risk preferences, and socio-demographic characteristics, and the dependent variable is financial behavior. Data are collected through the questionnaire, which consists of five categories of questions:

1) Sochi-demographic characteristics (questions 1 to 5 in the questionnaire, see Appendix 1);
2) Financial literacy (questions 6 to 10 in the questionnaire, see Appendix 1);

   It is through an individuals' constructive experience with money management, particularly in their adulthood or later stages in life that their financial literacy is shaped and developed (Gutter, Copur & Garrison, 2013; Lee & Mortimer, 2009). Therefore, in order to achieve an index of the research participant's degree of participation in finance during their childhood and adolescence that shaping their financial literacy, they are required to respond to three questions based on a 5-point Likert scale by selecting one of the five options of; never, seldom, half the time, usually, and always.
3) Financial behavior (questions 11 to 15 in the questionnaire, see Appendix 1);

   In this section, there are yes-no questions on the subject of holding five categories of financial products. In this study, the financial behavior variable is a dummy variable.
4) Financial risk preferences (questions 16 to 18 in the questionnaire, see Appendix 1);

   These questions are answered on the basis of the Likert scale.
5) Financial self-efficacy scale (questions 1 to 6 of the final table in the questionnaire, see Appendix 1).

Financial self-efficacy is the independent variable, which is measured via the financial self-efficacy scale. Respondents are asked to answer each one of the six statements based on the Likert scale. The response to each question has 1 to 5 points and high points are associated with high levels of self-efficacy. The points of each statement are aggregated for every respondent in order to obtain his/her overall score on the scale of financial self-efficacy. These scores range from a minimum potential value of 6 to a possible maximum value of 30.

A multivariate probit model, in which the dependent variable is holding a financial product, is developed as a representative for financial behavior and is employed for data analysis. A probit model is used when there is a binary dependent variable. To model the likelihood of holding each of the five financial products, in the initial stage, the model is expressed as follows:

$$y_{mi}^{*} = \beta_1' X_{mi} + \beta_2' L_{mi} + \beta_3' R_{mi} + \beta_4' P_{mi} + \varepsilon_{mi} \quad (1)$$

$$y_{mi} = \begin{cases} 1 & if\, y_{mi}^{*} > 0 \\ 0 & otherwise \end{cases}$$

m=1,…,M.

In this equation, y_{mi}^{*} represents the likelihood of holding each of the M different types of financial products. X_{mi} is a vector of socio-demographic variables. L_{mi} is a vector of influential variables on financial literacy, and R_{mi} represents an individual's financial risk preferences. These three variables are control variables. P_{mi} represents the psychometric instrument (financial self-efficacy) that is the independent variable of this research. y_{mi}^{*} is any value in the range of $(-\infty, +\infty)$ and is a hidden variable. To solve this issue, we define the visible y_{mi}. If:

1) $y_{mi} = 1$, then it means $y_{mi}^{*} \geq 0$ and the individual *i* holds the financial product *m*.
2) $y_{mi} = 0$, then it means $y_{mi}^{*} < 0$ and the individual *i* does not hold the financial product *m*.

In the second stage, the likelihood of holding multiple financial products is modeled. The explanatory variable, that is financial self-efficacy, is related both positively and negatively to the likelihood of having a particular financial product. Hence, financial products are categorized on the basis of their positive or negative relationship with the psychometric instrument examined in the initial stage of the analysis. Using these two categories of financial products as outcome variables, an ordered probit is estimated, where individuals holding more products are eventually categorized into one group.

In the ordered probit model, the dependent variable has more than two modes and the probability of different modes of the dependent variable is calculated simultaneously. Accordingly, the binary probit model developed by Sajaia (2008) is used, and the hidden variables in the model are expressed as follows:

$$y_{1i}^{*}=\beta_{11}'X_{1i}+\beta_{12}'L_{1i}+\beta_{13}'R_{1i}+\beta_{14}'P_{1i}+\varepsilon_{1i}$$
$$y_{2i}^{*}=\beta_{21}'X_{2i}+\beta_{22}'L_{2i}+\beta_{23}'R_{2i}+\beta_{24}'P_{2i}+\gamma y_{1i}^{*}+\varepsilon_{2i}$$

$$y_{1i}=\begin{cases} 1 \;\; if \; y_{1i}^{*} \le c_{11} \\ 2 \;\; if \; c_{11} < y_{1i}^{*} \le c_{12} \\ \vdots \\ J \;\; if \; c_{1J-1} < y_{1i}^{*} \end{cases} \qquad y_{2i}=\begin{cases} 1 \;\; if \; y_{2i}^{*} \le c_{21} \\ 2 \;\; if \; c_{21} < y_{2i}^{*} \le c_{22} \\ \vdots \\ K \;\; if \; c_{2K-1} < y_{2i}^{*} \end{cases}$$

In the equations above, y_{1i} and y_{2i} represent the likelihood result for both categories of financial products for the individual *i*. The two categories of financial products hold J and K number of financial products respectively.

The statistical population of the present study is all Iranian men and women between 18 to 59 years age. The method of Morgan's table is used to determine the sample size, and the cluster random method is applied for sampling. According to Morgan's table, for sampling at the confidence level of 95%, a sample of at least 384 members is required. To achieve that number, 444 completed questionnaires are utilized.

5 Data Analysis and Hypotheses Testing

5.1 Descriptive Data

Out of the total available samples, women comprise 44% and men comprise 56%.

Table 1
Descriptive Data of the Research

Gender	Age group				Total	% of Total
	18 to 29	30 to 39	40 to 49	50 to 59		
Male	121	81	30	18	250	56%
Female	140	38	9	7	194	44%
Total	261	119	39	25	144	100%
% of Total	59%	27%	8.9%	5.6%	100%	

Source: Research Findings

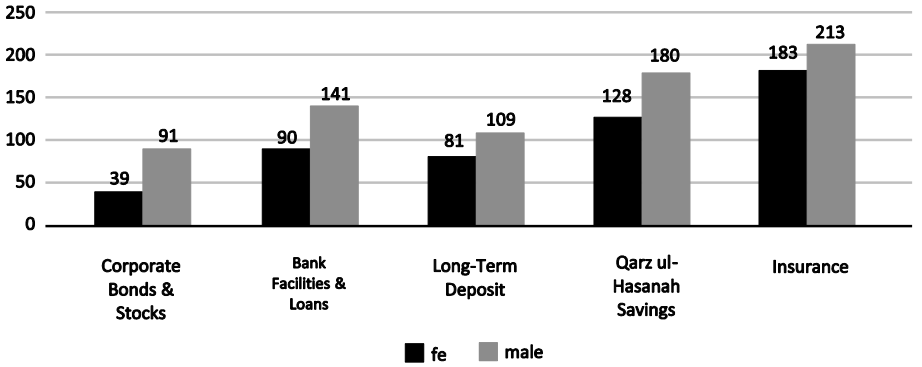

Figure 1. The Number of Products Held Per Gender. Source: Research Findings

The majority of the sample is comprised by individuals in the age group of 18 to 29 accounting for 59% of the sample, followed by individuals in the age groups of 30 to 39, 40 to 49, and 50 to 59.

Table 2
Gender and Education

	Less than high school diploma	High school diploma	Associate's degree	Bachelor's degree	Master's degree	Doctorate degree	Total
Male	3	18	9	57	131	132	250
% m	0.012	0.072	0.036	0.228	0.524	0.128	1
Female	1	13	5	56	99	20	194
% f	0.005	0.067	0.026	0.289	0.51	0.103	1

Source: Research Findings
% m – percentage relative to the total number of male participants.
% f – percentage relative to the total number of female participants.

5.2 Validity and Reliability of the Questionnaire

Considering that the questionnaire is of a standardized type, it is predominantly valid; however, to ascertain about its content validity and face validity, experts' views are taken into account. Content validity of the questionnaire is approved by the experts in finance and research methodology. To determine the reliability of the questionnaire, Cronbach's alpha test is conducted. The results of Cronbach's alpha calculations for each category of variables are presented in Table 3.

Table 3
Reliability Coefficient of the Questionnaire Variables

Variable	Reliability Coefficient
Financial Self-Efficacy Scale	0.712
Financial Risk Preferences	0.729
Financial Literacy	0.822

Source: Research Findings

As indicated in Table 3, the alpha coefficient of the questionnaire associated with all the three variables is above 0.7, thus the questionnaire is adequately reliable.

5.3 The Results of the Likelihood of Holding Each Financial Product

The present study investigates the relation between financial self-efficacy and financial behavior. The research model consists of three control variables of financial literacy, socio-demographic characteristics, and financial risk preferences. Considering that each of these factors has an impact on the outcome of one's financial behavior, it is essential to distinguish the aforementioned variables from financial self-efficacy. By doing so, we would be able to accurately assess the impact of financial self-efficacy on financial behavior by distinguishing other effective factors. Given that five financial products are investigated in this study, there are five hidden variables in five equations. These models are expressed in Equation 2:

$$p_{m,i} = \phi\left(\hat{\beta}_{age,m} age_i + \hat{\beta}_{mar,m} mar_i + \hat{\beta}_{exp,m} exp_i + \hat{\beta}_{edu,m} edu_i + \hat{\beta}_{eco,m} eco_i + \hat{\beta}_{teen,m} teen_i + \hat{\beta}_{R,m} R_i + \hat{\beta}_{P,m} P_i + c_m\right) \quad (2)$$

In this equation, *age* represents age, *mar* represents marital status, *exp* represents living expenses, *edu* represents the individual's level of education, *eco* represents household economic status in childhood, *teen* represents the degree of participation in finance during childhood and adolescence, *R* represents financial risk preferences, and *P* represents financial self-efficacy obtained from the questionnaire. The results of the simultaneous estimation of the five models are stated through seemingly unrelated regression in Table 4.

Table 4
The Results of Probit Models for Holding Financial Products – Seemingly Unrelated Regression

Variable	Bank Facilities	Qarz Al-Hassaneh Savings Account	Time Deposit	Insurance	Corporate Bonds & Stocks
Age	0.063***	0.0007	0.246***	0.042*	0.375***
Mar	1.076***	0.291***	-0.161***	0.35***	0.163***
Exp	0.058***	-0.046***	0.046***	0.102***	0.067***
Edu	0.27***	0.075***	0.11***	-0.029*	0.138***
Eco	-0.209***	-0.183***	0.029	-0.022	-0.119***
Teen	0.046*	0.321***	0.211***	0.345***	0.595***
R	0.049**	0.134***	0.044***	0.058**	0.32***
P	-0.011***	0.01***	0.011***	0.047***	0.036***
C	-1.038***	-0.171**	-1.307***	0.18*	-3.327***
	Wald $\chi 2 = 607.94$		$R^2 = 0.692$		
	Prob > $\chi 2 = 0.000$		Log Likelihood = -3845.21		

Source: Research Findings
*** Significant at 99% confidence level - ** Significant at 95% confidence level - * Significant at 90% confidence level

As presented in the table above, financial self-efficacy has a negative relationship with the likelihood of holding bank facilities and loans, and a positive relationship with the likelihood of holding Qarz Al-Hassaneh savings accounts, time deposits, insurance, and corporate bonds and stocks. The results of the impact of other control variables on the likelihood of holding financial products are indicated in Table 3.

5.4 The Evaluation of the Impact of Financial Self-Efficacy on Financial Behavior

In the next stage, taking into account the relationship between financial self-efficacy and the likelihood of holding each product, financial products are categorized into two groups. The first category consists of the products with a negative relationship between their likelihood of being held and self-efficacy comprising financial facilities and loans. The second category contains the products with a positive relationship between their likelihood of being held and self-efficacy comprising insurance, Qarz Al-Hassaneh savings accounts, time deposits, and corporate bonds and stocks. Following this classification, Equation 3 is modeled through the aggregation of products and by using the ordered probit model in the other two equations. As stated in the third section, the difference between an ordered probit model and a multivariate probit model is that the dependent variable have more than two modes and it is

possible to learn the probability of all the possible modes of outcomes being simultaneously employed in multiple equations.

$$p_{SUM,i}= \phi\left(\hat{\beta}_{age,SUM}\, age_i + \hat{\beta}_{mar,SUM} mar_i + \hat{\beta}_{exp,SUM} exp_i + \hat{\beta}_{edu,SUM} edu_i + \hat{\beta}_{eco,SUM} eco_i + \hat{\beta}_{teen,SUM} teen_i + \hat{\beta}_{R,SUM} R_i + \hat{\beta}_{P,SUM} P_i + c_{SUM}\right) \quad (3)$$

In this equation, $p_{SUM,i}$ represents the likelihood of holding a particular number of products by the i^{th} individual in each category. The results for both categories are presented in Table 5.

Table 5
The results obtained from the ordered probit model

Variable		First category of financial products (bank facilities and loans)	Second category of financial products (insurance, Qarz Al-Hassaneh savings accounts, time deposits, corporate bonds and stocks)
Financial self-efficacy scale		-0.011***	0.031***
		0.000	0.000
Demographic characteristics	Age	0.065***	0.252***
		0.000	0.000
	Marital status	1.076***	0.154***
		0.000	0.000
	Living expenses	0.057***	0.052***
		0.000	0.000
Financial literacy indexes	Related education	0.272***	0.116***
		0.000	0.000
	Household economic status in childhood	-0.207***	-0.113***
		0.000	0.000
	The degree of participation in finance during childhood and adolescence	0.048*	0.481***
		0.082	0.000
Financial risk preferences		-0.047***	0.137***
		0.017	0.000
Wald $\chi 2$ =308.74			R^2= 0.618
Prob> $\chi 2$ =0.000			Log Likelihood=-2312.09

Source: ResearchFindings
*** Significant at 99% confidence level - ** Significant at 95% confidence level - * Significant at 90% confidence level

The financial self-efficacy scale has a significant and negative relationship with the likelihood of holding the first category of financial products; i.e. the lower the financial self-efficacy, the more the likelihood of using a debt

instrument by an individual. On the other hand, the financial self-efficacy scale has a stronger relationship with the likelihood of holding the amount of financial products belonging to the second category. For Example, the higher the financial self-efficacy, the higher the likelihood of holding a greater number of financial products including insurance, Qarz Al-Hassaneh savings account, time deposit, and corporate bonds and stocks.

Based on the results of the ordered probit model, the probability of different modes of the dependent variable in two equations, which is, in fact, the likelihood of holding a variety of combinations of the products in both categories, is calculated. The results of these calculations are presented in Table 6. Each one of these modes is an indicator of a financial behavior. *(m,n)* refers to *m* products from the first category and *n* products from the second category being held by the individual. There is a marginal difference between the predicted probabilities and the observed probabilities. Considering the optimal financial behavior in the light of the difference between the predicted probabilities and the observed probabilities, the optimal financial behavior is in the state (0,4), where the individual has no bank facilities and loans, and holds all the four products belonging to the second category. Hence, the least desirable financial behavior is the state (1,0), where the individual merely holds the loan. In the state (0,0) the individual has not engaged in any types of financial activity, and in the state (1,4) the individual has the most active financial behavior.

Table 6

The Calculation Results of the Probability of Holding Different Combinations of Financial Products from Both Categories and the Observed Proportion of the Same Combination in the Sample.

	Holding combinations of financial products									
	(0,0)	(0,1)	(0,2)	(0,3)	(0,4)	(1,0)	(1,1)	(1,2)	(1,3)	(1,4)
Predicted probability	0.0157	0.1229	0.1945	0.1247	0.0432	0.0063	0.0743	0.1712	0.1596	0.0876
Observed proportion	0.0183	0.1164	0.2027	0.1198	0.0439	0.0039	0.0794	0.1659	0.1626	0.0871

Source: Research Findings

Based on the results, the probability of an individual selecting the optimal combination of financial products and having the most desirable financial behavior is 4.32%, which is the state where the given individual does not use the products from the first category while holding all the products from the second category. That being the case, the probability of selecting the least desirable financial behavior, that is selecting a product from the first category

and no products from the second category, is 0.63%. Consequently, according to these results, the probability of an individual having the most desirable financial behavior is 6.867 times or roughly 7 times more than the probability of the least desirable financial behavior. The probability of an individual not being engaged in any types of financial activity, which is the state where none of the financial products from either category are in use, is 1.57%. The probability of having the most active financial behavior, which is having all the products from both categories, is 8.76%. As demonstrated in Figure 2, the probability of holding each combination of financial products from both categories is predicted based on the results obtained from the ordered probit and the outcomes are compared with the real proportion of the same combination in the sample.

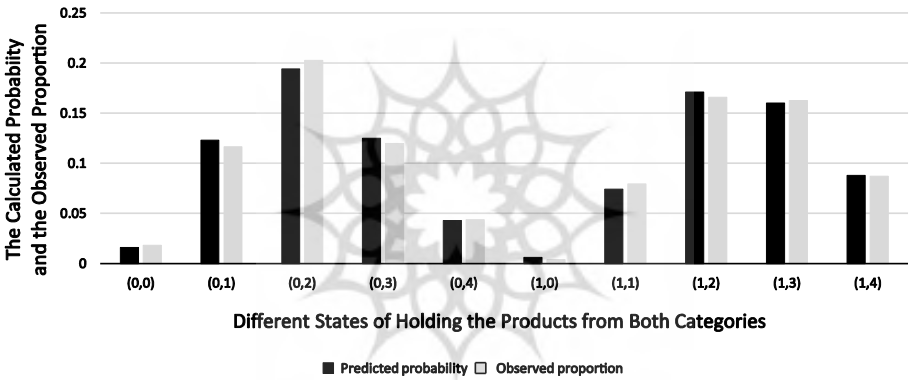

Figure 2. The Probability of Holding Each Combination and the Observed Proportion of It. Source: Research Findings

The predicted probability value of holding each combination of the products is quite close to the observed proportion with a marginal difference. This figure reflects the prediction accuracy of the model.

Figure 3 illustrates the relation between the financial self-efficacy scale score and the most desirable and the least desirable financial behaviors. The horizontal axis in Figure 3 indicates the financial self-efficacy scale score, and the vertical axis indicates the predicted probability based on the ordered probit results. According to the figure, the higher the level of financial self-efficacy, the more likely it is to have the most desirable financial behavior (0,4) and the less likely it is to have the least desirable financial behavior (1,0).

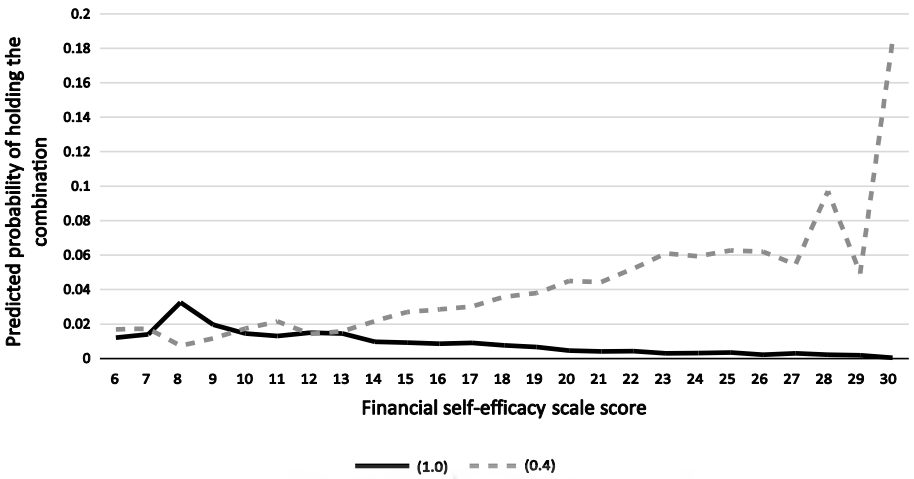

Figure 3. The relation between financial self-efficacy with the probability of two different combinations; the most desirable financial behavior, and the least desirable financial behavior. Source: Research Findings

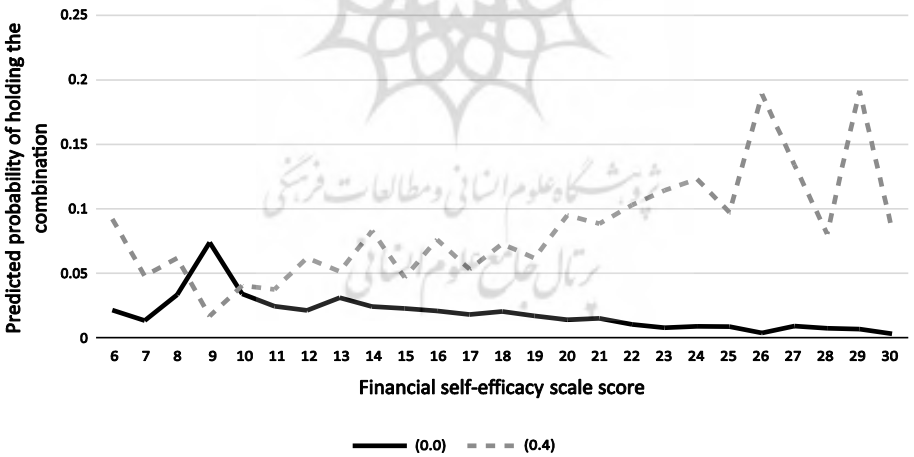

Figure 4. The relation between financial self-efficacy with the probability of holding two different combinations of financial products, based on the ordered probit model. Source: Research Findings

The likelihood of an individual not having any financial products or having all the financial products is illustrated in Figure 4; according to which it is inferred that the higher the financial self-efficacy of an individual, the lower the likelihood of not using any financial products (0,0), and the higher the likelihood of using all the financial products (1,4). Hence, financial self-efficacy has a relationship with the amount of financial activity. In addition to the desirable financial behavior; the higher is the financial self-efficacy of an individual, the more active the individual is in finance.

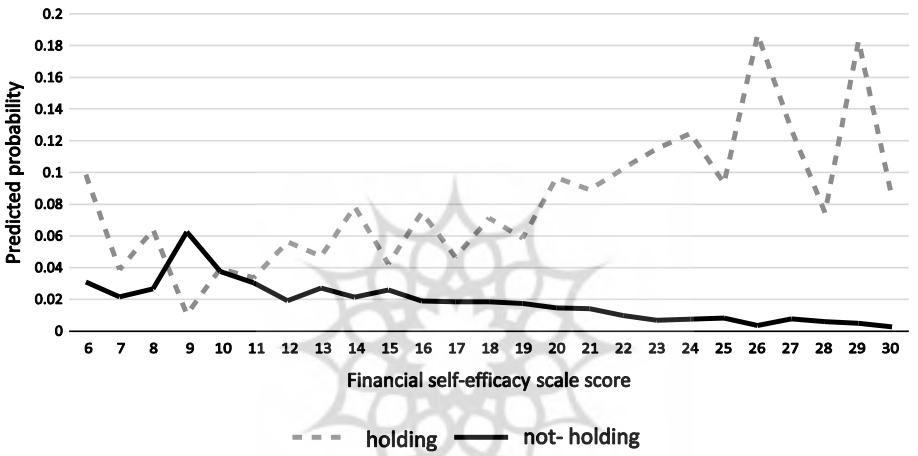

Figure 5. The relationship between the financial self-efficacy scores and the likelihood of holding all or none of the financial products based on the results of the multivariate probit model. Source: Research Findings.

Figure 5 is illustrated based on the results of the multivariate probit model. Based on this figure, the higher financial self-efficacy an individual has, the less likely it is for the individual to use none of the financial products, and the more likely it is for the individual to use all of the financial products. The results obtained from the multivariate probit is similar to the results obtained from the ordered probit, which indicates the accuracy of measurements and the strength of the model.

6 Conclusion

The present research investigates the relation between financial self-efficacy and personal finance behavior. Due to the novelty of this research, limited scientific resources, related to the subject of this study, are available. In this

study, desirable financial behavior refers to corporate bonds and stocks, savings account, insurance, and Qarz Al-Hassaneh savings account that are being held. Financial self-efficacy has a positive relationship with the likelihood of holding these products. Undesirable financial behavior, on the other hand, refers to the use of bank facilities and loans. Financial self-efficacy has a negative relationship with the likelihood of holding loans. Consequently, it is concluded that financial self-efficacy has a significant and positive relationship with desirable financial behavior and a significant and negative relationship with undesirable financial behavior. Based on the findings through two stages of modeling, it seems that in order to improve financial self-efficacy, it is mandatory to create a plan for the instruction of financial literacy. Furthermore, individuals could gain experience in finance and strengthen their financial self-efficacy through investing small part of their capital in the stock exchange and trading corporate bonds and stocks.

Regarding research, the limitation in efficiency is pointed out. Even though the attempt is to select the sample randomly, it cannot be claimed that the sample covers the entire society. It is recommended for future researches to investigate the impacts of self-efficacy on the return and risk of stock portfolio. Additionally, taking into account the importance of gold and foreign exchange in personal portfolios, it is suggested to explore these two assets as financial products in future studies.

Refrences

Ajzen, I. (1991). The Theory of Planned Behavior. *Organizational behavior and human decision processes*, 50(2), 179-211.

Ajzen, I., & Fishbein, M. (1980). *Understanding Attitudes and Predicting Social Behavior*, Englewood Cliffs, NJ, Prentice-Hall.

Bandura, A. (1977). Self-Efficacy: Toward A Unifying Theory of Behavioral Change. *Psychological review*, 84(2), 191.

Bandura, A. (1982). Self-efficacy mechanism in human agency. *American Psychologist*, 37, 122-147

Bandura, A. (1994). *Self-efficacy. In V.S. Ramachaudran (Ed.), Encyclopedia of Human Behaviour*, New York, Academic Press.

Chatterjee, S., Finke, M., & Harness, N. (2011). The Impact of Self-Efficacy on Wealth Accumulation and Portfolio Choice. *Applied Economics Letters*, 18(7), 627-631.

Danes, S. M. & Haberman, H. R. (2007). Teen Financial Knowledge, Self-Efficacy, and Behavior: A Gendered View. *Financial Counseling and Planning, 18(2).*

Farrell, L., Fry, T. R., & Risse, L. (2016). The Significance of Financial Self-Efficacy in Explaining Women's Personal Finance Behaviour. *Journal of Economic Psychology*, 54, 85-99.

Gecas, V. (1989). The social psychology of self-efficacy. *Annual review of sociology*, 15(1), 291-316.

Lown, J. M. (2011). Development and Validation of a Financial Self-Efficacy Scale. *Journal of Financial Counseling and Planning*, 22(2).

OECD (Organization for Economic Development and Cooperation). (2013a). Advancing National Strategies for Financial Education. A Joint Publication by Russia's G20 Presidency and the OECD. Paris: OECD Publishing.

Prochaska, J. O., DiClemente, C. C. & Norcross, J. C. (1992). In Search of How People Change: Applications to Addictive Behaviors. *American Psychologist*, 47(9), 1102.

Ranjkesh, S. (2008). *The Importance of Financial Self-Efficacy in the Behavioral Justification of the Investors in the Tehran Stock Exchange*. M.A. Dissertation in finance, NajafAbad Islamic Azad University.

Remund, D. L. (2010). Financial Literacy Explicated: The Case for a Clearer Definition in an Increasingly Complex Economy. *Journal of Consumer Affairs*, 44(2), 276-295.

Sajaia, Z. (2008). Maximum Likelihood Estimation of a Bivariate Ordered Probit Model: Implementation and Monte Carlo Simulations. *The Stata Journal*, 4(2), 1–18.

Xiao, J. J. (2008). Applying Behavior Theories to Financial Behavior. *In Handbook of consumer finance research (pp. 69-81)*. Springer New York.

Xiao, J. J., Chen, C., & Chen, F. (2014). Consumer Financial Capability and Financial Satisfaction. *Social Indicators Research*, 118(1), 415-432.