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The Effect of Emotion as a Moderating Variables Of Risk Perception Against Risk Taking In Share Trading In Indonesia Stock Exchange Using Structural Equation Modeling

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Abstract:

Background: Strategic risk is important in company management because it protects the organization from the changing globalization environment. The company manager will choose less risk if asked to take the risk and be rewarded as a consequence. Management of risk behavior, with consideration of utility, and propensity to accept certain risks including cognitive behavior and decision making. High individual emotions oblige a person to make rational choices. Emotions can lead to consistent behavior in economic predictions. Emotions can improve important and optimal decision making. The role of emotional anticipation in risk perception arises from the environment naturally. Negative emotional reactions that include the role of stress have an important role in moderating laden imagery, risk perception on risk taking. The limited level of knowledge between individuals causes differences in the level of confidence that have implications for differences in risk perceptions, which in turn lead to differences in decision making. Financial literacy can be used in financial activities to increase expected lifetime utility. Financial risk taking through standardized financial investment and using advanced technology, this shows that actual and perceived financial literacy is relevant for financial risk taking.

Materials and Methods: Therefore, it is necessary to study and research further by exploring more comprehensively the effects of emotions as a moderating variable on risk perception on risk taking in stock trading on the Indonesia Stock Exchange by involving financial literacy, and overconfidence using Moderating Structural Equation Modeling (MSEM).

Results: The results showed that the risk taking model with emotions as a moderating risk perception based on beginner investors on the Indonesia Stock Exchange is a fit model based on the Goodness of Fit (GoF) criteria.

Conclusion: The indicators Emotion, financial literacy, overconfidence, risk perception, and risk taking are valid and reliable indicators. The effect of emotion in moderating risk perception against risk taking is strengthening. The dominant indicator in forming Financial Literacy is Basic knowledge, Overconfidence is illusion of control, Emotions is formed by active behavior indicators, Risk perception is formed by Gambling indicators, while Risk taking is formed by indicators. Healthy / safety.

Key Words: Emotion; Risk Perception; Risk taking; financial literacy; Overconfidence; MSEM.

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I. Introduction

Risk management is very important, especially strategic risk. Strategic risk is very important in company management because it protects the organization from changes in the globalization environment. Frank (2008) managers will choose less risk if asked to take risks and are given an advantage as a consequence. Management of risk behavior, with consideration of utility, and propensity to accept certain risks including cognitive behavior and decision making. Based on expectations and risk preferences, managers need to compare project alternatives and make choices based on the beliefs of organizational resources (Fiegenbaum and Thomas, 1988). With regard to efforts to minimize risk in decision making, effective risk management is needed.

Heuristic theory explains a person's behavior in making decisions with limited and short time, only limited information and everything is in uncertain conditions (Ackert et.al, 2003). Huber and Neale (1986) proposed that when faced with something difficult to assess probability or frequency, people use a number of

heuristics to reduce the assessment to make it simpler. According to Ackert and Deaves (2010), making quick decisions involves elements of perception, memory, framing effects and the ease of processing information and the overload condition of informants. Sitkin and Pablo (1992), the extent to which decision makers can relate results to their actions, successful risk averse decision makers will become increasingly risk averse, and successful risk-seeking decision makers will become increasingly risk seeking.

Several studies discussing emotions, financial literacy, overconfidence, risk perception and risk taking have been conducted by Elster (1996), suggesting that to the extent that emotions are judged for their impact on others, it can also show whether people can choose expressions on the basis of blaming one's own emotions. another. (Virlics, 2013, Hermalin and Isen, 2000, Elster, 1998) stated that high individual emotions oblige a person to make rational choices. Kuppens and Verduyn (2015), Loewenstein et al., (2001) state that some emotional factors do not directly affect risk choices with little or no cognitive control on strong stimuli. Sjöberg (2007), argues that the role of emotions in risk perception has been considered important, especially based on the findings in the application of psychometric models and the notion of their effect on heuristics.

Zait and Berteau (2014) argue that the financial education of a country includes knowledge, abilities and behavior which are very important for a healthy economic life at the individual, macro or multinational level. Aydemir and Aren (2017), Bannier and Neubert (2016), which are about financial risk taking through standardized financial investment and using advanced technology. Aren and Zengin (2016) explain that risk perceptions and the level of financial literacy affect individual investment preferences. Cavezzali et al., (2015) show that financial education prevents financial illiteracy and changes the investment process of investors.

Methods related to Confirmatory Factor Analysis (CFA) (N. Rusdi et. Al., 2014)) and Structural Equation Modeling (SEM) (Mulaik, 2009; Raykov & Marcoulides, 2006; Hair et.al., 2010; Bollen, 1989). Otok et. al., (2018), Weak physical condition, social economy less prosperous, and the emergence of a degenerative disease that can lead to decreased productivity, thus affecting social life, it is necessary to study the quality of life index of elderly global, urban and coastal communities in Surabaya to Structural Equation Modeling (SEM) approach. Black (2015) who conducted quantitative research at higher education institutions, that the work environment, interpersonal relationships between lecturers, and rewards or awards from institutions are factors that can improve lecturer performance, while related to moderating SEM, among others: N Rusdi et. al., (2018), moderating entrepreneurship at corporate reputation in business performance using partial least square.

Based on previous research, it shows that financial literacy considers memory, information and knowledge of investors. Meanwhile, emotions prioritize feelings and intuition in decision makers. Overconfidence tends to use the feelings of the decision maker. The risk perception variable considers a person's feelings and perceptions in making risk decisions. It is hoped that this study can prove that emotions can also be unwanted or dangerous in risk management, by examining emotions as a moderating risk perception towards risk taking.

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II. Material And Methods

The data used in this study are primary data from the results of a survey of novice investors in East Java. The criteria for investors used in this study are novice investors who trade and invest their capital in stock trading on the Indonesia Stock Exchange, and novice investors who trade for less than one year. This research consists of five latent variables and each variable has several indicators. The variables in this study were financial literacy, emotion, overconfidence, risk perception and risk taking. Exogenous latent variables are financial literacy and overconfidence. Intervening latent variables are risk perception, endogenous latent variables are risk taking, and emotion as a moderating variable. The questionnaires distributed contain statements related to the research variables. There are 5 alternative answers given according to the Likert scale. The research conceptual is presented as follows.

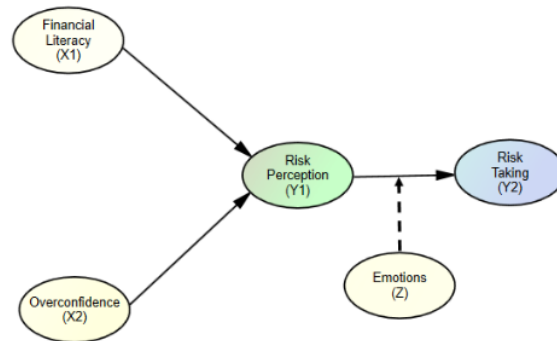


Figure 1.

Conceptual Framework Financial Literacy, Overconfidence Against Risk Taking Through Risk Perception with Emotions as a Moderating Variable

The stages of analysis carried out are evaluation of the measurement model, goodness of fit and evaluation of the structural model. Evaluation of the measurement model, namely convergent validity, is used to determine the correlation between each indicator and its latent variable. Convergent validity can be seen from the standardized loading factor (λ) value greater than 0.5 is still acceptable. Composite reliability is an indicator block that measures a construct and can be evaluated by measuring its internal consistency. Composite reliability can be accepted if the level of reliability of the latent variable is greater than 0.6. After testing the validity and reliability of each indicator on the latent variable, several prerequisites that must be met in covariance-based structural modeling are the multivariate normal assumption, the assumption of no multicollinearity, singularity and no outliers data. Normality of the data is one of the requirements in Structural Equation Modeling (SEM) modeling. Normality testing is emphasized multivariate data by looking at the value of skewness, kurtosis, and statistically it can be seen from the value of the Critical Ratio (CR). If a significance level of 1 percent is used, the CR value that is between -2.58 and 2.58 ($-2.58 \leq CR \leq 2.58$) is said to be normally distributed data, both univariate and multivariate. Outliers are observations that appear with extreme values univariate or multivariate, that is, those that arise because of a combination of unique characteristics that they have and appear very far from other observations. If an outlier occurs, special treatment can be done on the outlier as long as it is known how the outlier appeared. The Mahalanobis value that is greater than the Chi-square table or the p1 value <0.001 is said to be an outlier observation. In this study, there are 3 (three) data that are outliers, so it can be said that there are no outliers. Singularity can be seen through the determinant of the covariance matrix. The determinant value which is equal to zero indicates an indication that there is a Singularity problem, so it cannot be used for research. Multicollinearity occurs if there is more than one exogenous latent variable and there is a correlation, if the significant correlation value is indicated by a p value <0.05 , it is said that there is multicollinearity.

The evaluation of structural models in MSEM uses the Ping method, a method that can be used to assess the moderating effect. The Ping method has two step, namely

First Step:

- Perform estimates without including interaction variables so that only estimates the model
- The estimation results of this model are used to calculate the loading factor value of the interaction latent variable (interaction λ) and the error variance value of the interaction latent variable indicator.

Second Step:

- After the interaction λ value and q value are obtained from the first stage, these values are entered into the model with the interaction latent variable
- The result of manual calculation of the interaction factor loading is used to determine the parameter value of the interaction loading value, while the manual result of the calculation of the interaction variable error variance is used to determine the error variance of the interaction variable.

III. Result

The measurement model consists of a validity test and a reliability test. In detail, the validity and reliability of each latent variable are presented in Table 1.

Table 1.
The Value of Validity and Reliability Latent Variable Indicator

Latent Variables	Indicator	p variance error	Loading (λ)	λ^2	$1 - \lambda^2$	Composite Reliability (C-R)
Financial Literacy (X1)	Saving and investment (X1.1)	0.000	0.504	0.254	0.746	0.645
	Money management (X1.2)	0.000	0.560	0.314	0.686	
	Basic knowledge (X1.3)	0.000	0.648	0.420	0.580	
	Risk Management (X1.4)	0.000	0.521	0.271	0.729	
Overconfidence (X2)	Relative financial domain optimism (X2.1)	0.000	0.572	0.327	0.673	0.768
	Illution of control (X2.2)	0.000	0.813	0.661	0.339	
	Better than average (X2.3)	0.000	0.775	0.601	0.399	
Emotions (Z)	Experience controlling emotions (Z1.1)	0.000	0.608	0.370	0.630	0.623
	Active behavior (Z1.2)	0.000	0.634	0.402	0.598	
	Tolerance of negative emotions (Z1.3)	0.000	0.544	0.296	0.704	
Risk perception (Y1)	Investment (Y1.1)	0.000	0.604	0.365	0.635	0.674
	Gambling (Y1.2)	0.000	0.700	0.490	0.510	
	Social Item (Y1.3)	0.000	0.610	0.372	0.628	
Risk taking (Y2)	Ethical (Y2.1)	0.000	0.549	0.301	0.699	0.610
	Financial (Y2.2)	0.000	0.593	0.352	0.648	
	Healthy/safety (Y2.3)	0.000	0.613	0.376	0.624	

Table 1 shows that the indicators on exogenous latent variables, namely financial literacy (X1), overconfidence (X2), intervening latent variables, namely risk perception (Y1), endogenous latent variables, namely risk taking (Y2), and emotion (Z) as Moderating variables provide loading factor is greater than 0.5 and the value of Composite Reliability (CR) is greater than 0.6 so that it can be said that all indicators are valid and all latent variables are reliable. Likewise, each indicator on all latent variables gives a p-value of error variance less than 0.05 (p-value <0.05), so it is said that all indicators are reliable. Financial Literacy (X1) is formed by indicators of Saving and investment (X1.1) (0.504), Money management (X1.2) (0.560), Basic knowledge (X1.3) (0.648) and Risk Management (X1.4) (0.521) with Composite Reliability (CR) of 0.645. Overconfidence (X2) is formed by indicators of Relative financial domain optimism (X2.1) (0.572), Illution of control (X2.2) (0.813), Better than average (X2.3) (0.775) with Composite Reliability (CR) of 0.768. Emotions (Z) are formed by indicators of experience controlling emotions (Z1.1) (0.608), active behavior (Z1.2) (0.634), tolerance to negative emotions (Z1.3) (0.544) with Composite Reliability (CR) of 0.623. Risk perception (Y1) is formed by the indicators Investment (Y1.1) (0.604), Gambling (Y1.2) (0.700), Social Item (Y1.3) (0.610) with Composite Reliability (C-R) of 0.674. Risk taking (Y2) is formed by Ethical (Y2.1) (0.549), Financial (Y2.2) (0.593) and Healthy / safety (Y2.3) (0.613) indicators with Composite Reliability (C-R) of 0.610.

The results of data normality testing on all research variables gave a multivariate Critical Ratio value of 2.419 and this value lies outside -2.58 to 2.58, so it can be said that the data has a multivariate normal distribution. Singularity can be seen through the determinant of the covariance matrix. The results of the study provide a Determinant of sample covariance matrix value of 0.019. This value is not equal to zero, so it can be said that there is no singularity problem in the analyzed data. Multicollinearity can be seen through the correlation between the exogenous latent variables of financial literacy (X1) and Overconfidence (X2) of 0.081 with $p = 0.182$ greater than the significance level of $\alpha = 0.05$, it can be said that multicollinearity does not occur. The results of the outlier test in this study presented the Mahalanobis value that was greater than the Chi-square table or the $p1$ value <0.001 which was said to be an outlier observation. In this study, there is one data that is outliers, because it is still below 5 percent of the observation, it can be said that there are no outliers. Furthermore, the form of the path diagram model for risk taking stage 1 is presented as follows:

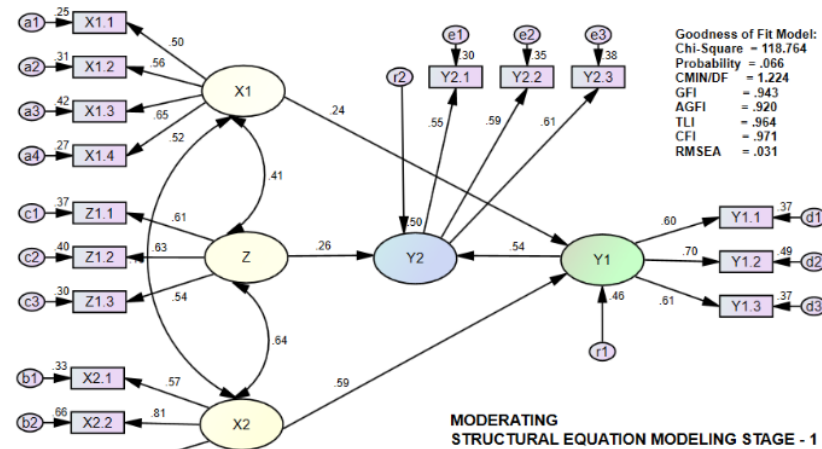


Figure 2
Relationship Model Financial Literacy, Overconfidence Against Risk Taking Through Risk Perception with Emotions as a Moderating Variable (Step 1)

The results of testing the stage 1 risk taking model with the complete AMOS program can be seen in the following table:

Table 2
Goodness of Fit Model Risk Taking with Emotions as a Moderating Variable Step 1

Goodness of Fit (GoF)	Cut – Off Value	The calculation results	Information
Chi – Square	Expect smaller ones from Chi-Square tables	118.764	χ^2 with df = 97 is 120.990
Significance Probability	≥ 0.05	0.066	Good
RMSEA	≤ 0.08	0.037	Good
GFI	≥ 0.90	0.943	Good
AGFI	≥ 0.90	0.920	Good
CMIN/DF	≤ 2.00	1.224	Good
TLI	≥ 0.90	0.964	Good
CFI	≥ 0.90	0.971	Good

Table 2, shows the suitable model based on all criteria. From the appropriate model, the structural equation can be stated as follows:

$$\begin{aligned} \text{Risk perception}(Y1) &= 0.243 \text{ Financial Literacy}(X1) + 0.591 \text{ Overconfidence}(X2) \\ \text{Risk taking}(Y2) &= 0.264 \text{ Emotion}(Z) + 0.540 \text{ Risk perception}(Y1) \end{aligned}$$

Testing the path coefficient in Figure 2 and the above equation in detail is presented in the following table:

Table 3
Results of Testing Financial Literacy, Overconfidence Against Risk Taking Through Risk Perception with Emotions as a Moderating Variable Step 1

Variables	Coefficient	Critical Ratio (C.R.)	Probability (p)	Information
Financial Literacy (X1) → Risk perception (Y1)	0.243	2.603	0.009	Significant
Overconfidence (X2) → Risk perception (Y1)	0.591	5.743	0.000	Significant
Emosi (Z) → Risk taking (Y2)	0.264	2.100	0.036	Significant
Risk perception (Y1) → Risk taking (Y2)	0.540	3.805	0.000	Significant

Table 3, it can be interpreted that the direct effect of the moderating variable Emotion (Z) on risk taking (Y2). Emotion (Z) has a positive and significant effect on risk taking (Y2). This can be seen from the positive sign path coefficient of 0.264 with a Critical Ratio (C.R.) value of 2.100 which is greater than t-table =

1.96, or the p value = 0.036 is smaller than $\alpha = 0.05$. Thus Emotion (Z) has a direct effect on Risk taking (Y2) of 0.264, which means that every time there is an increase in Emotion (Z), it will increase Risk taking (Y2) by 0.207. This indicates that Emotion (Z) is thought to be a moderating variable that amplifies risk perception (Y1) in influencing risk taking (Y2). The Moderating Structural Equation Modeling (MSEM) model in step-1 is used to obtain the Interaction and Variance Error parameters presented as follows.

Table 4
Value of Interaction Lamda, Interaction Variance Error

Factor Loading, Error Variance, Latent Variable, Lamda Interaction and Variance Error Interaction Indicator	Laten Variable			
	Emotion (Z)		Risk perception (Y1)	
	Loading	Variance	Loading	Variance
Factor Loading	0.608	0.659	0.604	0.554
	0.634	0.608	0.700	0.535
	0.544	0.694	0.610	0.652
Error Variance	0.291		0.174	
Lamda_ Interaction (Z_Y1)	3.41840			
Variance Error Interaction Indicator (Z_Y1)	6.28015			

Table 4 shows that the Lamda_Interaksi_ (Z_Y1) value is 3.4180 and the Interaction Indicator Varians_error_ (Z_Y1) is 6.28015, these values are used for the risk taking moderation model Step -2. The results of the analysis of the moderation model for risk taking Step -2 are presented in the form of a path diagram as follows:

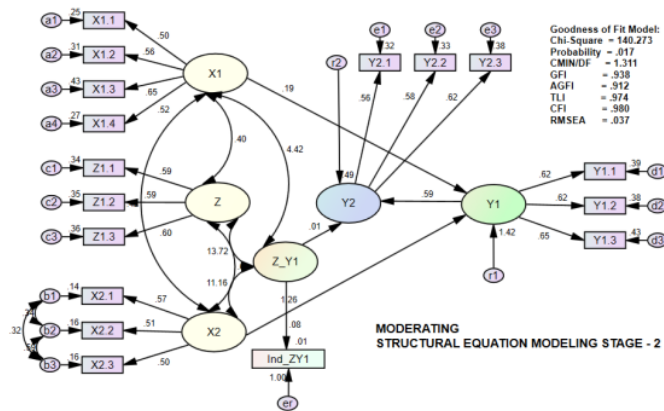


Figure 3
Relationship Model Financial Literacy, Overconfidence Against Risk Taking Through Risk Perception with Emotions as a Moderating Variable (Step 2)

The results of testing the measurement model with the complete AMOS program can be seen in the following table:

Table 5
Goodness of Fit Model Risk Perception with Emotions as a Moderating Variable Step – 2

Goodness of Fit (GoF)	Cut – Off Value	The calculation results	Information
Chi – Square	Expect smaller ones from Chi-Square tables	140.273	χ^2 with df = 107 is 132.144 Marginal
Significance Probability	≥ 0.05	0.017	Marginal
RMSEA	≤ 0.08	0.037	Good
GFI	≥ 0.90	0.938	Good
AGFI	≥ 0.90	0.912	Good
CMIN/DF	≤ 2.00	1.311	Good
TLI	≥ 0.90	0.974	Good
CFI	≥ 0.90	0.980	Good

Table 5, shows the suitable model based on the criteria. From the appropriate model, each path coefficient can be interpreted through the following structural equation:

$$Y1 = 0.190 X1 + 1.258 X2$$

$$Y2 = 0.594 Y1 + 0.009 Z_Y1$$

Where,

X1 : Financial Literacy

X2 : Overconfidence

Y1 : Risk perception

Y2 : Risk taking

Z : Emotion

Z_Y1: Interaction Emosi with Risk perception

The path coefficient testing in Figure 3 and the above equation in detail is presented in the following table:

Table 6
Results of Testing Financial Literacy, Overconfidence Against Risk Taking Through Risk Perception with Emotions as a Moderating Variable Step -2

Variables	Coefficient	Critical Ratio (C.R.)	Probability (p)	Information
Financial Literacy (X1) → Risk perception (Y1)	0.190	1.989	0.049	Significant
Overconfidence (X2) → Risk perception (Y1)	1.258	5.814	0.000	Significant
Risk perception (Y1) → Risk taking (Y2)	0.594	5.908	0.000	Significant
Emosi* Risk perception (Z_Y1) → Risk taking (Y2)	0.009	4.274	0.036	Significant

Table 6, the interpretation of each path coefficient is as follows:

- Financial Literacy (X1) has a positive and significant effect on risk perception (Y1). This can be seen from the positive sign path coefficient of 0.190 with a critical ratio (C.R.) of 1.989 and a probability (p) of 0.049 is obtained which is smaller than the significance level ($\alpha = 0.05$). Thus, Financial Literacy (X1) has a direct effect on Risk Perception (Y1) of 0.190, which means that every time there is an increase in Financial Literacy (X1), it will increase Risk Perception (Y1) by 0.190.
- Overconfidence (X2) has a positive and significant effect on risk perception (Y1). This can be seen from the positive path coefficient of 1.258 with a critical ratio (C.R.) of 5.814 and a probability (p) of 0.000 which is smaller than the significance level ($\alpha = 0.05$). Thus, Overconfidence (X2) has a direct effect on Risk perception (Y1) of 1.258, which means that every time there is an increase in Overconfidence (X2), it will increase Risk perception (Y1) by 1.258.
- Risk perception (Y1) has a positive and significant effect on risk taking (Y2). This can be seen from the positive sign path coefficient of 0.594 with a critical ratio (C.R.) of 5.908 and a probability (p) of 0.000 which is smaller than the significance level ($\alpha = 0.05$). Thus, risk perception (Y1) has a direct effect on risk taking (Y2) of 0.594, which means that every time there is an increase in risk perception (Y1), it will increase risk taking (Y2) by 0.594.
- Emotion (Z) * Risk perception (Y1) (Z_Y1) has a positive and significant effect on risk taking (Y2). This can be seen from the positive sign path coefficient of 0.009 with a critical ratio (C.R.) of 4.274 and a probability (p) of 0.000 is obtained which is smaller than the significance level ($\alpha = 0.05$). Thus Emotion (Z) moderates Risk perception (Y1) against Risk taking (Y2) which is strengthening by 0.009, which means that every time there is an increase in Emotion (Z) followed by Risk Perception (Y1) it will strengthen the effect of Risk taking (Y2) by 0.009. This is in accordance with the opinion of Damasio (1994) indicating that emotions improve decision making in two ways, namely first, emotions encourage individuals to make important decisions and the second emotion can make optimal decisions. Likewise Elster (1998), emotions can be valuable or useful. Bohm and Burn (2008) argued the importance of the role of emotions in decision making, and the role of anticipating emotions in risk perception arises from the environment naturally.

Based on Table 3 and Table 6, it shows the impact of emotional variables as moderating risk perception, which has an effect on the effect of financial literacy on risk perception from 0.243 to 0.190. The effect of overconfidence on risk perception is from 0.591 to 1.258, while the effect of risk perception (Y1) on risk taking (Y2) is from 0.540 to 0.594.

IV. Conclusion

The results showed that

- Risk taking (Y2) model with emotions as a moderating risk perception based on beginner investors on the Indonesia Stock Exchange is a fit model based on the Goodness of Fit (GoF) criteria.
- The influence of emotion (Z) in moderating risk perception (Y1) on risk taking (Y2) is strengthening.
- Financial Literacy (X1) is formed by indicators of Saving and investment (X1.1) (0.504), Money management (X1.2) (0.560), Basic knowledge (X1.3) (0.648) and Risk Management (X1.4) (0.521) with Composite Reliability (CR) of 0.645.
- Overconfidence (X2) is formed by indicators of Relative financial domain optimism (X2.1) (0.572), Illution of control (X2.2) (0.813), Better than average (X2.3) (0.775) with Composite Reliability (CR) amounted to 0.768.
- Emotions (Z) are formed by indicators of experience controlling emotions (Z1.1) (0.608), active behavior (Z1.2) (0.634), Tolerance to negative emotions (Z1.3) (0.544) 17th Composite Reliability (CR) of 0.623.
- Risk perception (Y1) is formed by the indicators Investment (Y1.1) (0.604), Gambling (Y1.2) (0.700), Social Item (Y1.3) (0.610) with Composite Reliability (C-R) of 0.674.
- Risk taking (Y2) is formed by Ethical (Y2.1) (0.549), Financial (Y2.2) (0.593) and Healthy / safety (Y2.3) (0.613) indicators with Composite Reliability (C-R) of 0.610.

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