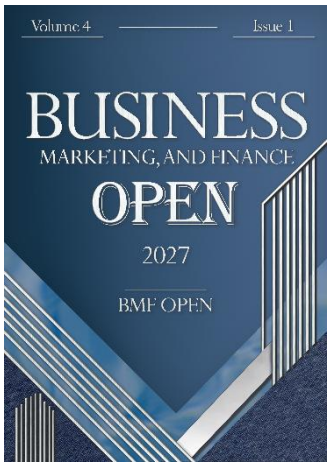
Examining the Interaction Between Financial Literacy and Financial Risk Tolerance with Emphasis on the Moderating Effect of Financial Intelligence



Moein Shahmohammadi[1], Soheila Torgheh[2,*] and Mohammad Khatiri[3]

[1] Department of Accounting, Tak.C., Islamic Azad University, Takestan, Iran;
[2] Department of Accounting, Tak.C., Islamic Azad University, Takestan, Iran;
[3] Department of Accounting, Tak.C., Islamic Azad University, Takestan, Iran;

* Correspondence: so.torghe@iau.ac.ir

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Abstract: This study aimed to examine the relationship between financial literacy and financial risk tolerance among employees of the Tehran Stock Exchange, with emphasis on the moderating effect of financial intelligence. This applied study used a descriptive-survey and causal-correlational design. The statistical population consisted of employees of the Tehran Stock Exchange, from whom 295 respondents participated in the final analysis. Data were collected using standardized questionnaires measuring financial literacy, financial risk tolerance, and financial intelligence. The validity of the instruments was assessed through expert review, convergent validity, and discriminant validity, while reliability was evaluated using Cronbach's alpha and composite reliability. Data analysis was conducted using SPSS 22 and Visual PLS. Descriptive procedures were used for preliminary data screening, and partial least squares structural equation modeling was applied to test the measurement model, structural model, and moderating effect. The Kolmogorov–Smirnov test showed that the study variables did not follow a normal distribution, supporting the use of PLS-SEM. The structural model showed acceptable explanatory and predictive power, with financial risk tolerance having an R^2 value of 0.645 and a Q^2 value of 0.181. The overall goodness-of-fit index was 0.625, indicating strong model fit. Hypothesis testing showed that financial literacy had a positive and statistically significant relationship with financial risk tolerance ($\beta = 0.527$, $t = 7.82$, $p = 0.000$). However, the moderating effect of financial intelligence on the relationship between financial literacy and financial risk tolerance was not statistically significant ($\beta = -0.053$, $t = 0.89$, $p = 0.370$). The findings indicate that financial literacy is an important predictor of financial risk tolerance, but financial intelligence does not significantly change the strength or direction of this relationship. Therefore, improving financial literacy may be a direct and practical pathway for enhancing informed financial risk tolerance.

Keywords: Financial Literacy; Financial Risk Tolerance; Financial Intelligence; Structural Equation Modeling; Tehran Stock Exchange.

1. Introduction

Financial decision-making has become increasingly complex as individuals face wider access to investment products, digital financial services, retirement planning instruments, and market-based wealth-building opportunities. In such an environment, the ability to understand financial concepts and evaluate uncertainty is no longer a peripheral competence but a core determinant of responsible participation in financial markets. Financial literacy refers to the knowledge, skills, and cognitive capacity required to understand financial information,

compare alternatives, and make informed choices under conditions of uncertainty. Recent literature has emphasized that financial literacy is not limited to basic numerical awareness; rather, it includes the capacity to interpret risk, evaluate future consequences, and connect financial knowledge with actual decision contexts [1]. This issue is particularly important in investment-related environments, where individuals must assess expected returns, possible losses, time horizons, inflationary pressures, diversification benefits, and the psychological consequences of exposure to risk. Therefore, financial literacy is increasingly treated as a strategic personal capability that enables individuals to navigate financial systems with greater confidence and rationality [2].

One of the most important outcomes associated with financial literacy is financial risk tolerance. Financial risk tolerance refers to the degree to which individuals are willing and able to accept uncertainty in financial outcomes, especially when there is a possibility of capital loss. It is a psychological-financial construct that reflects not only knowledge but also attitudes, expectations, personality tendencies, prior experience, and perceived control over financial decisions. Studies have shown that risk tolerance plays a central role in investment choices, portfolio composition, retirement planning, and participation in financial markets [3]. Individuals with higher risk tolerance are generally more likely to accept variable returns and participate in investment opportunities, while those with lower risk tolerance tend to prefer secure but potentially lower-yield financial options. However, risk tolerance should not be understood as irrational risk-seeking; rather, in a well-informed context, it can indicate the capacity to evaluate risk realistically and accept an appropriate level of uncertainty in pursuit of long-term financial objectives [4].

The relationship between financial literacy and financial risk tolerance has received considerable empirical attention. A growing body of research suggests that individuals with stronger financial literacy tend to show higher levels of financial risk tolerance because they are better able to understand the nature of risk, distinguish between systematic and unsystematic uncertainty, and evaluate financial opportunities based on evidence rather than fear or speculation [5]. Financial literacy may reduce ambiguity surrounding financial products and can help individuals avoid exaggerated perceptions of loss. When people understand concepts such as diversification, compound returns, inflation, time value of money, and portfolio risk, they may become more capable of accepting calculated risk. Studies on investors in emerging markets have similarly indicated that financial knowledge and financial interest can contribute to stronger tolerance for financial uncertainty [6]. This suggests that risk tolerance is not merely a fixed psychological trait but can also be shaped by financial learning, market exposure, and cognitive interpretation of financial information.

Despite this general association, the link between financial literacy and financial risk tolerance is not always linear or uniform across individuals and contexts. Some individuals may possess financial knowledge but still avoid financial risk because of low confidence, negative prior experiences, personality traits, age-related concerns, or emotional responses to possible losses. For example, studies on overconfidence and risk tolerance indicate that financial judgments can be influenced by the extent to which individuals overestimate their own abilities, especially in older age groups [7]. Similarly, personality characteristics such as conscientiousness and neuroticism may shape how financial literacy translates into risk-related choices [8]. Therefore, financial literacy may be necessary but not sufficient for explaining financial risk tolerance. This makes it important to examine additional factors that may strengthen, weaken, or modify the relationship between financial literacy and risk tolerance.

Recent studies have also emphasized generational, demographic, and socioeconomic differences in financial risk tolerance. Evidence from African American communities has shown that financial literacy, generation, and socioeconomic conditions are connected to financial risk tolerance, suggesting that financial decisions are

embedded in broader life experiences and social contexts [9]. Research on generational differences in financial securities ownership also indicates that risk tolerance varies across age cohorts and is shaped by economic opportunity, accumulated experience, and exposure to financial markets [4]. Similarly, studies on student and youth populations have shown that demographic factors and financial knowledge affect investment perceptions and readiness to engage with financial instruments [10]. These findings indicate that the interaction between knowledge and risk cannot be understood without considering individual capacities and contextual conditions.

The importance of financial literacy has also been highlighted in retirement planning. Retirement savings decisions require individuals to make long-term financial commitments under uncertainty, and risk tolerance plays a crucial role in determining whether people choose conservative or growth-oriented saving strategies. Research on Indonesian millennials has shown that financial literacy, goal clarity, and risk tolerance contribute to retirement savings, suggesting that informed individuals are more likely to connect financial knowledge with long-term planning [11]. Similarly, comparative evidence on retirement awareness and readiness among women in Malaysia and China has shown that financial preparedness is associated with awareness, knowledge, and the capacity to evaluate future financial needs [12]. These studies reinforce the view that financial literacy and risk tolerance are closely connected in planning for future financial security.

The relationship between financial literacy and risk tolerance is also relevant in emerging economies, where financial markets may be less stable, financial education may be unevenly distributed, and individuals may face higher uncertainty in income, inflation, and investment outcomes. Studies have shown that financial literacy is associated with financial well-being, and risk tolerance may act as an important mechanism linking knowledge to financial outcomes [13]. Research on financial capability, risk-taking ability, and financial well-being among women in Sri Lanka has similarly emphasized the role of financial competence in shaping the ability to engage with risk in a productive and informed manner [14]. In emerging market contexts, therefore, financial literacy may be particularly important because individuals often need to make decisions in environments characterized by volatility, limited advisory access, and unequal financial information.

Investment participation is another area in which financial literacy and risk tolerance are closely connected. Studies on stock market participation among Malaysian students using PLS-SEM have demonstrated that financial knowledge and related psychological determinants influence the willingness to engage with capital markets [15]. Other research on crypto-asset investment among Indonesian youth has shown that young investors' intentions are shaped by knowledge, perception, and willingness to accept uncertainty in new financial products [16]. Similarly, research on individual investment decision-making has found that social and personal factors interact with financial perceptions when individuals evaluate investment alternatives [17]. These findings are important because they show that financial risk tolerance is not only relevant for traditional investments but also for emerging digital and alternative financial assets.

In addition to knowledge-based explanations, the literature increasingly points to the role of psychological and cognitive factors in financial decisions. Planned behavior, risk appetite, and financial knowledge may coexist in explaining risky investment decisions, indicating that individuals act based on both cognitive evaluation and motivational orientation [18]. Financial socialization and psychological characteristics also influence how young professionals manage personal financial decisions, suggesting that financial judgment is shaped through family, education, peer environments, and internal traits [19]. Research on financial well-being in emerging economies has further shown that personal financial outcomes depend on a combination of literacy, attitudes, and decision-related

competencies [20]. These studies collectively suggest that financial risk tolerance emerges from a broader cognitive-affective system rather than from financial knowledge alone.

Within this broader framework, financial intelligence can be introduced as a higher-order capability that may influence how financial literacy is applied in risk-related contexts. Financial intelligence refers to an individual's ability to understand financial realities, interpret financial information, recognize opportunities and threats, and use financial reasoning in practical decision-making. While financial literacy reflects what individuals know, financial intelligence reflects how effectively they use that knowledge when facing uncertainty. The conceptual distinction is important because two individuals may have similar levels of financial knowledge but differ in their capacity to analyze risk, control emotional reactions, compare alternatives, and make coherent decisions. Studies on investment preference have shown that emotional intelligence, confidence, trust, financial literacy, and risk preference jointly influence investment-related choices, suggesting that knowledge-based and intelligence-related characteristics may interact in financial contexts [21]. Therefore, financial intelligence may operate as a moderating factor that changes the strength or direction of the relationship between financial literacy and financial risk tolerance.

The moderating role of individual capabilities has been increasingly examined in financial studies. For example, research has indicated that subjective financial literacy can moderate the relationship between coping strategies and financial risk tolerance, showing that individuals' perceived financial competence may alter how they respond to financial uncertainty [22]. Similarly, studies have shown that risk tolerance can moderate the relationship between financial literacy and digital financial service use, particularly during periods of crisis such as the COVID-19 pandemic [23]. Financial confidence and risk aversion have also been examined as moderators in the relationship between financial literacy and savings-related outcomes, suggesting that literacy becomes more effective when individuals have confidence in their ability to apply knowledge in practical settings [24]. These findings provide theoretical support for investigating whether financial intelligence moderates the relationship between financial literacy and financial risk tolerance.

The role of mediation and moderation in this field has also been observed in studies examining risk tolerance as an intervening mechanism. For instance, research among Muhammadiyah organization members in East Java indicated that financial literacy can mediate or help explain the prediction of risk tolerance, emphasizing the need to analyze indirect and conditional pathways among financial constructs [25]. Another study on herding bias and investment performance in Nigeria found that financial literacy can moderate the role of financial risk tolerance in investment outcomes, demonstrating that literacy may change how risk-related tendencies affect financial results [26]. These studies suggest that the relationships among financial literacy, risk tolerance, and individual financial capabilities are dynamic and conditional rather than isolated and direct.

Measurement quality is also essential when studying financial risk tolerance. Since risk tolerance includes psychological, perceptual, and behavioral dimensions, its measurement must be both conceptually valid and empirically reliable. Recent work on the face and content validity of financial risk tolerance instruments has emphasized the need for accurate measurement tools that can capture risk tolerance across relevant domains [27]. This is especially important in studies using structural equation modeling, where latent constructs are measured through observed indicators and the validity of conclusions depends heavily on the reliability and validity of the measurement model. Consequently, before examining structural paths among financial literacy, financial intelligence, and financial risk tolerance, researchers must first ensure that the constructs have acceptable internal consistency, convergent validity, and discriminant validity.

The literature also shows that financial literacy affects not only risk tolerance but also broader financial preparedness and future orientation. Studies on passive income generation have linked financial literacy with the risk-as-feelings hypothesis, indicating that financial decisions are shaped by both cognitive understanding and emotional interpretation of risk [28]. Research on Islamic financial literacy among Generation Z has shown that financial knowledge systems can influence how young people understand and approach financial decisions within specific cultural and ethical frameworks [29]. These findings support the argument that financial literacy is context-sensitive and may function differently depending on the individual's cognitive capacity, confidence, cultural background, and financial reasoning ability.

In sum, previous studies provide strong evidence that financial literacy is associated with financial risk tolerance, investment participation, retirement readiness, and financial decision quality. However, the literature also shows that this relationship is influenced by psychological, demographic, cognitive, and contextual factors. While financial literacy provides the informational foundation for financial decision-making, financial intelligence may determine whether that knowledge is translated into informed tolerance of financial risk. This distinction is especially important in professional financial environments, such as the Tehran Stock Exchange, where individuals are exposed to financial information and risk-related judgments more frequently than the general population. Examining the moderating role of financial intelligence can therefore clarify whether financial literacy alone is sufficient to explain financial risk tolerance or whether its effect depends on the individual's broader financial reasoning capacity.

The aim of this study was to examine the relationship between financial literacy and financial risk tolerance among employees of the Tehran Stock Exchange, with emphasis on the moderating effect of financial intelligence.

2. Methodology

This study was designed as an applied, descriptive-survey, causal-correlational research. The main purpose of the study was to examine the interaction between financial literacy and financial risk tolerance, with particular emphasis on the moderating role of financial intelligence. Since the study sought to explain the relationships among latent constructs and test a theory-based conceptual model, the research design was non-experimental and cross-sectional. Data were collected through standardized questionnaires after reviewing the theoretical foundations, related literature, and previous empirical studies. The statistical population consisted of employees of the Tehran Stock Exchange. Because access to the whole population was not practically feasible, a sample was selected through simple random sampling. The sample size was estimated using Cochran's formula with a confidence level of 95%, an acceptable error level of 0.05, and the maximum variance assumption of $p = q = 0.50$. Based on this calculation, 306 participants were selected as the final sample. The respondents were asked to complete the research questionnaire voluntarily. The questionnaire included an initial demographic section covering gender, educational level, and work experience, followed by the specialized items measuring the main constructs of the study. The use of employees of the Tehran Stock Exchange as the target population was appropriate because these individuals work in a financial environment and are expected to encounter financial information, investment-related decisions, and risk-related financial judgments in their professional activities.

The data collection instrument was a structured questionnaire composed of two main sections. The first section included demographic questions designed to describe the characteristics of the respondents, including gender, level of education, and work experience. The second section consisted of standardized scales measuring financial literacy, financial risk tolerance, and financial intelligence. Financial literacy was measured using the standard

Financial Literacy Questionnaire developed by Moinuddin in 2011. This questionnaire assesses respondents' knowledge, understanding, and practical awareness of financial concepts, including the ability to interpret financial information and make informed financial judgments. Financial risk tolerance was assessed using Deacon's Financial Risk Tolerance Questionnaire developed in 2004. This instrument evaluates the degree to which individuals are willing to accept uncertainty, possible financial loss, and variability in financial outcomes when making financial decisions. Financial intelligence was measured using the Financial Intelligence Questionnaire developed by Popović and colleagues in 2012. This questionnaire evaluates the individual's ability to understand financial situations, process financial information, evaluate financial alternatives, and apply financial reasoning in decision-making contexts. All questionnaire items were scored using a closed-response Likert-type scale, allowing quantitative analysis of the respondents' perceptions and attitudes toward the study variables.

To ensure the validity of the instrument, both content validity and construct validity were considered. Although standardized questionnaires were used, the complete questionnaire was reviewed by several faculty members and experts in management and finance. They examined the clarity, relevance, comprehensibility, and conceptual adequacy of the items and evaluated whether the questions appropriately represented the constructs included in the research model. After receiving expert feedback, necessary revisions were made to improve the wording and alignment of the questionnaire items. In addition, convergent validity was assessed through average variance extracted and composite reliability. The accepted criteria were AVE values greater than 0.50, CR values greater than 0.70, and CR values higher than AVE, indicating that the indicators adequately represented their corresponding latent constructs. Reliability was assessed using Cronbach's alpha coefficient and composite reliability. Cronbach's alpha was used to examine the internal consistency of each scale, with values equal to or greater than 0.70 considered acceptable. Therefore, the final instrument was evaluated in terms of both validity and reliability before testing the research hypotheses.

After collecting the questionnaires, the data were coded, screened, and prepared for statistical analysis. Descriptive statistics were first used to summarize the demographic characteristics of the participants and the main research variables. Frequency tables and percentage distributions were used for demographic variables, while mean, standard deviation, minimum, and maximum values were calculated for the main constructs. SPSS 22 was used for data preparation, descriptive analysis, preliminary screening, and reliability assessment. The inferential analysis was conducted using Visual PLS because the study involved latent variables measured through multiple observed indicators and required simultaneous assessment of the measurement model and structural model. Partial least squares structural equation modeling was considered appropriate because it allows the researcher to evaluate complex causal relationships among latent constructs, estimate direct and moderating effects, and assess the quality of both observed indicators and latent variables.

The data analysis process included two main stages: assessment of the measurement model and assessment of the structural model. In the measurement model, confirmatory factor analysis was used to examine the relationship between observed questionnaire items and their corresponding latent constructs. Factor loadings, Cronbach's alpha, composite reliability, and average variance extracted were examined to confirm indicator reliability, internal consistency, and convergent validity. Factor loadings were assessed to determine whether each item contributed adequately to the measurement of its related construct. In the structural model, the direct effect of financial literacy on financial risk tolerance was tested first. Then, the moderating role of financial intelligence was examined by adding the interaction term between financial literacy and financial intelligence to the model. The significance of the path coefficients was evaluated using the bootstrapping procedure in Visual PLS. The coefficient of

determination, predictive relevance, and model fit indices were also examined to evaluate the explanatory and predictive capacity of the model. Through this analytical procedure, the study determined whether financial intelligence strengthens, weakens, or changes the relationship between financial literacy and financial risk tolerance.

3. Findings and Results

The demographic characteristics of the participants showed that, out of 295 respondents, 188 were male (63.73%) and 107 were female (36.27%). In terms of age, 64 participants (21.69%) were under 30 years old, 82 participants (27.80%) were between 30 and 40 years old, 86 participants (29.15%) were between 40 and 50 years old, and 63 participants (21.36%) were over 50 years old. Regarding educational level, 45 respondents (15.25%) held an associate degree, 108 respondents (36.61%) held a bachelor's degree, 89 respondents (30.17%) held a master's degree, and 53 respondents (17.97%) held a doctoral degree. Overall, the sample was predominantly male, most participants were between 40 and 50 years old, and the largest educational group consisted of respondents with a bachelor's degree.

Before testing the structural model, the normality of the main research variables was examined using the Kolmogorov–Smirnov test. In this test, the null hypothesis assumes that the distribution of the variable is normal; therefore, when the significance level is greater than 0.05, the normality assumption is accepted. The results showed that the significance values for all three variables were below 0.05, indicating that the distributions of financial literacy, financial intelligence, and financial risk tolerance did not follow a normal distribution.

Table 1. Results of the Kolmogorov–Smirnov Test for Normality

Variable	Kolmogorov–Smirnov Statistic	Significance Level
Financial literacy	0.079	0.039
Financial intelligence	0.083	0.023
Financial risk tolerance	0.095	0.005

As shown in Table 1, the significance level for financial literacy was 0.039, for financial intelligence was 0.023, and for financial risk tolerance was 0.005. Since all values were lower than 0.05, the assumption of normality was rejected for all research variables. Therefore, the data did not have a normal distribution, and the use of partial least squares structural equation modeling was appropriate for testing the research model.

The reliability and convergent validity of the research constructs were examined before testing the hypotheses. Cronbach's alpha was used to assess internal consistency, with values above 0.70 considered acceptable. In addition, convergent validity was evaluated using average variance extracted (AVE), and composite reliability (CR) was used as a stronger reliability criterion in structural equation modeling. The accepted criteria were CR > 0.70, AVE > 0.50, and CR > AVE.

Table 2. Reliability and Convergent Validity of the Research Constructs

Construct	Cronbach's Alpha	AVE	Composite Reliability
Financial risk tolerance	0.769	0.597	0.825
Financial literacy	0.869	0.507	0.890
Financial intelligence	0.819	0.544	0.854

According to Table 2, Cronbach's alpha values ranged from 0.769 to 0.869, indicating acceptable internal consistency for all constructs. The AVE values were also greater than 0.50, confirming convergent validity. In

addition, all CR values exceeded 0.70 and were higher than the corresponding AVE values. Therefore, the measurement model met the required reliability and convergent validity criteria.

Discriminant validity was assessed using the Fornell–Larcker criterion. According to this criterion, the square root of AVE for each construct should be greater than its correlations with other constructs. The diagonal values in Table 3 represent the square root of AVE for each construct.

Table 3. Discriminant Validity Matrix Based on the Fornell–Larcker Criterion

Construct	Financial Risk Tolerance	Financial Literacy	Financial Intelligence
Financial risk tolerance	0.772		
Financial literacy	0.557	0.712	
Financial intelligence	0.406	0.686	0.737

As presented in Table 3, the square root of AVE for financial risk tolerance was 0.772, for financial literacy was 0.712, and for financial intelligence was 0.737. Each diagonal value was greater than the correlations between that construct and the other constructs. Therefore, the measurement model had acceptable discriminant validity, showing that each construct was empirically distinct from the other constructs in the model.

The outer measurement model was then assessed through confirmatory factor analysis in the PLS framework. The purpose of this stage was to examine whether the observed questionnaire items properly measured their corresponding latent variables. Factor loadings greater than 0.30 were considered acceptable. The results of the outer model are presented in Table 4.

Table 4. Outer Model Factor Loadings for the Research Constructs

Construct	Indicator	Factor Loading
Financial risk tolerance	r1	0.415
Financial risk tolerance	r10	0.520
Financial risk tolerance	r13	0.582
Financial risk tolerance	r15	0.311
Financial risk tolerance	r18	0.523
Financial risk tolerance	r19	0.567
Financial risk tolerance	r2	0.654
Financial risk tolerance	r3	0.494
Financial risk tolerance	r4	0.763
Financial risk tolerance	r7	0.343
Financial risk tolerance	r8	0.360
Financial risk tolerance	r9	0.772
Financial literacy	s1	0.448
Financial literacy	s11	0.547
Financial literacy	s12	0.663
Financial literacy	s13	0.345
Financial literacy	s14	0.658
Financial literacy	s15	0.522
Financial literacy	s17	0.497
Financial literacy	s18	0.664
Financial literacy	s19	0.607
Financial literacy	s2	0.480
Financial literacy	s20	0.354
Financial literacy	s22	0.690
Financial literacy	s24	0.539
Financial literacy	s3	0.709
Financial literacy	s5	0.452

Financial literacy	s6	0.503
Financial literacy	s7	0.497
Financial literacy	s8	0.563
Financial literacy	s9	0.601
Financial intelligence	h1	0.681
Financial intelligence	h11	0.513
Financial intelligence	h12	0.763
Financial intelligence	h13	0.584
Financial intelligence	h14	0.725
Financial intelligence	h15	0.403
Financial intelligence	h16	0.369
Financial intelligence	h3	0.411
Financial intelligence	h4	0.659
Financial intelligence	h6	0.761
Financial intelligence	h8	0.608
Financial intelligence	h9	0.319

Based on Table 4, all observed indicators had factor loadings greater than 0.30. This result indicates that the observed variables had acceptable correlations with their corresponding latent constructs. Therefore, the measurement model confirmed that financial literacy, financial intelligence, and financial risk tolerance were properly measured by their respective questionnaire items. After confirming the reliability, convergent validity, discriminant validity, and outer model loadings, the structural model was evaluated.

The goodness of fit and predictive quality of the structural model were examined using R^2, Q^2, and GOF. The coefficient of determination (R^2) shows the explanatory power of the exogenous variables for the endogenous variable. In addition, Q^2 evaluates the predictive relevance of the model. Values of 0.02, 0.15, and 0.35 are usually interpreted as weak, moderate, and strong predictive power, respectively. The GOF index was also used to assess the overall fit of the model, where values of 0.01, 0.25, and 0.36 indicate weak, moderate, and strong model fit, respectively.

Table 5. Goodness-of-Fit and Predictive Indices of the Structural Model

Construct	R^2	Q^2	GOF
Financial risk tolerance	0.645	0.181	0.625
Financial literacy	—	0.222	0.625
Financial intelligence	—	0.213	0.625

As shown in Table 5, the R^2 value for financial risk tolerance was 0.645, indicating that the model explained 64.5% of the variance in financial risk tolerance. This value reflects a strong explanatory power for the endogenous construct. The Q^2 value for financial risk tolerance was 0.181, which indicates acceptable predictive relevance. The Q^2 values for financial literacy and financial intelligence were also positive, confirming the predictive adequacy of the model. Moreover, the GOF value was 0.625, which is higher than the threshold of 0.36 and therefore indicates a strong overall model fit.

After confirming the adequacy of the measurement and structural models, the research hypotheses were tested using path coefficients, t-statistics, and significance levels. The main criterion for confirming a relationship between constructs was the t-value. If the t-value was greater than 1.96 and the significance level was lower than 0.05, the hypothesis was supported at the 95% confidence level.

Table 6. Results of Hypothesis Testing

Hypothesis	Path	Beta Coefficient	t-Statistic	Significance Level	Result
H1	Financial literacy → Financial risk tolerance	0.527	7.82	0.000	Supported
H2	Financial literacy × Financial intelligence → Financial risk tolerance	-0.053	0.89	0.370	Not supported

According to Table 6, the direct relationship between financial literacy and financial risk tolerance was positive and statistically significant. The beta coefficient was 0.527, the t-statistic was 7.82, and the significance level was 0.000. Since the t-value was greater than 1.96 and the significance level was lower than 0.05, the null hypothesis was rejected at the 95% confidence level. Therefore, financial literacy had a significant positive relationship with financial risk tolerance.

The moderating effect of financial intelligence on the relationship between financial literacy and financial risk tolerance was not statistically significant. The beta coefficient for the interaction effect was -0.053, the t-statistic was 0.89, and the significance level was 0.370. Since the t-value was lower than 1.96 and the significance level was greater than 0.05, the null hypothesis was accepted at the 95% confidence level. Therefore, financial intelligence did not significantly moderate the relationship between financial literacy and financial risk tolerance. Overall, the findings indicate that although financial literacy directly predicts financial risk tolerance, the strength or direction of this relationship does not significantly change across different levels of financial intelligence.

4. Discussion and Conclusion

The findings of this study showed that financial literacy had a positive and statistically significant relationship with financial risk tolerance among employees of the Tehran Stock Exchange. The path coefficient for the relationship between financial literacy and financial risk tolerance was positive and relatively strong ($\beta = 0.527$), and the t-value was clearly above the critical threshold ($t = 7.82$, $p < 0.001$). This result indicates that individuals with higher levels of financial literacy were more likely to demonstrate greater tolerance for financial risk. In other words, when employees had stronger knowledge of financial concepts, financial products, investment principles, and uncertainty-related decision-making, they were more prepared to accept reasonable levels of financial risk. This finding is theoretically meaningful because risk tolerance is not merely an emotional willingness to take risks, but a cognitive-evaluative capacity through which individuals assess potential gains, possible losses, time horizons, and the consequences of uncertain outcomes. Therefore, higher financial literacy may reduce ambiguity, improve interpretation of risk information, and help individuals distinguish between calculated risk and irrational exposure to loss.

This finding is consistent with previous studies that have emphasized the role of financial literacy in shaping financial risk tolerance and investment-related decisions. Murhadi et al. found that financial literacy and financial interest influence investors' financial risk tolerance, suggesting that individuals who better understand financial concepts are more capable of accepting investment uncertainty [5]. Similarly, Potts emphasized that financial knowledge, experience, and domain-specific risk tolerance are important predictors of financial risk-taking, supporting the argument that informed individuals are more likely to engage in risk-related financial decisions in a calculated manner [3]. The result of the present study also aligns with the findings of Pangaribuan and Bertuah, who showed that investment decisions among private employees are affected by financial knowledge and risk-related perceptions [6]. These findings collectively suggest that financial literacy provides individuals with the

analytical tools required to understand the structure of risk and to evaluate financial opportunities more confidently.

The positive relationship between financial literacy and financial risk tolerance can also be explained through the uncertainty-reduction function of financial knowledge. Individuals with limited financial literacy may perceive financial risk as vague, threatening, and uncontrollable, while financially literate individuals may interpret the same risk as measurable, manageable, and potentially productive. Financial literacy enables individuals to understand diversification, inflation, return variability, market fluctuation, investment horizon, and the relationship between risk and expected return. In this regard, the present result supports the view that financial literacy strengthens the cognitive foundation of financial decision-making and increases individuals' ability to tolerate uncertainty. This interpretation is consistent with the work of Bunyamin and Wahab, who described financial literacy as a central factor in understanding finance and economic decision-making [1]. It is also compatible with Rodrigues and Gopalakrishna's finding that financial literacy regulates intended investment behavior and can influence how individuals design hypothetical investment portfolios [2].

The findings are especially important because the participants were employees of the Tehran Stock Exchange. In such a professional financial environment, individuals are more frequently exposed to financial information, market fluctuations, investment analysis, and risk-related judgments. Therefore, the significant relationship between financial literacy and financial risk tolerance suggests that even in a financially informed occupational context, differences in financial literacy remain meaningful. This result supports studies showing that financial literacy continues to explain financial attitudes and investment perceptions even among groups with some exposure to financial environments. Luther and Sumani reported that demographic factors and financial literacy influence students' investment perceptions, showing that knowledge affects how individuals evaluate investment opportunities [10]. Manaf et al. similarly found that determinants of stock market participation among Malaysian students could be meaningfully analyzed through PLS-SEM, emphasizing the role of financial knowledge and decision-related factors in capital-market participation [15]. Thus, financial literacy appears to be relevant not only for general populations but also for individuals who are closer to financial and investment environments.

The result also corresponds with studies that link financial literacy, risk tolerance, and long-term financial planning. Alfando et al. found that financial literacy, goal clarity, and risk tolerance play a role in retirement savings among Indonesian millennials, indicating that individuals who understand financial concepts and tolerate appropriate risk are more likely to prepare for future financial needs [11]. Yuan et al. also emphasized the importance of retirement awareness and readiness among women in Malaysia and China, showing that financial preparedness is related to knowledge and future-oriented financial evaluation [12]. These studies support the interpretation that financial literacy does not only increase short-term financial knowledge but also affects broader risk-related attitudes necessary for long-term planning. In the present study, the positive association between financial literacy and financial risk tolerance may indicate that financially literate employees are more capable of connecting current financial decisions with future financial outcomes.

The findings are also aligned with evidence from emerging economies and developing financial contexts. Naveed and Ali showed that risk tolerance mediates the relationship between financial literacy and financial well-being during COVID-19, suggesting that financial knowledge may contribute to well-being through improved capacity to tolerate and manage financial uncertainty [13]. Neruja and Harishanthan similarly found an interplay among financial capability, risk-taking ability, and financial well-being among women in Sri Lanka, indicating that financial capability and risk-related capacity are closely connected [14]. The present study extends this line of

evidence by showing that among employees of a stock exchange, financial literacy is directly associated with financial risk tolerance. This is particularly relevant in financial systems where market instability, inflation, and uncertainty may make financial decision-making more demanding.

The positive effect of financial literacy on financial risk tolerance can also be discussed through behavioral finance perspectives. Financial risk tolerance is shaped by cognitive evaluation, emotional interpretation, confidence, personality, and prior experience. Habyarimana and Kakkar's discussion of financial literacy and the risk-as-feelings hypothesis indicates that financial decisions involve both knowledge and affective responses to uncertainty [28]. Therefore, financial literacy may increase risk tolerance not by eliminating emotional reactions but by helping individuals interpret risk more accurately and manage their affective responses. This view is also supported by Malik's study, which emphasized the coexistence of financial knowledge, risk appetite, and planned behavior in risky investment decisions [18]. Accordingly, the significant relationship observed in the present study may reflect the role of financial literacy in transforming risk from an emotionally threatening condition into an analyzable decision variable.

The second major finding of the study showed that financial intelligence did not significantly moderate the relationship between financial literacy and financial risk tolerance. The interaction effect was negative but very weak ($\beta = -0.053$), and it was not statistically significant ($t = 0.89$, $p = 0.370$). This means that the relationship between financial literacy and financial risk tolerance did not significantly differ across different levels of financial intelligence. In practical terms, financial literacy was associated with higher financial risk tolerance regardless of whether employees reported higher or lower levels of financial intelligence. This finding suggests that, in the present sample, financial intelligence did not strengthen, weaken, or change the direction of the relationship between financial literacy and financial risk tolerance. Therefore, financial literacy appears to have a direct and independent association with financial risk tolerance.

Although the non-significant moderating effect may initially appear unexpected, it can be interpreted in several ways. First, financial intelligence may overlap conceptually with financial literacy in this sample. Employees of the Tehran Stock Exchange may already possess a baseline level of financial reasoning because of their professional environment. As a result, financial intelligence may not create enough additional differentiation to change the effect of financial literacy on risk tolerance. Second, financial risk tolerance may be more strongly shaped by knowledge, experience, confidence, personality, and market exposure than by financial intelligence as measured in this study. Previous research has shown that financial risk tolerance is affected by several demographic and psychological factors, including generation, socioeconomic characteristics, and personality traits [8, 9]. Therefore, financial intelligence may be only one part of a broader psychological-financial system and may not independently alter the literacy–risk tolerance relationship.

The non-significant moderation result can also be understood in light of studies that have examined other moderators in financial decision-making. Aren and Hamamcı found that subjective financial literacy moderates the relationship between coping strategies and financial risk tolerance, suggesting that perceived knowledge may sometimes change the way individuals respond to uncertainty [22]. Ananda et al. also showed that risk aversion and financial confidence can moderate the effect of financial literacy on savings behavior, indicating that affective and confidence-based variables may influence the translation of knowledge into financial action [24]. However, the present study found that financial intelligence did not function in the same way. One possible explanation is that financial intelligence, unlike confidence or risk aversion, may not directly alter the emotional willingness to accept

financial uncertainty. It may improve understanding and reasoning, but the willingness to tolerate risk may depend more strongly on attitudes, previous investment outcomes, subjective confidence, or personality characteristics.

The findings are also comparable with studies that have examined emotional intelligence, trust, confidence, and risk preference in investment contexts. Aren and Hamamcı reported that investment preference is influenced by fantasy, emotional intelligence, confidence, trust, financial literacy, and risk preference, showing that risk-related financial behavior is multi-dimensional [21]. In the present study, the absence of a significant moderating effect suggests that financial intelligence alone may not be sufficient to explain conditional differences in risk tolerance. This is important because it indicates that financial intelligence should not be assumed to automatically intensify the effect of financial literacy. In some contexts, the effect of financial literacy may be strong enough that additional reasoning capacity does not substantially change its influence on risk tolerance.

The result also resonates with research on overconfidence and risk tolerance. Frank et al. showed that overconfidence is related to financial risk tolerance in older age, suggesting that subjective evaluation of one's ability may influence risk-related decisions [7]. This finding implies that confidence or overconfidence may play a stronger moderating role than financial intelligence. Similarly, Apochi et al. found that financial literacy moderated the relationship between herding bias, financial risk tolerance, and investment performance, indicating that knowledge can affect how biases and risk tendencies influence outcomes [26]. In comparison, the present study suggests that financial intelligence did not moderate the effect of literacy on risk tolerance, perhaps because the moderation mechanism depends more on perceived competence, emotional control, or behavioral bias than on financial reasoning ability alone.

The measurement perspective is also important for interpreting the findings. Hadi et al. emphasized the importance of face and content validity in measuring financial risk tolerance, because this construct includes several psychological and behavioral dimensions [27]. If risk tolerance is measured primarily as a willingness to accept uncertainty, then knowledge may predict it more directly than financial intelligence. Moreover, if financial intelligence is measured as a broad ability to understand and process financial information, its unique moderating role may be reduced when financial literacy is already included in the model. This interpretation is consistent with studies showing that financial literacy, financial capability, and psychological characteristics often interact in complex ways rather than producing simple linear or moderating effects [19, 20].

Overall, the results of this study support the central role of financial literacy in explaining financial risk tolerance, while showing that financial intelligence did not significantly condition this relationship. This means that strengthening financial literacy may be a more direct and reliable pathway for improving appropriate financial risk tolerance than relying on financial intelligence alone. The findings are consistent with studies showing the importance of financial literacy for investment intention, risk perception, financial well-being, and participation in financial markets [16, 17, 23, 29]. At the same time, the insignificant moderating effect highlights the need for more precise theoretical and empirical models that distinguish between knowledge, intelligence, confidence, personality, experience, and emotional responses to financial uncertainty.

Limitations: This study had several limitations that should be considered when interpreting the findings. First, the sample was limited to employees of the Tehran Stock Exchange, which may restrict the generalizability of the results to other occupational groups, ordinary investors, students, entrepreneurs, or individuals with limited exposure to financial markets. Second, the study used a cross-sectional design; therefore, although the structural model tested directional relationships, causal conclusions cannot be made with certainty. Third, the data were collected through self-report questionnaires, which may be affected by response bias, social desirability, or

participants' subjective interpretation of the items. Fourth, the study focused only on financial literacy, financial intelligence, and financial risk tolerance, while other potentially important variables such as investment experience, income level, financial confidence, personality traits, emotional regulation, and previous exposure to financial losses were not included in the model.

Suggestions for future research: Future studies should examine the same model in broader and more diverse populations, including individual investors, university students, financial advisors, entrepreneurs, and employees in non-financial organizations. Longitudinal designs are recommended to determine whether financial literacy increases financial risk tolerance over time or whether individuals with higher risk tolerance are more motivated to acquire financial knowledge. Future researchers may also compare different models by including variables such as financial confidence, overconfidence, risk perception, investment experience, personality traits, financial socialization, and emotional intelligence. In addition, future studies can use multi-group analysis to examine whether the relationship between financial literacy and financial risk tolerance differs by gender, age, education, income, work experience, or investment background. Qualitative or mixed-method studies may also provide deeper insight into how individuals interpret financial risk and how financial intelligence is actually applied in real investment decisions.

Suggestions for practice: The findings suggest that organizations, financial institutions, and policymakers should prioritize financial literacy development as a practical way to improve informed financial risk tolerance. Training programs should go beyond basic financial definitions and include applied topics such as risk-return trade-offs, diversification, inflation, investment horizons, portfolio selection, and decision-making under uncertainty. In professional financial environments, such as stock exchanges and investment institutions, educational programs should be designed to help employees distinguish between rational risk tolerance and excessive risk-taking. Since financial intelligence did not significantly moderate the relationship between financial literacy and financial risk tolerance, interventions should not rely only on general financial reasoning ability but should directly strengthen measurable financial knowledge, analytical skills, and practical decision-making competence. This approach can help individuals accept appropriate financial risks while avoiding uninformed, impulsive, or emotionally driven financial decisions.

Authors' Contributions

Authors equally contributed to this article.

Ethical Considerations

All procedures performed in this study were under the ethical standards.

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Conflict of Interest

The authors report no conflict of interest.

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