Chapter 2

Investigate the Impact of Demographic and Socio-Economic Characteristics on the Financial Risk Attitudes and Investment Preferences Applying CART Technique Based on Turkish Investors

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Abstract

Determining the risk-taking attitudes of individuals and the variables that influence investment decisions is crucial for financial investors and stakeholders interested in investment decisions. Hence, the main aim of behavioral finance is to uncover the reasons and mechanisms behind the influence on investors. Among these factors, individuals' demographic and socio-economic characteristics are prominent. The aim of this study is to determine the impact of these factors on risk-taking attitudes and investment preferences. For this purpose, individual investors selected through a convenient and purposive sample were asked demographic and socio-economic questions, as well as questions about their risk-taking attitudes and investment preferences. The risk-taking attitudes variable was defined as risk-lover, risk-neutral, and risk-averse, while investment options were specified as interest, gold, and stocks. Analyses were conducted using the responses of 294 individual investors obtained through an online survey tool. Firstly, descriptive statistical analysis was performed to outline the general structure of the dataset. Then, chi-square analysis was conducted to determine the relationship between demographic and socio-economic characteristics and risk-taking attitudes and investment options. Finally, Classification and Regression Tree (CART) analyses were performed to determine the impact of these characteristics on risk-taking and investment preferences. The results of relational and CART analyses revealed that individuals' risk-taking attitudes are influenced by different demographic

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and socio-economic characteristics, affecting their investment choices. In other words, individuals with a tendency to take risks were found to prefer low-risk investments. Thus, approaching these two phenomena with distinct evaluations will result in more optimal investment decisions. Furthermore, there is a belief that data mining techniques, like the CART method, can yield more meaningful outcomes when compared to conven Thus, approaching these two phenomena with distinct evaluations will result in more optimal investment decisions. Furthermore, there is a belief that data mining techniques, like the CART method, can yield more meaningful outcomes when compared to conventional statistical analyses. This is particularly true given the heightened accessibility of data on individual investors in today's world.

1. Introduction

Understanding individuals' financial risk-taking attitudes in the field of finance and identifying the factors influencing financial investment choices are crucial for both individual investors and financial advisors. Socio-demographic characteristics such as age, income, education, and marital status are known to play a significant role in both individuals' risk-taking attitudes and investment preferences. Ongoing research in this field is enhancing our understanding of how socio-demographic characteristics interact with risk-taking attitudes and investment choices. Therefore, understanding investor behavior based on these differences can help finance professionals tailor their services to different investor profiles and assist individuals in making informed investment decisions.

Numerous studies have been conducted to determine the relationship and interaction between individuals' socio-demographic characteristics, risk-taking attitudes, and financial investment decisions (Barasinska et al., 2012; Bhavani and Shetty, 2017; Emfevid and Nyquist, 2018; Alanko, 2009; Bayar et al., 2020; De Bortoli et al., 2019; Reedy and Devi, 2022). However, there is no consensus on this relationship and interaction in the existing literature and among practitioners. Furthermore, as highlighted by Davey (2006), financial advisors and individuals frequently tend to equate an individual's financial risk tolerance (FRT) with their risk behavior (FTB). In reality, individuals may make financial investment decisions different from their tolerance for risk. Therefore, understanding and assessing the difference between financial risk tolerance and financial risk behavior is important for making optimal decisions in terms of the risk-return balance. Misjudging risk tolerance may result in less-than-optimal investment decisions. For example, an investor/financial advisor, by overestimating individual risk tolerance while keeping all factors such as gender, income, and education constant, may choose an overly aggressive portfolio (Kannadhasan, 2015).

This result could lead investors to not achieve the desired return for the risk undertaken and incur losses due to the choices made. Taking into account these potential negative outcomes, this study separately examines the impact of individuals' demographic and socio-economic characteristics on their risk-taking attitudes and investment preferences.

In addition, the majority of the reviewed studies employ classical statistical techniques such as ANOVA, Kruskal-Wallis, linear regression, chi-square relational analysis, etc. In this study, however, the Classification and Regression Tree (CART) method, which does not require many assumptions necessary for classical techniques, has been used. As there is an increasing amount of data available about individual investors, the use of these data mining-based techniques is expected to contribute to making more optimal decisions.

Within this framework, the study is divided into five sections. The ongoing second section includes studies examining the impact of socio-demographic characteristics on financial risk-taking attitudes and investment decisions. The third section provides information about the research methodology, including the dataset, sample, and the employed method. In the fourth section, the analysis results are explained. In this context, descriptive analysis results are first presented to determine the overall structure of the dataset. Subsequently, the chi-square analysis results, conducted to identify the relationship between socio-demographic characteristics and risk-taking attitudes and investment preferences, are reported. Later on, the results of the CART technique are presented, initially focusing on the impact of socio-demographic characteristics on risk-taking attitudes, followed by the effects of these characteristics on investment choices. The study is concluded with the fifth section, which provides a general evaluation and suggestions for future research.

2. Literature Review

Individuals' socio-demographic characteristics such as age, income, education, and marital status have been shown to have an impact on their risk-taking attitudes, as well as influencing their investment preferences, according to numerous studies. Many of these studies evaluate both of these factors together, although as highlighted by Davey (2006), these two behavioral aspects can differ. Therefore, the examined studies have been reviewed taking into consideration these different dimensions.

Firstly, studies examining the impact of socio-demographic characteristics on financial risk tolerance have been addressed. Different results are

obtained when analyzing these studies. Geetha and Vimala (2014) found no significant influence of gender, age, and education levels on investors' risk-taking attitudes. Bairagi and Chakraborty (2021) conducted a study stating that gender, age, and income levels do not significantly affect the risk perception of Indian individual investors. However, a survey conducted by Çatak and Arslan (2021) in Turkey and Germany revealed that demographic and socio-economic factors create a significant distinction in investors' risk attitudes. Rather than presenting the outcomes of each of these studies separately, it would be more advantageous to reference the literature review carried out by Mishra and Mishra (2014). They identified the following situations among practitioners and researchers:

- Elderly individuals tend to have lower risk tolerance than younger ones.
- Males are more risk-tolerant than females.
- Single individuals are more risk-tolerant than married ones.
- Professionals are more prone to risk than non-professionals.
- Employed individuals can tolerate more risk than those on salary.
- Individuals with higher income are more risk-tolerant.
- Risk tolerance increases with the level of education.
- Increased personal financial knowledge is associated with increased risk tolerance.
- Higher economic expectations are associated with higher levels of risk tolerance.

Numerous studies have also been conducted regarding the impact of socio-demographic characteristics on investment preferences. Aren and Aydemir (2015) conducted a study analyzing the effects of different factors such as demographic characteristics, investment decision criteria, and financial literacy on preferred investment alternatives. The results indicated that factors such as age, marital status, and social criteria do not create a difference in investment preferences. Thulasipriya (2015) found that age and income levels play a significant role in the choice of investment preferences. Rizvi and Abrar (2015) found that education, income, and age are effective factors in determining the investor's investment style. Amaraveni and Archana (2017) found that income level has a significant impact on the chosen investment preference, but age has no effect. Venkataiah and Surya Prakasha Rao (2018) demonstrated a significant relationship between investment preferences and

gender. Danila et al. (2019) showed that all examined demographic factors significantly contribute to the investment goals of individual investors. Triwijati and Wijiyanti (2020) found that the investment amount influences the choice of investment category (savings, stocks, gold, etc.), and variables such as gender, marital status, education, and income significantly affect at least one preference among various investments. They mentioned that gender only affects the choice of gold, while marital status and education level influence the decision to invest in stocks.

Chavali and Mohannraj (2016) stated that there are very few studies examining the combined influence of demographic characteristics, investment model, decision-making process, and the role of risk tolerance. Among these, the study by Bashir et al. (2013) analyzed the impact of demographic characteristics on the risk levels, stock selection, and gambling decisions of salaried individuals and found that demographic characteristics have a significant effect on these factors. Manjunath and Bankar (2021) investigated the impact of individual investors' demographic characteristics on the selection of mutual funds as risk appetite, investment habits, and investment preferences. According to their findings, age and income were found to be effective in the selection of mutual funds, while gender and occupation were not effective.

3. Research Methodology

3.1. Dataset

The dataset for this study was obtained through the convenience and purposive sampling method via online survey data collection. Individuals within the sample used for analysis were required to possess specific characteristics. For instance, they should be 18 years or older, at least high school graduates, and have invested in one of the investment instruments such as gold, stocks, or interest. The data of 294 individuals meeting these criteria were used for the analyses.

The dependent variables were determined as the risk-taking attitudes and investment preferences of individual investors. Since the variables are categorical, it is important to define categories. Categories for the risk attitude variable were set as risk-averse, risk-lover, and risk-neutral. For the investment preference variable, the categories were defined as interest, stocks, and gold. Independent variables included gender, marital status, age, education, occupation, and monthly income. Subcategories for the independent variables are presented in the descriptive statistical analysis table.

3.2. Method

This study includes a relational analysis conducted using the chi-square technique to determine the relationships between individuals' demographic and socio-economic characteristics, risk-taking attitudes, and investment options. Subsequently, it employs causal analyses using the Classification and Regression Tree (CART) technique to determine the effects of these characteristics on risk-taking attitudes and investment preferences. The CART technique, developed by Breiman and colleagues, is a non-parametric method that generates classification or regression trees depending on whether the dependent variable is categorical or continuous. Focusing on post hoc prediction based on the repetition process, this technique is commonly used in data mining. The fundamental aim of the technique is to generate data subsets that are inherently homogeneous. Binary decision trees are created to rapidly analyze a large dataset, identifying those variables that have the greatest impact on a specific dependent variable. The advantages of the CART technique, in contrast to other regression/classification methods, encompass the swift identification and unveiling of insights and significant relationship models within the data. It is characterized by its straightforward comprehensibility and interpretability, does not rely on distribution assumptions, has the capability to manage missing data, and does not necessitate the normalization of data, the creation of dummy variables, or the removal of empty variables (Lewis, 2000). This technique simplifies the analysis process and provides an effective tool for understanding the complexity of data.

3.3. Hypotheses

Some studies in the literature focus solely on examining the relationship between individual investors' demographic and socio-economic characteristics and risk-taking attitudes, or they investigate the relationship between these characteristics and investment options separately. However, as highlighted by Davey (2006), many individual investors and financial advisors exhibit a flawed approach by evaluating individuals' risk-taking attitudes and financial behavior together.

Therefore, in this study, firstly, the relationship between individuals' demographic and socio-economic characteristics and risk-taking attitudes is explored, followed by the relationship between these characteristics and investment preferences. The hypotheses proposed for these relational analyses are expressed as follows:

- There is a relationship between individual investors' demographic and socio-economic characteristics and their *risk-taking attitudes*.
- There is a relationship between individual investors' demographic and socio-economic characteristics and their *investment preferences*.
- The relationship between individual investors' demographic and socio-economic characteristics, risk-taking attitudes, and investment preferences is different from each other.

Subsequently, using the CART technique, analyses were conducted to identify the factors influencing the impact of individuals' demographic and socio-economic characteristics on their risk-taking attitudes and investment preferences. The causality hypotheses advanced in the study can be expressed as follows:

- Individual investors' demographic and socio-economic characteristics have an impact on their *risk-taking attitudes*.
- Individual investors' demographic and socio-economic characteristics have an impact on their *investment preferences.*
- The impact of individual investors' demographic and socio-economic characteristics on their risk-taking attitudes and investment preferences is different from each other.

4. Analysis Results

In this section of the study, analyses were conducted using the defined dataset. Initially, descriptive statistical results for this dataset were presented. In the second part of the analyses, relationship-based chi-square analyses were performed based on cross-tabulations. In the next part, the CART technique was employed to conduct analyses necessary to test hypotheses regarding the impact of demographic and socio-economic characteristics on risk-taking attitudes and investment preferences.

4.1. Descriptive Analysis Results

With the dataset created, descriptive statistical results were first obtained. These values are found as shown in Table 1.

Table 1. Individuals' Demographic and Socio-Economic Characteristics Along with Risk Attitude and Investment Preferences.

No	*Variables*	*Categories*	*Frequency*	*Frequency (%)*
1	Gender	Male	191	65
		Female	103	35
2	Marital status	Single	160	54,4
		Married	134	45,6
3	Age	18-29	142	48,3
		30-39	103	35
		40-49	49	16,7
4	Education	High school	66	22,4
		University	183	62,2
		Graduate	45	15,3
5	Occupation	Public sector	93	31,6
		Private sector	54	18,4
		Government	72	24,5
		Other	75	25,5
5	Income level	15001-25000	144	49
		25001-45000	108	36,7
		45001and above	42	14,3
6	Risk attitude	Risk neutral	115	39,1
		Risk lover	66	22,4
		Risk averser	113	38,4
7	Investment preference	Interest	156	53,1
		Stock	14	4,8
		Gold	124	42,2
Total	294			

As seen in Table 1, the proportion the number of males is higher, while there is not a significant difference in terms of marital status. Regarding age groups, it is observed that the majority, with a rate of 48.3%, consists of individuals in the 18-29 age range. In terms of education level, the majority is dominated by those with a bachelor's degree, with a value close to 63%. For the occupation variable, it is determined that public sector constitute the majority, with a value close to 32%, and for the monthly income level, individuals in the income range of 15,001-25,000 form the majority. Regarding the risk-taking attitude, the rate of risk-averse individuals is 38.4%, and those neutral to risk are close with 39.1%, showing similar results. The rate for risk-takers is lower, at 22.4%. Looking at investment preferences, values that do not strongly reflect this situation are observed. For risk-takers, the investment preference for stocks, which is considered as the preference of those who love risk, is only 4.8%. This implies a mismatch between the risk-taking attitude and the accepted risk.

4.2. Relational Analysis Results

In the second section of the analysis, cross-tabulation-based chi-square analyses were conducted to determine the relationship between individuals' demographic and socio-economic characteristics, risk-taking attitude, and investment preferences. The results obtained are shown in Table 2.

Table 2. Relationship between Individuals' Demographic and Socio-economic Characteristics, Risk-taking Attitudes, and Investment Preferences.

Variables	*Categories*	*Risk neutral*	*Risk loving*	*Risk averser*	*Gold*	*Stock*	*Interest*
Gender	Male	%67	%7,8	%54,9	%63,7	% 85,7	%64,1
	Female	%33	%21,2	%45,1	%36,3	%14,3	%35,9
	χ^2 = 10,803, p <.05				χ^2 = 2,785, p >.05		
Marital status	Single	%56,5	%66,7	%45,1	%49,2	%42,9	%59.1
	Married	%43,5	%33,3	%54,9	%50,8	%57,1	%40,4
	χ^2 =8,125, p <.05				χ^2 =3,18, p >.05		
Age	18-29	%46,1	%59,1	%44,2	%41,9	%42,9	%53,8
	30-39	%32,2	%31,8	%39,8	%42,7	%14,3	%30,8
	40-49	%21,7	%20,4	%15,9	%15,3	%42,9	%15,4
	χ^2 =7,380, p >.05				χ^2 =12,803 , p <.05		
Education	High school	%22,6	%24,2	%21,2	%21	%28,6	%23,1
	University	%62,6	%60,6	%62,8	%65,3	%35,7	%62,2
	Graduate	%14,8	%15,2	%15,9	%13,7	%35,7	%14,7
	χ^2 =,257, p >.05				χ^2 =6,203, p >.05		
Occupation	Public sector	%31,3	%24,2	%36,3	%32,3	%42,9	%30,1
	Government	%17,4	%21,2	%17,7	%18,	%28,6	%17,3
	Private sector	%24,3	%34,8	%18,6	%23,4	%14,3	%26,3
	Other	%27	%19,7	%27,4	%25,8	%14,3	%26,3
	χ^2 =7,928, p >.05				χ^2 =3,169, p >.05		
Income level	1500-2500	%45,2	%62,1	%45,1	%46,8	%21,4	%53,2
	2501-4500	%36,5	%31,8	%39,8	%36,3	%50	%3,9
	4501 and above	%18,13	%19,4	%15	%16,9	%28,6	%51,9
	χ^2 =8,173, p <.05				χ^2 =7,432, p >.05		

When the first part of the results in Table 2, related to risk-taking attitudes, is examined, a significant relationship between demographic and socio-economic characteristics such as gender, marital status, and risk-taking attitude is observed ($\chi2 = 10.803$, $p<.05$ and $\chi2 = 8.125$, $p<.05$). Additionally, income level has been identified as a variable influencing individuals' risk-taking attitude ($\chi2 = 8.173$, $p<.05$). These results are consistent with expectations.

However, looking at the second part of the table, it is found that there is only a relationship between the age variable and investment preferences ($\chi2 = 12.803$, $p <.05$). When considering that there are studies conducted solely on the age variable, this result can be considered as expected.

When both parts are evaluated together, as mentioned earlier, there is no consistency observed between individuals' risk-taking attitudes and investment preferences. Even those who perceive themselves as risk-takers are hesitant to make risky investments.

4.3. CART Analysis Results

In this section, separate analyses were conducted using the CART technique to determine the effects of individuals' demographic and socio-economic characteristics on their risk-taking attitudes and investment preferences. The obtained analysis results are explained in the following section.

1. Effects of Demographic and Socio-economic Characteristics of Individual Investors on Risk-Taking Attitudes

The initial analysis was developed to determine the impact of individuals' demographic and socio-economic characteristics on their risk-taking attitudes. The analysis results indicated that gender was the most influential factor in individuals' risk-taking attitudes. Since the sub-branches developed based on this factor were significantly different from each other, the flow was examined separately for female and male investors for a clearer understanding.

In Figure 1a, the impact of demographic and socio-economic characteristics on the risk-taking attitudes of female investors and the resulting flow can be observed.

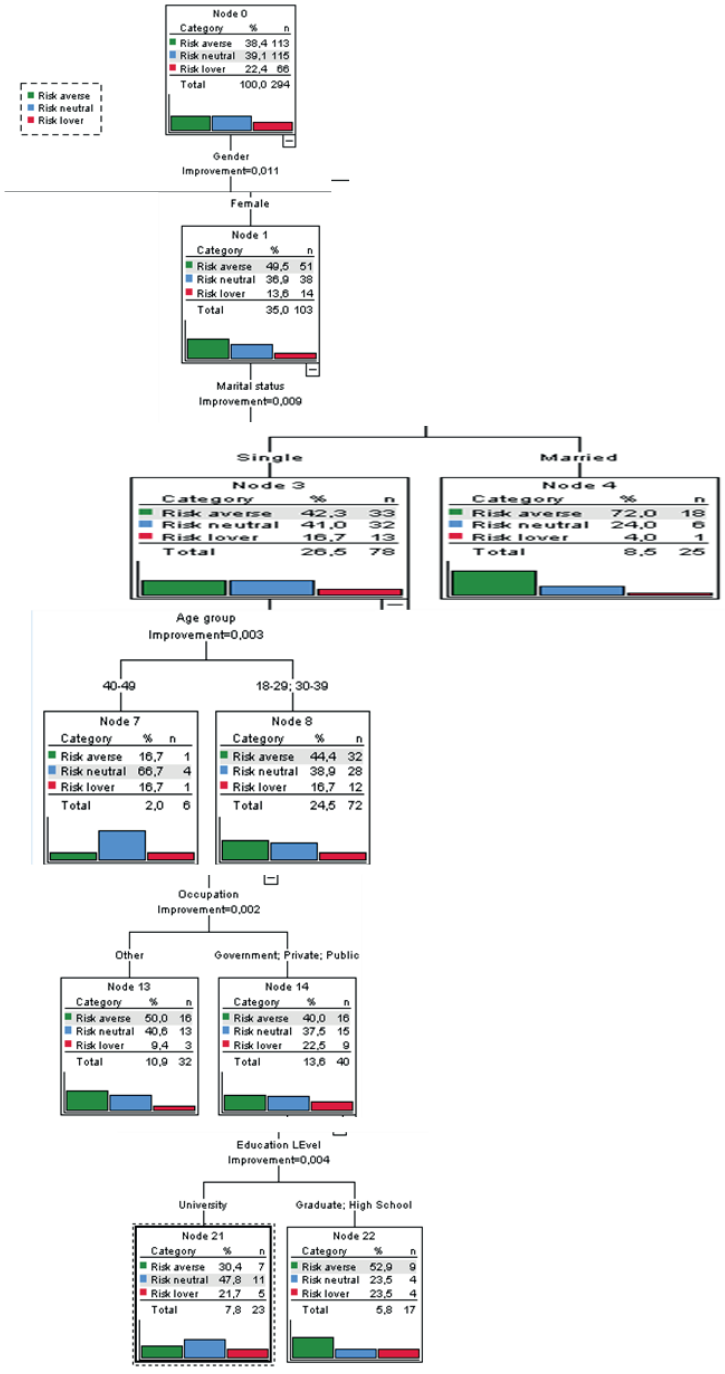

Figure 1a: Effects of Demographic and Socio-Economic Characteristics of Female Investors on Risk-Taking Attitudes

According to the distribution in Figure 1a, it is revealed that 40% of women tend to avoid risks, 36.9% are neutral to taking risks, and only about 13% have a tendency toward risk-taking. In the next stage, marital status of women was found to be a significant factor in their risk attitudes. Approximately 72% of married women tend to avoid risks, about 24% are neutral to taking risks, and about 4% are willing to take risks. For single women, a different situation emerged, where the percentage of risk-averse women decreased to around 42%, those neutral to risk increased to about 41%, and the percentage of risk-takers rose to approximately 16%.

The next factor influencing risk attitudes for single women was determined to be age. About 16% of individuals in all age groups prefer risk, with those in the 40-49 age range having a risk-avoidance rate of around 16% and those neutral to risk being about 67%. In the 18-29 and 30-39 age groups, the risk-avoidance rate increased to 44%, while the rate of those neutral to risk was approximately 39%.

For single women in the 18-29 and 30-39 age groups, the next important factor influencing risk attitudes is the occupation. In the "employees Employees" group, the rate of risk-takers was found to be significantly lower compared to those working in the public and private sectors. Education emerged as the next factor influencing risk attitudes across all occupational groups, with university graduates observed to be more risk-averse than high school and master's graduates.

Figure 1b depicts the situation of male investors in terms of risk-taking attitudes. When examining Figure 1b, it is observed that 32.5% of investors tend to avoid risks, 40.3% are neutral to taking risks, and 27.2% are risk lovers.

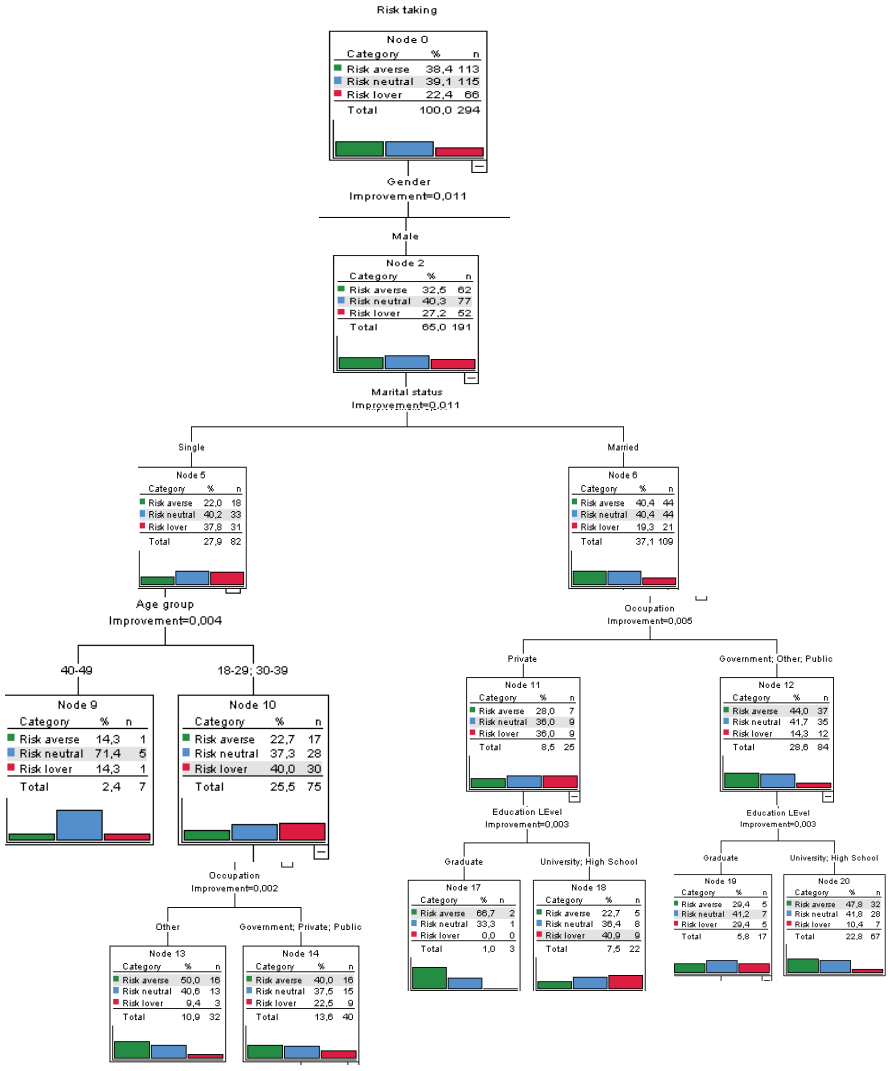

Figure 1b: Effects of Demographic and Socio-Economic Characteristics of Male Investors on Risk-Taking Attitudes

According to Figure 1b, the most influential factor affecting the risk-taking attitudes of male investors is observed to be marital status, and the influential factors show a different flow depending on marital status. For single men, age is identified as a differentiating variable, segmented as 40-49 and 18-29 to 30-39; for married men, the differentiating factor appears as the occupation, segmented as Private Sector and Government, Public, and

Other. It is determined that the differentiation in the occupation continues based on the education variable. Single men are observed to exhibit different attitudes toward risk based on the occupation after age.

2. The Effects of Individual Investors' Demographic and Socioeconomic Characteristics on Investment Preferences

In this part of the study, the effects of demographic and socioeconomic characteristics on investment preferences were analyzed using the CART technique. The analysis results for each investment option are shown in Figure 2.

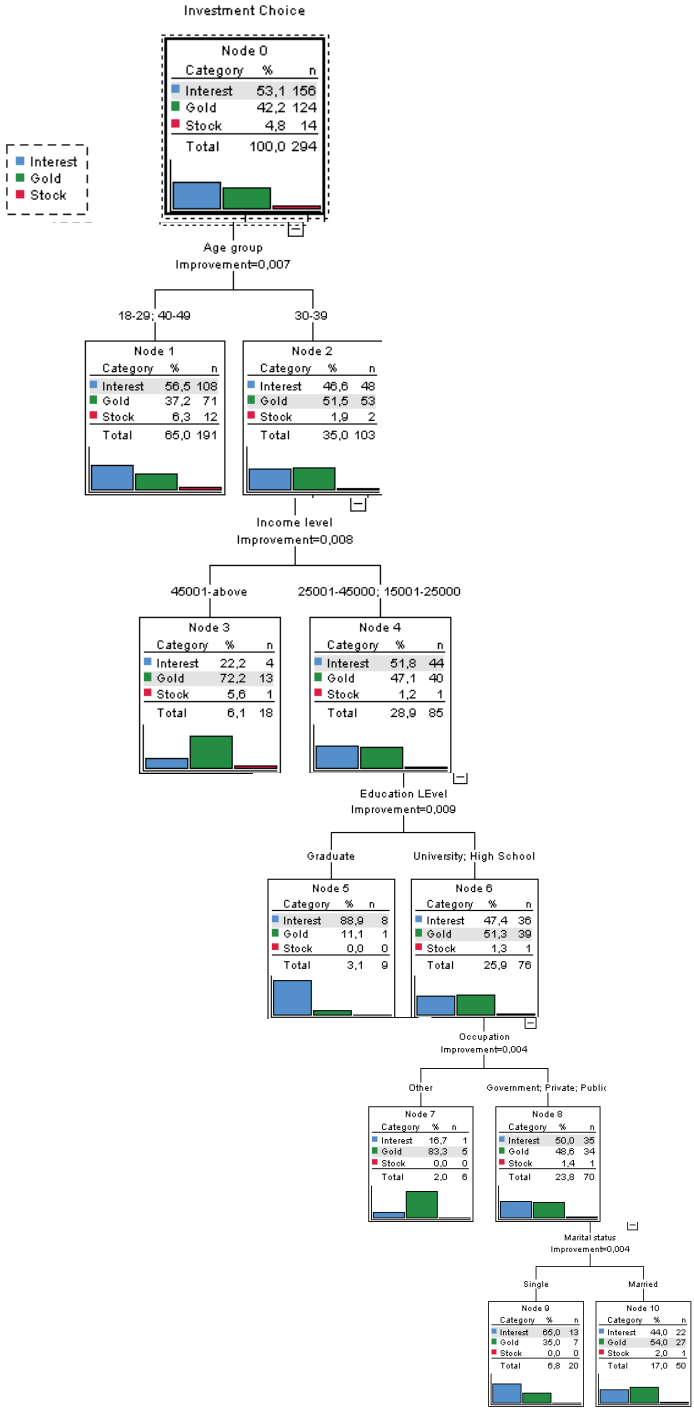

Figure 2: The Effects of Individual Investors' Demographic and Socioeconomic Characteristics on Investment Options

When examining the distribution of individuals' investment preferences in Figure 2, it is observed that 53% prefer interest, 42% prefer gold, and a low percentage of 4.8% prefer stocks. The most influential factor affecting this differentiation is determined to be age. Similar to the risk-taking attitude in the age group, a differentiation based on the age range of 18-29, 40-49, and 30-39 is observed. In the first group, it is revealed that about 56% prefer interest, around 37% prefer gold, and about 6.3% prefer stocks. In the 30-39 age group, it is observed that a significant portion of interest investments shifts to gold, and the stock investment rate drops to 2%. The subsequent differentiations occur for the 30-39 age group. In this age group, there is a differentiation between the upper-income group with 450,001 TL and above and those with lower and middle incomes. It is observed that those in the upper-income group prefer gold with a high rate of 72% and stocks with a rate of 5.6%. In the lower and middle-income group, this distribution shifted to about 47% for gold, close to 52% for interest, and 1.2% for stocks. The flow continues from the lower and middle-income group, and at this stage, the level of education emerges as a differentiating factor. It is observed that those with a master's degree prefer interest with a rate of nearly 89%, while high school and university graduates equally prefer interest and gold. It is determined that the stock investment tool is not preferred at all by those with a master's degree and is chosen by high school and university graduates at a very low rate of 1.3%. This flow continued with a sub-branch where high school and university graduates differentiated from government, public, and private sector employees and those in the Other job field. In this branch, the distribution of investment preferences consisted of 83% gold, 16% interest, and 0% stocks. Among government, public, and private sector employees, there was a very close distribution between gold and interest, with very low levels of stock investment preferences. The last branch of this flow was marital status. In the distribution of investment preferences here, singles preferred interest with 65%, gold with 35%, and stocks with 0%. In married individuals, stock investment increased to 2%, while results close to each other were obtained in the distribution between interest and gold.

5. Conclusion

This study aims to explore the association and causal relationships among demographic and socio-economic characteristics, risk-taking attitudes, and financial investment preferences among individual investors in Turkey. Additionally, the study seeks to establish causal relationships utilizing the CART technique. To achieve this, individuals who could be evaluated within this scope were reached through an online survey. Questions related

to independent variables such as gender, marital status, age, education, occupation, and income were asked to these individuals. Additionally, questions regarding dependent variables, namely risk-taking attitude and investment preferences, were requested. Risk-taking attitude was categorized into three groups: risk-averse, risk-lover, and risk-neutral, while investment options were specified as interest, stocks, and gold. From the collected data, 294 entries were deemed available for analysis.

Firstly, descriptive analysis and chi-square analysis were conducted to interpret the obtained results and determine the association relationship between demographic and socio-economic characteristics, risk-taking attitudes, and investment preferences. The results showed that there was no consistent relationship between individuals' risk-taking attitudes and their investment preferences. Based on this result, separate CART analyses were conducted to determine the causality relationship between demographic and socio-economic characteristics, risk-taking attitudes, and investment preferences.

The CART analysis results also revealed that different demographic and socio-economic factors influenced risk-taking attitudes and investment preferences. According to the analysis results, the following findings were obtained:

Effects of Demographic and Socio-economic Factors on Risk-taking Attitudes:

- Gender emerged as the most influential factor in risk-taking attitude. Due to the differentiation in other variables, the decision tree was evaluated separately for women and men.
- For female investors, it was observed that single women showed a tendency to be more risk-neutral or risk lover compared to married women, who were mostly risk-averse.
- Other distinguishing factors in the risk-taking attitudes of single women were age and occupation, respectively.
- For male investors, marital status emerged as a significant factor. Age for single men and occupation for married men were identified as sub-determining factors in risk-taking attitudes.

The findings presented are in line with studies conducted in the literature.

Effects of Demographic and Socio-economic Factors on Investment Preferences:

- The analysis of investment preferences showed that age was a significant determinant. Young and elderly investors preferred stocks, while middle-aged individuals turned to gold investments.

- Income levels were also found to shape investment preferences. The upper-income group showed a higher tendency to prefer gold, while the lower and middle-income group exhibited a more balanced distribution between interest and gold.
- Education emerged as a differentiating factor among preferences, with investors with a master's degree showing a higher preference for interest. High school graduates tended to avoid stocks.

In summary, the varying influence of demographic and socio-economic characteristics on both risk-taking attitudes and actual investment preferences underscores the need to address these two phenomena distinctly. This is because, despite the high percentage of those who claim to love risk, the high rate of investment in stocks, considered a risky investment, does not reflect this. This result supports the view proposed by Davey (2006) that risk-taking attitudes and investment preferences should not be considered together. Additionally, one of the results obtained is the identification of interest as the most preferred investment tool. This result, as demonstrated by Reed and Devi (2022) for Indian investors, indicates that individual investors in Turkey also prefer risk-free investments. Therefore, financial investment advisors should give more weight to risk-free investment options in their clients' portfolios. With this perspective, advisors can determine the characteristics of individual investors and offer suitable investment options based on investor profiles and risk attitudes.

This study has contributed to the literature by using the CART technique to analyze complex relationships and interactions between socio-demographic characteristics, risk-taking attitudes, and financial investment preferences. As more data becomes available about individual investors, it is believed that the use of these techniques based on data mining will produce results that lead to more optimal decisions. Future research that could be an extension of this study may be conducted to analyze changes in investor behavior over time, taking into account economic cycles and market conditions.

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