



**CRYPTOCURRENCY AWARENESS AND TRENDS IN  
CRYPTOCURRENCY OWNERSHIP IN TURKEY: A  
NEW ERA OF FINANCIAL LITERACY**

**AQSA AFZAL**

Graduate School  
Izmir University of Economics

Izmir

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The Graduate School of Izmir University of Economics  
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# ABSTRACT

## CRYPTOCURRENCY AWARENESS AND TRENDS IN CRYPTOCURRENCY OWNERSHIP IN TURKEY: A NEW ERA OF FINANCIAL LITERACY

Afzal, Aqsa

Master's Program in Business Administration

Advisor: Prof. Dr. Gülin VARDAR

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Cryptocurrency is defined as a new edition to the financial markets, along with technological advancements, as it is backed by blockchain technology and is gaining hype as an investment asset. Considering all the developments in this technology in recent years, the cryptocurrency market has attracted the attention of investors, academicians, regulators, and policymakers. Therefore, this thesis aims to analyze whether financial literacy level makes any difference or impacts cryptocurrency awareness and forecast the trend of cryptocurrency ownership in Turkey. For this study, 258 respondents from Turkey were selected through a “*Convenience sampling method*”. The relationship between the level of financial literacy and enlisted demographic factors is investigated by using cross-tabulation analysis. The results of the study revealed that financial literacy level differs with respect to all demographic factors, except education level. The results of the One-way ANOVA test present that cryptocurrency awareness differs with respect to financial literacy level, whereas it does not differ with respect to all mentioned demographic factors. This finding is

purely a contribution of this study, that has not been presented by any other researcher before this. Another result of this research revealed an increasing trend in cryptocurrency ownership. Although the increase in cryptocurrency ownership is not so significant, the result of the research invites new insights for future studies.

Keywords: Financial literacy, Financial technology, Cryptocurrency awareness, Cryptocurrency ownership.



# ÖZET

## TÜRKİYE'DE KRİPTO PARA BİLİNCİ VE KRİPTO PARA SAHİPLİĞİNDE EĞİLİM: YENİ BİR FİNANS OKURYAZARLIĞI DÖNEMİ

Afzal, Aqsa

İşletme Yüksek Lisans Programı

Tez Danışmanı: Prof. Dr. Gülin VARDAR

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Kripto para birimi, blokzinciri teknolojisi ile desteklendiğinden ve bir yatırım varlığı olarak artış kazandığından, teknolojik gelişmelerle birlikte finansal piyasalar için yeni bir sürüm olarak tanımlanmaktadır. Son yıllarda bu teknolojidaki tüm gelişmeler göz önüne alındığında kripto para piyasası yatırımcıların, akademisyenlerin, düzenleyicilerin ve politika yapıcıların ilgisini çekmiştir. Bu nedenle, bu tez finansal okuryazarlık seviyesinin herhangi bir fark yaratıp yaratmadığını veya kripto para farkındalığını etkileyip etkilemediğini analiz etmeyi ve Türkiye'de kripto para sahipliği eğilimini tahmin etmeyi amaçlamaktadır. Bu çalışma için Türkiye'den 258 katılımcı “Uygun örnekleme yöntemi” ile seçilmiştir. Finansal okuryazarlık düzeyi ile kayıtlı demografik faktörler arasındaki ilişki, çapraz tablolama analizi kullanılarak araştırılmıştır. Araştırmanın sonuçları, finansal okuryazarlık düzeyinin eğitim düzeyi dışındaki tüm demografik faktörlere göre farklılık gösterdiğini ortaya koymuştur. Bu bulgu, daha önce başka hiçbir araştırmacı tarafından sunulmamış, tamamen bu çalışmanın bir katkısıdır. Tek yönlü ANOVA testinin sonuçları, kripto para birimi

farkındalığının finansal okuryazarlık açısından farklılık gösterdiğini, ancak demografik faktörler açısından farklılık göstermediğini ortaya koymaktadır. Bu araştırmanın bir diğer bulgusu, kripto para sahipliğinde artan bir eğilimin öngörülmesidir. Bu artış çok önemli olmasa da, bu araştırma gelecekteki çalışmalar için yeni bakış açıları oluşturmaya davet etmektedir.

Anahtar Kelimeler: Finansal okuryazarlık, Finansal teknoloji, Kripto para farkındalığı, Kripto para sahipliği.



This thesis is wholeheartedly dedicated to my parents, who have been my true inspiration for completing this thesis. They have been my vigor whenever I thought of giving up in tough situations.

To my siblings for sharing words of advice and encouragement to complete this thesis.

Above all, I dedicate this thesis to Allah Almighty, Thank You for the guidance, and strength. power of the mind, protection, skills, and healthy life. All of these I offer to you.

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I would like to give my deepest appreciation to my friends for their unlimited support, and unconditional help throughout the data collection stage.

Finally, but most importantly I would like to thank my family, especially my father for allowing me to come abroad and excel in my academic career. Their emotional and financial support really meant a lot to completing this thesis.



## **PREFACE**

The author Aqsa Afzal, an international master's student from Pakistan, at the Izmir University of Economics, Izmir, Turkey. Previously have done a bachelor's in business administration with finance as a major subject, from The University of Central Punjab, Lahore, Pakistan. That was the time when I developed an interest in exploring investment options, as I became familiar with stock markets for the very first time and had heard about bonds as a childhood memory. Later I came to Turkey with the intention to explore and excel in my academic career. Here I got a chance to be in a discussion with Prof. Dr. Gülin Vardar who gave me ideas about exploring the latest technology-based digital currencies gaining the hype in the market. Later I went to Germany for the ERASMUS semester for a term only but got a chance to meet people with the same interest as mine in the finance field.

Finally, this thesis originated from the curiosity of knowing the latest investment assets but with a fear of failure to end up in something useless. A lot of people discuss cryptocurrency and planning to invest as if it was a fantasy where people could earn high-profit by just being smart and active decision-makers. This was the time when I was back in Turkey and was experiencing high inflation and decreasing value of the Turkish Lira. At that time cryptocurrency such as Bitcoin was getting fame as being the new gold.

At that time, I planned to conduct research on cryptocurrencies and underlying blockchain technology. As I reviewed the literature and to my expectations found that there still exists a gap in the literature, till that time only the general information about cryptocurrencies and blockchain technology was discussed in the limited amount of literature available. Hence, I decided to research these assets. Further discussion with my advisor, and with analyses of the current studies, I ended up doing my thesis about the relationship between financial literacy, cryptocurrency awareness, and cryptocurrency ownership.

I had gone through a lot of hurdles and tough times in the process of writing this thesis, especially while writing the literature review part. Each time I came up with a new idea and was lost with so many thoughts in mind, I gathered strength and finally stick

to the topic decided. The most difficult part was designing the study and collecting the data. Although research says the Survey method is quite easy but being a foreigner and conducting my research with Turkish people was the most heartbreaking stage. The target audience for this research was individuals approaching working age and above. So many times, I realized being ignored and helpless while collecting the data. There were times when I planned to quit but my parents kept my motivation high. With the guidance of my advisor and with the support of my friends and family I have been able to complete this thesis finally. I as the author of this thesis appreciate all the constructive feedback and critique from the readers and hope his thesis be useful for them.

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Aqsa Afzal

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## **LIST OF ABBREVIATIONS**

OECD: Organization for Economic Co-operation and Development (38 member countries)

TEB: Turkish Economy Bank

UNICEF: United Nations International Children's Emergency Fund

P2P: Peer-to-Peer lending

CBDC: Canadian Bank Digital Currencies

ICOs: Initial Coin Offerings

ING: The Internationale Nederlanden Groep

UTAUT model: Unified Theory of Acceptance and Use of Technology

PISA: Program for International Student Assessment

SEC: U.S. Securities and Exchange Commission

FBR: Federal Board of Revenue

## **CHAPTER 1: RESEARCH OVERVIEW**

### ***1.1. Research Background***

#### ***1.1.1. Introduction to Financial Literacy***

Financial literacy is one of the most demanding skills of each era, that contributes to the current needs of people, intending to earn a living for their households. Everyone knowingly or unknowingly has the skill set of understanding the basic principles of financial literacy. These principles revolve around the fact that each one of us must earn, spend, save, invest, borrow, and protect the assets that we hold. It may also be called the possession of the skills that help us to analyze the situation, and make effective, yet informed decisions about the financial resources that we own. The understanding of basic financial concepts makes it easier for people to run through the financial systems. People who have a good understanding of these concepts and terminologies used in financial systems tend to perform better, than the ones who don't own this intelligence. This also refers to personal fiscal management, doing the budgeting, and making well-thought investment decisions. As it is a vital part of our life journey, the earlier one starts to focus on this aspect, the more that person is better off in the future deals.

The history of financial literacy goes back to the year 2005. Hecklinger, and Richard (2006) analyzed financial literacy in OECD countries by using survey method. According to the results of this study in Australia, 67% of the survey respondents claimed to well know the concept of compound interest but when it came to problem-solving only 28% were able to solve it. According to the results of this study with British people, it was found that consumers do not tend to seek financial knowledge, instead, what they know is that they have gotten by chance from various sources like bank pamphlets, and other random sources of information. According to Canadian responses to the survey, they found investment decisions more difficult than compared to deciding on a dentist. As a result of a survey in the U.S., it was found that 4 out of every 10 workers don't consider a retirement plan for themselves. Therefore, it can be concluded that regardless of the country's boundaries, overall financial literacy was yet to be improved at that time. This was the actual mission of OECD, to develop common practice standards and principles, to improve financial literacy, across the 38

member countries.

Moving on as financial literacy of people is of great concern for economies, few of the educational financial programs that have been evaluated, prove to be reasonably effective. However, Cole, and Shastry (2008), stated that analyses of academic financial education supply no success for people's financial well-being. Adding to this, Enkhbold, and Enerelt (2016), supported that according to a survey in 2014 conducted by Asian Development Bank, more Mongolians have diversified their portfolios regarding financial options. They have started comparing the cost of borrowing money, and earning on savings, and this has been done by the launch of TV dramas, intending to literate poor and non-poor family unit, that in return tend to focus on fiscal literacy. Approximately 80% of Mongolians said that this TV drama was a source of knowledge to them.

Regarding the financial products, in recent times, a variety of financial products and services had made their way to our economies. While the ancient generations were simply using cash to make their purchases and that was the only exchange that existed. Various products are becoming well known today and termed as credit cards, debits cards, and in addition to this electronic transfer of payments is also in trend. According to results of a survey conducted by the Central Reserve Bank of San Francisco (2019), only 22% of the payments by the consumers are preferred in cash, while 29% is the usage of credit cards and the highest is 48% usage of debit cards for making payments.

Regarding, the components of financial literacy, Fernando (2021), mentioned that there is, no doubt, a large list of skills that are to be considered under the umbrella of financial literacy, but household budgeting, and paying off the liabilities are the most critical for any individual. Moreover, evaluating tradeoffs for investment, and other credit products are also included in this. A person to get these skills should have a sound understanding of financial concepts like simple and compound interest, and the time value of money. One, who is unable to have a good understanding of these concepts, might be exposed to great damage to its long-term financial success. Being financially illiterate, a person might find themselves in a tricky situation, such as accumulated heavy debt, either because that person had poor long-term planning or bad spending decisions. This, in return, can lead a person to severe conditions like going bankrupt, poor credit management, housing foreclosure, business liquidity, and

several other negative impacts alongside. There exist several practical strategies to help an individual improve their financial literacy, such as starting from creating your budget, making a saving account, paying bills at once when arrived, getting one's own credit report, managing one's liabilities, and as most important one investing in the future. These all contribute to better understanding of financial concepts.

Regarding financial literacy in Turkey, Kayacan (2019), stated that after the 80s with liberalization and foreign exchange market, and improvement of foreign trade economy of Turkey, it came into amalgamation with the world's economy. For this reason, the financialization process has been put on a spurt. A system came into being where the daily exchange rate is announced by the Central Bank of Turkey, and the Capital Market Board (CMB) was also inveterate during this period. With the passage of time Turkey's financial system has gone through a lot of amendments and encountered new products and services to compete with the developing world standards. Aydin (2018) reported that financial literacy rate in Turkey is low, therefore, it needs to be improved for a better functioning economy and financial markets. This study by Aydin (2018), confirms the report of a survey by PISA (2021), which indicates that Turkey has low financial literacy percentage and among 72 countries, Turkey was ranked 50<sup>th</sup>. Moreover, Aydin (2018), also stated that a circular was published by the Ministry, in the form of financial access, financial education, financial consumer protection strategy, and action plan in the official Gazette No. 29021 in June 2014. TEB (Turk Economy Bank) a Turkish bank, also played an important role, to serve the purpose of increasing financial literacy. It started a family academy project believing that the Economy's starting point is family. The combined efforts of TEB, the Ministry of Education, and UNICEF, financial literacy was included in the student courses for the very first time in Turkey.

### ***1.1.2. Introduction to Cryptocurrencies***

Alongside the traditional investment tools, cryptocurrency has recently gained a boom in popularity. Frankenfield (2022), said that in these days a generic form of digital or virtual currency can be named as cryptocurrency. It is secured by cryptography which is the reason that it can't be fake or spent twice. These digital currencies are considered decentralized, as they are not issued by any central body. The decentralization makes these digital currencies immune to any manipulation or government interference. The

decentralized network of cryptocurrencies is specifically based on a well-known technology named Blockchain technology. This system helps to make online payments more secure, with the help of distributed ledger, which makes it difficult to replicate the data. In addition to this, there is no third-party intermediary involved. These transactions are direct transactions encrypted end to end. The word “Crypto” itself refers to encryption algorithms and to cryptography that protects these transactions. There exist cryptocurrency exchanges where these digital currencies can be mined or bought. The rapidly increasing value of these digital currencies has made them a popular trading asset, although the most well-known cryptocurrencies like Bitcoin are rarely used for retail transactions. Moreover, these are sometimes used for international transactions as well.

Among all cryptocurrencies, Bitcoin is the most well-known and highly valued digital currency. It was invented back in 2008 by Satoshi Nakamoto. Since then, there are thousands of other cryptocurrencies existing in the market. Each of them differs in specifications and serves distinct functions and purposes. Ethereum, another well-known cryptocurrency, has an Ether market that is known as the basis for the smart contract platforms. Ripple, as a digital currency is also known for being used by banks for international transactions. Among all cryptocurrencies, Bitcoin, is the most traded. The observed success of Bitcoin has launched many other cryptocurrencies like Altcoins. According to the data presented by Coinbase (2022), until May 2022, almost 19 million Bitcoins were being traded in the market, with a market capitalization of around 576\$ billion, approaching the assumption that 21 million Bitcoins can exist. Few of the altcoins are the clones of the Bitcoin, while others are created completely new. The list of these includes Solana, Lite coin, Ethereum, and Cardano. According to the data presented on CoinMarketCap (2022), by the end of the year 2021, the aggregate value of all the cryptocurrencies reached 2.1 \$ trillion and Bitcoin was the most dominant, capturing a major part of around 41% of the total market capitalization value.

In the traditional concept, the Fiat currency that we normally use is backed by some sort of precious item like Gold, or usually, federal reserves, and these currencies are authorized by the government or monetary authorities to be used as a medium of transaction. However, the case for cryptocurrencies is completely different, as these

are not backed by any private or public entities. This is the major reason why these currencies are still unable to get valid legal status in the entire world. No matter even the cryptocurrencies have outperformed most of the existing financial infrastructure, their legal status still has certain implications for their daily usage for trading and transactions. Frankenfield (2022), mentioned that by the end of the year 2021, only one country El Salvador allowed Bitcoin to be used as monetary transactions. The rest of the world varies by authority on the matter of cryptocurrency regulations.

Based on the data presented on Freeman Law (2021), in Japan, it has been declared legal to use Bitcoin and the exchanges working in the country must collect customer information, and details related to wire transfers. However, China has banned mining and usage of cryptocurrency within its boundaries. At the same time, Prahbu (2021), reported that India was formulating the framework to use cryptocurrencies. Regarding the data presented on European commission website (2021), the usage of cryptocurrencies has been declared legal in the European Union and these will need to be entitled as financial instruments. The European Union released regulations to protect those using and supplying financial services for cryptocurrencies. The most sophisticated financial market in the world is in the United States and Bitcoin futures are available at the Chicago Mercantile Exchange. Security Exchange Commission (SEC) hereafter doesn't accept Bitcoin and Ethereum as securities.

As cryptocurrencies rely on a decentralized system, so for their trading and transactions, it is not necessary that centralized systems such as banks and monetary institutes should play a role to make these transactions reliable. It ensures easy transactions between two parties without a third-party interfering to make these transactions more reliable. As these transactions don't involve an intermediary in between, so these are comparatively quicker than the traditional fund transfer that needs a third-party. These also allow users to take flash loans, that don't require any collateral against it, as it's required in the traditional way of getting a loan from a financial institution like banks. These loans without collateral are also used in trading.

Along with the data reported by "The New York Times" (2022), although these transactions are claimed to be anonymous, still cryptocurrencies are pseudonymous, which leaves footprints that the FBI can decode. Hence, it is not anonymous as governments and federal authorities can track these so-called anonymous protected

transactions of citizens. This indeed has become a common tool for criminals to make fraudulent activities like money laundering.

### ***1.2. Goals of this Research***

Summing up the basic introduction of financial literacy and cryptocurrency market, it can be inferred that financial literacy has been in the minds of researchers since a long time ago and it also has been linked to investment decisions and other related topics. However, the topic of cryptocurrency is evolving for a couple of years only, so there is not much literature about it. As a researcher, I aim to relate financial literacy to cryptocurrency awareness in Turkey, as the previous researchers such as, Kayacan (2019), has only studied about financial literacy in relation to household wealth. To the best of my knowledge, this is the pioneering study, which investigates the relationship between financial literacy levels and cryptocurrency awareness in Turkey so far. In addition to the impact of financial literacy level, I also intend to find out whether cryptocurrency awareness has a significant difference with respect to demographic factors, such as gender, age, education level, marital status, having children, income level, and employment status. I assume these demographic variables to be positively correlated to financial literacy. Through my research, I plan to get answers to the following questions:

1. What is the current level of financial literacy in Turkey?
2. What is the average level of cryptocurrency awareness in Turkey?
3. Is there any relationship between financial literacy level and demographic factors?
4. Does cryptocurrency awareness differ with respect to financial literacy level?
5. Does cryptocurrency awareness differ with respect to demographic factors?
6. What is the trend of cryptocurrency ownership in Turkey?

Based on the research questions above, a set of hypotheses statements are developed and presented in the literature review section (*Chapter 2*) of this paper.

### ***1.3. Outline of this Study***

Although financial literacy is not being examined for the first time in literature, and similarly, researchers have also shown their interest in examining cryptocurrencies.

Yet to my knowledge, this is the first study that aims to examine relationship between financial literacy level and cryptocurrency awareness in Turkey.

This study fills the gap in the literature by answering to the above-mentioned research questions, using data collected from survey method, conducted with 258 respondents in Turkey. Through this survey, the data collected allows us to examine demographic attributes of financially literate and illiterate individuals, along with financial literacy level of individuals. It also allows us to examine demographic attributes of cryptocurrency aware and unaware individuals, then, relate the financial literacy levels with the cryptocurrency awareness. Lastly, it also allows us to forecast the trend in cryptocurrency ownership.

The remaining study is structured as follows: *Chapter 2* discusses the literature review related to financial literacy, cryptocurrency awareness, and cryptocurrency ownership. *Chapter 3* discusses the research methodology design and data used in this study. *Chapter 4* reports descriptive statistical analysis of the data and discusses empirical findings of this study, particularly focusing on financial literacy level of the Turkish people. Additionally, this study also discusses the relationship between financial literacy levels and demographic factors. Similarly, this study discusses whether cryptocurrency awareness differs with respect to financial literacy levels, or not. A further discussion is made on whether cryptocurrency awareness differs with respect to demographic factors, or not. Finally, it sheds light on cryptocurrency ownership trend in Turkey. *Chapter 5* concludes the study with concluding remarks, and discussion over the results of this study along with shedding light on the practical implications and limitations of the study. Based on the results, the key takeaway of this study includes: First, financial literacy level in Turkey has improved as compared to the results of previous studies. For instance, Aydin (2018), stated that financial literacy in Turkey is low. Second, financial literacy has a statistically significant relationship with all demographic factors mentioned in this study, except education level. Third, cryptocurrency awareness is found to differ significantly with respect to the level of financial literacy in Turkey. Fourth, demographic factors are found to have no significant difference on cryptocurrency awareness. Fifth, and as a final result, an increasing trend is expected in cryptocurrency ownership in Turkey in the future.



## **CHAPTER 2: LITERATURE REVIEW**

This chapter provides an extensive literature review that investigates the previous research related to financial literacy, and cryptocurrencies. Moving on this chapter also presents some of the theories related to the topic of the study. In addition to this, a theoretical framework related to financial literacy will also be presented. Following the detailed literature review, finally, this chapter highlights the gaps in the current literature related to the study. Based on the aims of this study and the gaps in current literature, conceptual framework along with hypotheses will be developed by the end of this chapter. These developed hypotheses will be systematically analyzed and tested in the following chapters of the study.

### ***2.1. Literature about Financial Literacy***

Financial literacy, which can be defined as, having knowledge about basic financial concepts like interest rate, time value of money, inflation, investment, and risk, attracted the attention of many academicians, policy makers, regulators, and investors as well, in the recent times. With the help of the financial knowledge, the individuals will be avoiding rash and unwise financial decision making, such as increased borrowing, or increased expenditure, which may enforce a great burden on the wealth of the households (Demirguc-Kunt et al., 2007; Lusardi et al., 2007). Therefore, financial literacy level of the people will have an important role in the development of the countries and better functioning of the economies. In the recent period, with the increasing popularity of the cryptocurrencies, the financial literacy level of the people has gained much more interest.

#### ***2.1.1. Theoretical Framework related to Financial Literacy***

Few of the theoretical frameworks related to financial literacy found in the present literature are must to mention. These includes the following theories:

##### ***2.1.1.1. The Conventional Economic Approach***

The conventional economic approach, when it is used to make financial decisions, it assumes that in case of high earnings, literate people tend to invest relatively less as compared to the earnings they make. Explaining this, Lusardi, and Mitchell (2014), stated that the main aim behind this is the support needed to manage spendings, when earnings had already collapsed after the retirement. Assuming this fact and according

to the views of Friedman (1957), individuals are encouraged to make savings from their income, for the times when there will be no sources of income, but expenditures will still exist. Few earlier studies, for instance, Chai et al. (2013) have presented that saving behaviors persist throughout individuals' life, but in a variety of forms, and is based on numerous factors, such as individual preferences, social safety, and prevailing economic conditions. Moreover, Lusardi, and Mitchel (2014), also mentioned that this approach assumes that individuals can manage their income and savings, making rational financial decisions, while being literate enough to undergo complex financial calculations, along with their experience and capability. Lusardi (2007), in his studies also suggested that the financial literacy level has still not reached too high, therefore, these theories are yet to be implemented in such economies. Therefore, the researchers in this field have mentioned the utmost importance of future studies to fill the gap between theories and reality.

#### ***2.1.1.2. Social Exchange Theory***

According to the social exchange theory, financial decision of an individual is influenced by the social interaction of that individual. Gallery et al. (2011) declared that as people do not have enough financial knowledge, therefore, they rely on advice from their surroundings when it comes to making financial decisions. In addition to this, Cook et al. (2013) stated that this theory proposes that any social behavior is the outcome of an exchange action. The main aim of social exchange behavior is to decrease loss while increasing profit. Gallery et al. (2011) further added that to determine the accuracy of the decision, individuals tend to compare the gain with the disadvantages of their decisions, as proposed by social exchange theory. Capuano, and Ramsay (2011), supported individuals seek advice from other, ignoring the fact that advisors' low financial literacy might affect their financial decisions. Hilgert et al. (2003) found that the influencing factor for financial decisions includes family, friends, social circle, and media. These advisory resources can be crucial to financial decisions, especially when these are the influencers for a specific financial product. This theory further explains that financial actions are based on the strength of the relation and trust, between the individual and the advisor. However, the intention of the advisor is difficult to determine.

### ***2.1.1.3. Prospect Theory***

The prospect theory assumes that it is not necessary that individuals make rational and wise decisions. Tversky, and Kahneman (1981), stated that when individuals are under pressure, they might not make wise decisions. Adding to this, Ricciardi (2004), suggested that people intend to avoid losses rather than intending to gain profit. He also added that in various circumstances, financial decisions are influenced by emotive and cognitive factors. Furthermore, Monticone (2010), confirmed that individual with low financial knowledge seek continuous income and avoid risk and losses. However, Lusardi (2011), asserted that individual having enough financial knowledge tend to make risky investments.

### ***2.1.2. Empirical Literature about Financial Literacy***

Considering the importance of financial literacy in economic development of the countries, a large body of literature addresses the analysis of the financial literacy level in the economies. Kayacan (2019), analyzed the financial literacy of households and their money measuring skills in Zonguldak, Turkey. Using a survey method, he examined the effect of demographic factors on financial literacy, and then the relationship between financial literacy and money management skill. As previous studies in Turkey have observed a low level of financial literacy, for instance, Aydin (2018), found that financial literacy in Turkey is low. Therefore, this study by Kayacan (2019), conducted in Zonguldak province aimed to enhance the level of financial literacy. The results of this study revealed that there was no significant difference observed in financial literacy perceptions with respect to gender, marital status, age, education, and profession, whereas a significant difference was observed between financial literacy perceptions and income status. It can be said that income status of the households makes a difference in the financial literacy of them.

In another research conducted by Kawamura et al. (2021) using data from a Japanese survey in the year 2018, the relationship between financial behaviors of households and their attitudes were analyzed. The empirical result of this research showed that financial literacy is important for making financial decisions. Nevertheless, actual behaviors are so sensitive, and respondents having higher financial knowledge are more likely to make risky investment decisions, overborrow, and hold unsophisticated financial attitudes. At the same time, respondents who have a high level of financial

literacy are good at planning their retirement or making long-term decisions and are uninterested in gambling. Some factors such as risk preferences, loss aversion attitude, and discount also are important to making financial choices. It is also found that a higher level of financial literacy does not stop investors from overborrowing and financial inexperience, which are not considered to be wise financial behaviors. Risky assets when combined with speculative investment, overborrowing, and financial inexperience can bring huge disasters. These behaviors cannot be avoided but stimulated with higher financial knowledge. The reasons why financial literacy leads to unsuitable financial behaviors could be listed as overconfidence in financial knowledge, fluency effect, prejudiced knowledge, cultural factors, and financial knowledge levels. This might lead to overconfidence, the ability to make financial decisions that are not endorsed by actual ability. Financial knowledge confidence is different from financial ability. Inconsistent with the findings of Kawamura et al. (2021) Lusardi, and Tufano (2015), stated that investors with low debt knowledge are more likely to incur a higher cost of borrowing the funds.

Knecht et al. (2013) found that in the perspective of learning by experience, beginners are more likely to be overconfident before touching a certain level of experience. However, in other research of McKenzie et al. (2008) experts and beginners both are found equally overconfident. Their research reveals that financial knowledge can lead to improper financial attitudes and behaviors.

Using a random sampling method, Fettahoglu, and Kildize (2019), investigated the financial literacy level of individuals in Turkey. Moreover, they aimed to analyze the attitudes of respondents toward digital financial assets. Perceived legal risk, security risk, operational risk, seamless transaction, economic benefits, and perceived benefits were found as the factors which affect investors' attitudes toward digital financial products. Moreover, the findings also revealed that participants using financial digital services tend to use only those that don't require much knowledge whereas, the one that requires more knowledge are avoided.

Allgood, and Walstad (2016), reported that financial literacy has a prominent impact on the financial behavior of an individual. This is defined as the extent to which individuals understand the basic financial concepts and can make financial decisions related to their personal finances in short-run and long-term financial planning,

considering the economic conditions. Financial literacy and financial knowledge are terms that are used interchangeably in the literature. The research has differentiated two domains of financial literacy, objective, and subjective financial literacy. Lusardi, and Mitchell (2007), stated that objective financial literacy refers to the individual understanding of the concepts and theoretical knowledge whereas Alba, and Hutchinson (2000), stated that subjective financial literacy refers to the confidence with which an individual makes financial decisions. In the earlier studies, objective financial literacy has been an important determinant of investment behaviors and has a positive relationship with it. For instance, Kim et al. (2019) wrote that millennial investors who pose a higher level of objective financial literacy tend to have investments. This is also positively related to making investments in highly risky assets. On the other hand, Fujiki, and Hiroshi (2020), study in Japan showed no relationship between objective financial literacy with cryptocurrency assets. As was the case with objective literacy, earlier research has also shown the positive relationship of subjective literacy with investment in securities. For instance, Riitsalu, and Murakas (2019), through their research found out that although there exists a positive relationship between objective and subjective financial literacy with investment, subjective financial knowledge has a stronger relationship when compared to objective financial knowledge.

## ***2.2. Literature about Cryptocurrencies***

The increasing popularity and importance of cryptocurrency market has triggered huge interest not only among currency users and investors, but also in the economics of cryptocurrencies. Dorofeyev et al. (2018) examined preconditions for the development of cryptocurrencies and their underlying Blockchain technology. Their research mainly focuses on comparing the earlier form of exchange items like precious metals and money with cryptocurrency as a medium of exchange. Their paper presents a details view of the advantages and disadvantages of using this technology-based investment asset, and researchers also try to find out the reasons for stopping the circulation of cryptocurrency in the economy. The author further tries to assess the risk associated with cryptocurrencies if these were to be completely replaced with traditional fiat money. The results exposed that weak integration is one of the main reasons, cryptocurrencies are not being able to circulate in the economy as means of making payments. This research exposed that traditional money has outperformed and

so far, can not be replaced with cryptocurrencies. A situation where most people will start using an alternative to fiat money, will bring a point where monetary authorities' ability will get limited. On the other hand, if few people use cryptocurrencies this will make divisions in the economy. If everybody will be using these digital currencies country's; central banks would not be able to accelerate economies through discount rates. Adding to this, the high fluctuations in crypto markets will lead to depreciation and ultimately to several other severe consequences like bankruptcy and non-payment of debts. The major challenge to introducing cryptocurrencies is to develop a globally accepted trusted financial infrastructure, that will be the surety of a stable financial system and capability to perform satisfactory monetary policy. The principles on which the cryptocurrency system is built are totally contradictory to the traditional financial system. as it is decentralized and is clashing with the principles and values.

Hidajat et al. (2021) studied how to measure cryptocurrency knowledge specifically about Bitcoins. Based on a qualitative method and data collection through one-to-one interviews, they found that eight factors can be discussed to know Bitcoin knowledge. These are called as supply of Bitcoin, regulatory guarantees, record of transactions, third-party interference, handling of transfer transactions, initial coin offering, the smallest unit of Bitcoin, and exchange with other currencies.

The crisis of the years 2008 and 2020 became the reason to give a boost to the debate on financial democratization. Although credit risk is high, peer-to-peer lending serves as a valuable option. Blockchain technology and crypto assets are used as collateral to reduce the risk of P2P lending. In this study, Gonzalez (2021), intended to find out lenders' intentions regarding crypto assets and financial literacy levels. A mock test with finance students on P2P lending was run online to test prosocial lending decisions. The findings of his study reported that crypto is riskier as collateral against other traditional forms of collaterals. Hence, it is concluded that crypto collaterals are not supporting financial inclusion, but cryptocurrencies issued or backed by central banks would serve as reliable collateral. This might help to democratize peer-to-peer lending, providing evidence for behavioral financial knowledge.

Almost a decade after the initial release of Bitcoins, cryptocurrencies are moving away from the niche market to the maturity phase. Although cryptocurrencies are growing rapidly and has quickly become a phenomenon in global financial markets, the

investors' motivation to trade in the cryptocurrency market and cryptocurrency literacy have yet to be researched. Steinmetz et al. (2019) who conducted research on the base of an online representative survey of 3864 German population sample, analyzed the demographic factors of the cryptocurrency users. Interestingly, most individuals in the sample are mindful of this phenomenon, although their self-assessed knowledge related to blockchain technology and cryptocurrencies using this technology is inadequate. At the time of the survey being conducted, 9.2% of the individuals were owners of cryptocurrencies, whereas 9.1% of individuals had owned these in the past. The individuals using cryptocurrencies are usually male, young, well-educated, and well-off people. The ownership of these currencies is linked to long-term investment, and more than half of the respondents showed their motivation for being owners. The major driver for ownership behavior is the trust and the understanding of cryptocurrencies. The results showed that there is some inconsistency between factual and supposed usage realms of cryptocurrencies that reflect the divergence of the phenomenon. Their research disclosed a three-cornered relationship between ownership, trust, and knowledge about cryptocurrencies, where each variable is complementing other variables. In addition to all these discussions, cryptocurrencies were also linked with unlawful activities by illiterate respondents. The actual results were found to be different from the supposed ones, and they showed that more educated individuals have trust in cryptocurrencies and tend to own these. According to this result, one can say that knowledge is so important for the success of cryptocurrency acceptance. As a summary, they concluded that instead of only educating and protecting the ones that tend to be the user of cryptocurrencies, it is more crucial to educate all the population that has the wrong perception.

Henry et al. (2019) using survey method, made a study to examine acceptance and usage of crypto assets, especially Bitcoin. They reported that within the time span of two years, 2016-2018, cryptocurrency awareness, especially Bitcoin has been increased from 62% to 89%. They also reported that the cryptocurrency especially Bitcoin ownership, is found to be increased from 3% to 5%. In addition to this, they also mentioned that cryptocurrency past owners' share had also found to be increased, because of the rise in the prices in year 2017. The share of owning crypto assets for the sake of making speculative investments was found to be decreased a bit in the year 2017. However, the share of the individuals who used Bitcoin for transaction purpose

was found to be increased. Finally, they also shed light on how Bitcoin users are different from other individuals, based on financial literacy, cash holding, and preference over payment methods. Concluding their study which is related with digital currencies like cryptocurrencies, they found that majority of Canadians are aware of cryptocurrencies, whereas only 5 % has accepted these by the end of the year 2018. Furthermore, they also discussed that, for the issuance of Canadian Bank Digital Currencies (CBDC), the use of cash in the economy must decrease and at the same time use of privately issued digital currencies must be accepted.

Since the invention of cryptocurrencies especially Bitcoin, it has gained so much attention from the researchers, that they tend to research about motivations behind the adoption of these new technology-based financial assets. Using a survey method to analyze the demographic characteristics of people in South Africa. Mahomed (2017), found that real and probable users of crypto assets are males, with above-average educational level, holding a bachelor's degree and having an income of around R84000, and of middle-aged adults falling in the age range of 25-34 years, with a considerable number of users up to 44. The major use aim was to adopt crypto assets as an investment tool, while minor use was its usage as a currency. Facilitating environment proves to be a strong factor for cryptocurrency adoption. Social influence is also a considerable predictor, due to the network created by this technology. Furthermore, trust is significant to the use of these technology-based assets. Lastly, effort expectations and performance expectations are not significant to the use of this technology-based digital currency.

Aiming to explore the socio-demographic characteristics of cryptocurrency investors and factors supporting their financial decisions for initial coin offerings (ICOs), XI et al. (2020) employed an online survey with Australian and Chinese respondents. For the analyses of investor characteristics and determinants of the choice with other ICOs, multinomial logit model was run. The results revealed the difference between the base of the two choices of Chinese and Australian investors. The major factor in these choices is gender, age, occupation, education, and experience, and these are associated well with behavioral aspects. In addition to the difference in ranking given to attributes of ICOs, there also exists a difference between Australian and Chinese investors' ranking of investment strategies and deterrence factors. The empirical finding



demonstrated that fewer female Australian investors invest in cryptocurrencies, and they plan not to invest again. Behavioral finance studies propose that males tend to be overconfident, but females are more careful about unsure situations. This might serve as the reason that cryptocurrency markets experienced fluctuations and their future is uncertain, therefore regulation and price controls must be performed. Income proves to be another important factor in these investments.

Continuing with the results Xi et al. (2020) stated that there is a greater probability to invest from the age group ranging from 18-30 for Chinese investors. In both countries, individuals' graduate degrees and financial knowledge tend to positively affect cryptocurrency investments. Moreover, Australian investors working in the finance or IT sector tend to invest more in crypto assets, possibly due to the interest in financial innovation and new technology. Nevertheless, business owners in Australia and the individuals working in the education industry tend not to invest in these assets in the future. Similarly, Chinese investors working in the wholesale industry tend not to invest as well. Investors in the Australian share market also do not plan to invest in the future, possibly due to the year 2017 market crash.

Even if cryptocurrency markets have been supported, at the same time, there are also detractors, who assert to identify socio-demographic and behavioral factors that in return push for making or not making investments in cryptocurrencies. Pham et al. (2021) analyzed the demographic factors, behavioral factors, and financial factors of investing in cryptocurrencies using survey method in Italy. The results of the 275 Italian individuals' answers, in the questionnaire showed that investors' intentions to invest in cryptocurrencies are positively affected by the illegal mindset, subjective customs, superficial behavioral control, herding behavior, and seeming risk. Whereas it is found that financial literacy and socio-demographic factors don't have any influence on investors' intentions. The outcomes of the research revealed that the attitude to make cryptocurrency investment is positively affected by the desire to achieve goals, to enhance living standards, and apparent control, in short, assuming to have knowledge and resources and help to use cryptocurrencies. The other important factor was that individuals investing in cryptocurrencies do not have any legal aim to make investments. In many times, they tend to use these channels to hide their identity and save money outside of legal channels.

Arias-Oliva et al. (2019) investigated the intentions of the individuals to invest in cryptocurrencies. They have found that the investors are affected by subjective norms, the media, family, friends, and reliable people collectively influence herding behavior. Similarly, Lin, and Tsyvinski (2018), suggested that these intentions lead to the high instability of cryptocurrency markets. Moreover, Aloosh, and Ouzanb (2020), mentioned that investors having risk-seeking behavior still tend to invest in this highly volatile market. They further added that financial literacy does not influence the intentions to invest in cryptocurrencies, and this result is aligned with the study of Arias-Oliva et al. (2019) who stated that financial literacy can not help to reduce certain behaviors like herding behavior. Their study also revealed that the risk-seeking behavior of investors is related to their herding behavior and influence their intentions to invest. This relationship was confirmed from another research conducted by Senarathne (2019). This study added another reference that the theory of planned behavior and intentions to invest are applicable in various contexts. The results of this study are aligned with other research in Spain (Arias-Oliva et al., 2019), Malaysia (Gazali, 2019), and China (Shahzad et al., 2018).

In another study by Uckun, and Dal (2021), the authors made an analysis to check the risk tolerance of people investing in cryptocurrencies, and to classify these people according to different risk tolerance groups. Their aim was also to determine the investment profiles and demographics of these people with different levels of risk tolerance. These levels of risk tolerance range from 1-5, 1 being low-risk tolerance and 5 being high-risk tolerance. Using convenience sampling method, they have collected data from almost 233 cryptocurrency investors. An online survey method was employed to collect this data and the risk tolerance of the investors in Turkey was revealed as 3.85 out of 5 points. From this sample, 62.2% of investors were found to have a high level of risk tolerance.

Furthermore, Uckun, and Dal (2021) investigated the relationship between risk tolerance, demographic factors, and investment profiles of investors. Employing ANOVA test and independent-sample t-tests, the results of this study declared that there were significant differences between risk tolerance, the time they make investments, and a few demographic characteristics of the sample audience. Only 4 % of investors in the sample were low-risk conservative investors, 3.4% were having

tolerance below average, almost 34% had average risk tolerance, 35.6% were having above-average risk tolerance and the remaining 26.6% had high-risk tolerance or also known as aggressive investors. The results of this study also mentioned that the number of females participating in the survey is low. Female individuals, when compared to males, are at risk. Their tolerance is also observed to be lower than that of male individuals. It was found that most of the investors in cryptocurrencies are male, high-risk takers, or aggressive investors.

Zubir et al. (2020) in another study, aimed to assess the cryptocurrency awareness of Malaysian investors. The empirical findings revealed that more than half of the respondents are aware of cryptocurrency but do not own any single of it. The factors that influenced cryptocurrency awareness are found to be age, gender, ethnicity, and occupation. This study further found that older age people should be given more awareness as those are found not to know much about cryptocurrencies. In consistent with the study, Awan, and Khuram (2011) also supported that age is an important determinant for the selection of financial services. Ahmed et al. (2011) also found similar result. Furthermore, it was also noticed that there is a lack of equal distribution of information. There might exist several reasons for this and one that is mentioned by Sabri et al. (2012) is that Malays are more concerned about religion even when it comes to financial affairs. These findings are aligned with several other research that includes research done by Haque (2010), who mentioned that ethnicity is a determinant factor as religion guides financial matters.

Moreover, Zubair et al. (2020) also found that occupation influences cryptocurrency awareness. Additionally, most of the respondents are in favor of online payment methods apart from cryptocurrencies. The determinants of these preferences are based on age, gender, and occupation. Bhushan, and Medury (2013), also found similar results. Ethnicity and residency are found linked to usage and awareness of cryptocurrencies. Residency relates to business activities and other payment services. Polasik et al. (2015) stated that since residency is linked with businesses and payment services, so is the case with cryptocurrency. To conclude, residency is found to be linked to cryptocurrency usage, and it works together with payment procedures in electronic commerce.

Apart from Bitcoin, many cryptocurrencies have emerged such as Ethereum, Ripple, Stellar, Bitcoin cash, Cardano, Litecoin, and several others. Moreover, according to the data presented on CoinMarketCap (2022), the number of cryptocurrencies increase on monthly basis and has reached to 9,976 in June 2022. Buterin (2018), stated that cryptocurrencies are not only traded over exchange but also as tokens in fairs. Additionally, Morgan, and Trinh (2019), mentioned that there exists a difference in the levels of awareness in Vietnam and Cambodia, the east-west side of Malaysia, because of the different services provided in these areas, so the usage of cryptocurrency differs based on this as well. Nga et al. (2010) stated that men are more likely to use these new technologically advanced financial services. Crypto assets can be seen as globally common in the future and by spreading awareness, Malaysians could be protected from cryptocurrency pitfalls.

Nilay (2019), examined the demographic factors and the propensity of behavioral prejudices like ambiguity aversion, loss aversion, risk-seeking, and overconfidence, to analyze both cryptocurrencies and altcoins at the same time. The data for this research was collected by online survey, conducted in Turkey. The findings of this survey revealed that financial literacy and high-income status of individuals are positively related to cryptocurrency ownerships, whereas its negatively related to age, gender, and low education level of the individuals. The findings also revealed that financial literacy, the high income of individuals, and high risk-seeking is positively related to altcoin ownership. Whereas it is negatively linked to low experience and ambiguity averse behavior of individuals.

Fatih et al. (2010), in their study, examined investment choices of investors along with their effect categories like economic, social, and personal factors, on investment choices in Turkey. Their study result revealed that female investors with a low level of financial literacy invest in safe investments. It is also observed that a positive relationship exists between education level, earnings, and investment assets.

ING (2018), international survey was conducted to gain information about people saving, spending, and investing habits. Almost 1000 people responded from each country except Luxemburg which had 500 respondents. This survey revealed the perception and use of cryptocurrencies like Bitcoin. The results of this showed that most of the people in Europe knew about cryptocurrencies and among these majority

were male, but the surprising thing was that young age respondents did not know about cryptocurrencies. The respondents already using digital devices like smartphones for mobile banking were more likely to have heard about cryptocurrencies. Very few like 1 out of 10 were owning cryptocurrencies at the time of the survey being conducted, whereas 1 out of 4 showed an intention to own cryptocurrencies in near future, with more people responding to this intention being the ones using mobile banking. Only about 35% of the respondents see cryptocurrencies, as an investment asset and the future of online spending. Many of the respondents consider digital currencies as risky investment assets than stock market shares as an investment option. Almost 30% of the respondents also said they would never invest in crypto assets. These might serve as reasons for not considering cryptocurrencies such as taking pay, paying the bills, personal finance, or other similar usage as cash. Only a few people consider cryptocurrencies to use for the activities as they use cash. Surprisingly, the respondents having lower income tend to be interested in using cryptocurrencies for the function for which cash is currently being used. For the decisions to consider these as investment opportunities, majority of people seek official websites or advising experts in this matter.

### ***2.3. Literature about Financial Literacy in relation to Cryptocurrency***

Considering the separate literature review about financial literacy and cryptocurrency awareness, this part moves on reviewing the literature about the relationship between financial literacy and cryptocurrency awareness. Arias-Oliva et al. (2019) analyzed the growth of cryptocurrency market from a consumer behavior viewpoint. This research used a technology acceptance framework that could explain almost 85% of the intentions to use crypto assets. Their research was conducted with college-going adults in Spain, having basic knowledge about internet usage. When using the model for knowing the intentions to use cryptocurrencies, along with other variables of UTAUT technology acceptance model variables, financial literacy, and perceived risk were also used. As a result, almost 85% discrepancy was observed in the intention to use digital currencies. The results of this study demonstrated that the variables which could best explain the intentions to use digital currencies were performance expectation by 68 %, conditions facilitating the use by 15%, effort expectation had a comparatively smaller effect of almost 5 %, and the other variables like perceived risk, social influence, and financial literacy did not have any significant effect. The major finding of this research

was that performance expectation is the most important factor for the user acceptance of digital currencies like crypto assets. This finding is common with the other research, conducted by Kim et al. (2018) who found that performance expectation is an important determinant of even using biometric payment services and other financial services, like online banking (Sánchez et al., 2018), plastic money, and m-banking. Mendoza-Tello et al. (2018) in their study about cryptocurrencies also got the same result that performance expectation is found to be an important factor for the intention to use these and considered cryptocurrencies relation with electronic payments and acceptance of digital currency such as Bitcoin in China as said by Shahzad et al. (2018). Arias-Oliva et al. (2019) mentioned that the results also revealed that effort expectation is an important factor but not so powerful and vital to the adoption of cryptocurrencies, as compared to facilitation factor and performance expectations.

Panos et al. (2020) examined the relationship between financial literacy and attitudes to cryptocurrencies by using data from 15 countries (list includes United States, Australia, Austria, Belgium, France, Germany, Italy, Luxembourg, Netherlands, Spain, United Kingdom, Czech Republic, Poland, Romania, and Turkey). The study identified a negative relationship between financial literacy and cryptocurrency ownership. They explained that the people who are more financially literate seems to be more aware of cryptocurrencies and keep in mind that they make more informed decisions, thus financial literacy proves to be negative towards cryptocurrency ownership. The people who own cryptocurrencies are more likely to be less literate. In addition to this, they also explored, that the relationship between financial literacy and cryptocurrency is moderated by the risk factor, perceived by the investor when they compare cryptocurrency to other financial assets. The findings of this research present that the major demand for cryptocurrencies is from the less illiterate people.

As several other researchers, Rey, and Williams (2019), aimed to find financial knowledge of newly introduced digital currency (cryptocurrency) users. Their study was based on a survey method in which 36 measuring instruments were used such as financial knowledge, behaviors, attitudes, etc. The convenience sampling method was used to collect data and the results were extracted from the data of 32 respondents, who were using cryptocurrency, in South Africa. The results of their study revealed that all individual knowledge variables somehow influenced financial knowledge. The

respondents' attitudes and behavior also influenced by financial attitudes and their behaviors positively. The result of this research concluded that financial literacy is positively linked to cryptocurrency users, and this makes them savvy investors.

In another recent study by Zhao, and Zhang (2021), aimed to explore the factors contributing to cryptocurrency investments and furthermore, they also aim to analyze that whether financial literacy is the key factor towards cryptocurrency investment or investment experience is more related to cryptocurrency investments. They used a survey method in their research, and the sample was taken from a U.S. individual investor survey conducted in 2018, named the National Financial Capability Study Investor Survey. The findings of the study by Zhao, and Zhang (2021), mentioned that both financial literacy and investment experience are positively correlated with cryptocurrency investment, but investment experience have more influence on owning cryptocurrencies.

Zhao, and Zhang (2021), in their study, further tried to explain cryptocurrency investments with the help of the cognitive theory proposed by Albert (1989). This theory explains human behaviors as an interaction between cognitive, behavioral, and environmental factors that are known as triadic reciprocal determinism. The reciprocal of these 3 factors helps to identify whether a person engages in specific behavior and the reason for this engagement. They also tried to relate financial literacy with cognitive factors and behavioral factors that will determine the upcoming behavioral actions related to investment experience. According to Albert (1989), theory, environmental factors usually act as barriers and in most cases, these do not influence until they are triggered by a specific behavior.

Munnukka et al. (2017) stated that they have seen a positive effect of financial literacy and investment experience on investors' investment decisions for other investment assets, but Krische (2019), stated that despite this fact, the research done so far has been unable to prove it through empirical results for the case of cryptocurrency as an investment asset.

Baur et al. (2018) stated that commodities can also be considered assets. At the same time, cryptocurrencies differ from traditional assets as there is a huge fluctuation in crypto assets. These higher price fluctuations of crypto assets give an indication of

these being a riskier and more volatile class of assets, in comparison to other traditional assets. Since the first existence of crypto assets, there are more than thousands of crypto assets discovered to date. Ong et al. (2015) stated that crypto assets possess different specialties and functions and hence, making it difficult for individual investors to understand the potential of owning and benefiting from each of these. Moreover, despite the fact of different specialties and different functions of these assets, the individual investor's unfamiliarity with these has made these investments more riskier to hold. On the other hand, with the high volatility, high risk associated with these assets, and with a high probability of losing money still, it has gained investors' attention. Adding to this, Dyhrberg (2016), stated that investors intend to include crypto assets in their investment portfolios.

Fujiki, and Hiroshi (2020), investigated the variables regarding cryptocurrency, and then differentiated owners from non-owners, and later found variables that differentiate owners from other owners within the same group. Moreover, their research also tends to investigate four different groups levels of owner understanding, profitability on investments, adoption of non-cash payments, and investing in the traditional risky assets. Moreover, demographic factors, financial knowledge and behavior, traditional risky asset holding, and non-cash payment usage was also examined. The result revealed 35 variables that differentiate owners from non-owners. Most owners are young, educated, male, have higher pre-tax earnings, work in the public or private sector, or are self-employed. The people owning crypto assets tend to have higher financial knowledge from two viewpoints, a measure of objective financial knowledge, and financial experience at school. The owners have a lower level of financial knowledge from three viewpoints, financial knowledge experienced by parents at home, experience financial problems, and information about credit card usage. The results also revealed that regarding financial behaviors, investors are overconfident about their financial knowledge, anxious, decide based on the repute of financial assets, lack self-control, and have less risk-averse behavior.

As the trend of holding crypto assets is increasing rapidly so in another study, Fujiki, and Hiroshi (2021), tried to make a comparison of Japanese investors of cryptocurrencies with non-investor. The results revealed that when compared to non-owners, cryptocurrency owners are more likely to be young and men. In addition to



this they also found that crypto-asset owners have hoarding behavior, and using cashless payments is highly common. Moreover, this study analyzed those investors with no investment experience with traditional risky financial assets, who don't stockpile cash. It is interesting to know that there is the lowest financial literacy among owners and non-owners of crypto assets that not only have higher financial literacy but investment experience as well. Therefore, this research suggested that the regulators must not put these investors in the same group as the financially literate ones, good at internet transactions.

Furthermore, Fujiki, and Hiroshi (2020), stated that with the ever-increasing interest in technology, some investors may possibly try to invest in risky crypto assets instead of risky traditional assets. There is a probability that they might indulge in activities like gambling, instead of trying to enhance their financial literacy. According to the RADAR data of the year 2018, of 72 respondents who owned cryptos, more than half intended to make risky investments, and few of them were interested in cryptocurrencies and underlying blockchain technology. Few of them were interested in making internet purchases. A very few meant to make international transfers, the remaining wanted to make purchases physical.

Eggink (2020), stated that there is no consensus on whether a person should invest in Bitcoin markets or not, in comparison to the loss of not taking part in stock markets which is comparatively considerable. Although there exists evidence that the Bitcoin market is a bubble, it is true that it makes the investors' portfolios diversified. One of the main problems is, that the investors are immature and new to making investments and they usually tend to take higher risks. They also do not know how to diversify their portfolios efficiently. Abreau, and Mendes (2010), stated that the more financially literate investors tend to diversify their portfolios by investing in different investments to spread the risk across their portfolios.

The first contribution of Eggink (2020), study states that there is no connection between the amount of investment made in Bitcoin markets and financial literacy. However, there is a connection between positive feedback on trading and the Bitcoin market being a bubble. Feedback trading refers to that when investors buy assets at rising prices and sell assets at decreasing prices. Another contribution of this to the literature is that the amount of investment is not related to the positive feedback.

Lastly, there is no combined effect observed between financial literacy, positive feedback, and the amount of investment done in Bitcoin markets.

Furthermore, Eggnik (2020), added that financial literacy has an impact and is attached to the macroeconomic stability of any country as illiterate individuals are less likely to be aware of risks attached to Bitcoin and hence, they make risky investments. These investments when proceeding to losses create a hype in the market to consider Bitcoins as highly unstable markets. The regulators of these markets are stressed because of the investments being made by these financially illiterate investors, and the further risks associated with these investments. Usually, these investors borrow funds to finance their need for investment which might worsen the situation. The study also investigates that financially literate investors tend to invest more in Bitcoin markets. However, there is a connection found to the amount of investment made in Bitcoins, but this connection is not significant. Moreover, the controlled variables like financial literacy and demographics do not affect the amount invested in Bitcoins.

Kim et al. (2022) stated that like all other financial markets, similarly in U.S. financial market cryptocurrency investments became popular as well. They stated that in the year 2018, through the National financial capability study investor survey, their aim was to investigate the association of investment literacy with cryptocurrency ownership. The results of the survey revealed that approximately 13% of the respondents' own cryptocurrencies in one or another way. Furthermore, their results also revealed a negative association between objective investment literacy and cryptocurrency investments, whereas the association between subjective investment literacy and cryptocurrency investment was positive. Although there existed a noticeable effect of cryptocurrency investment with investment literacy, and as the investment volume just started to increase rapidly but due to high volatility and it is not so long history making this investment does not seem sensible. Kim et al. (2020) further stated that mostly overconfident investors are the one making cryptocurrency investment as many of the researchers has found a low level of financial literacy and divergence between objective and subjective investment literacy to a noticeable extent. This problem could be solved by consulting financial advice, and this could serve as a complementary source of investors' financial and investment literacy.

#### **2.4. Research Gap**

While going through the present literature about financial literacy and cryptocurrency, even if there are many studies in the literature, as a researcher, I had rarely found any proven evidence of relationship between financial literacy, cryptocurrency awareness, and cryptocurrency ownership. All the specific amount of present literature is based on the assumptions that there exists a positive relationship in between these variables. Steinmetz et al. (2019) explained that financially literate individuals trust and tend to own crypto assets, and they make wise and informed decisions. An example of this could be financially literate individuals owning cryptocurrencies for risk diversification across their investment portfolios. Some of the researchers had also said that although there is a positive relationship, but it is not significant enough, for instance, Zhao, and Zhang (2021), stated that investment literacy is more influential for cryptocurrency investments. At the same time, there also exists literature that tries to prove that there happens to be the negative relationship in between financial literacy and cryptocurrency ownership, for instance, the study by Panos et al. (2020). The researchers find out that more financially literate individuals are less likely to make cryptocurrency investment since they are aware of instability of this market. Surprisingly, there are many crypto asset owners that are financially illiterate, and their sole purpose is to make profits, or they are involved in illegal activities taking advantage of cryptocurrency and their underlying blockchain technology. They can do so as transactions made using blockchain technology are anonymous and no third party like government, or any other regulatory body is involved in the system. In actual, this is not true, as recently it was reported in The New York Times (2022), that Federal Board of Revenue (FBR) hereafter can trace these so-called anonymous transactions. Moreover, only few of the researchers, for instance, Kayacan (2019), had studied Turkey's market regarding financial literacy in combination with money management skills of households, whereas several research have been conducted in other countries like Japan, Indonesia, Malaysia, Spain, Germany, Luxembourg, and few other European countries as well.

Among the few researchers who studied cryptocurrencies in Turkey's context, Nilay (2019), is also one of these. Although he discusses about financial literacy and cryptocurrencies, but he mainly focused on behavioral biases such as ambiguity aversion, overconfidence aversion, experience level and loss aversion. His study being

so similar to our study proves to be a base for this research, as at the end of his study, he suggested another research with a greater number of behavioral biases and more demographic factors. This makes his study different from this thesis, as in this thesis, I intend to focus on financial literacy levels, cryptocurrency awareness average level, and their relationship with each other. Furthermore, I also intend to analyze their relationship with demographic factors separately.

In addition to this, according to my knowledge, none of the studies have studied a combined relationship of financial literacy, cryptocurrency awareness and trends in cryptocurrency ownership, along with the demographic factors in Turkey. Therefore, there exists a literature gap that needs be filled. For this reason, I intend to conduct this research assuming that it will add on to the current knowledge, benefiting public in terms of awareness. It will also benefit policy makers, in terms of giving them a direction or as an alarm, to work regarding the policy that would favor both the economies and public with this discovery of digital world. Hence, in this study, the main aim is to examine financial literacy level, cryptocurrency awareness and cryptocurrency ownership trend in Turkey in the current time in prevailing economic conditions.

### ***2.5. Conceptual Framework of this Study***

The conceptual framework of this study is based on the aims of this research and keeping in mind the research questions mentioned in *Chapter 1*, the following Figure 1 represents the conceptual framework of this study. The very first step is to determine financial literacy level of Turkish people (RQ1). The financial literacy is categorized on four levels, high, moderate, average, and low. The second step is to determine the averages for cryptocurrency awareness of Turkish people (RQ2). The third step is to determine relationship between financial literacy level and demographic factors including: gender, age, education level, marital status, having children, income level and employment status (RQ3). At the fourth step, the aim is to determine whether cryptocurrency awareness differs with respect to financial literacy level or not (RQ4). The fifth step is to determine whether cryptocurrency awareness differs with respect to demographic factors or not (RQ5). The final step was to determine cryptocurrency ownership trends (RQ6).

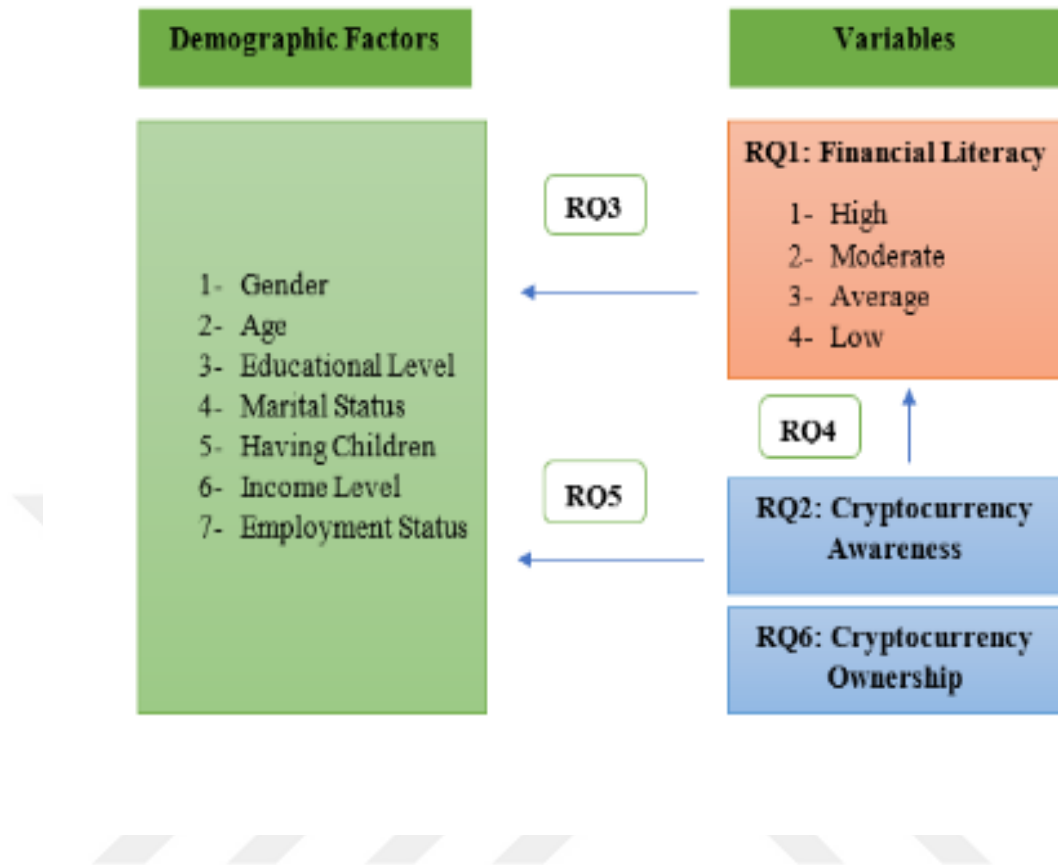


Figure 1. Conceptual Framework of this Study

## 2.6. Hypotheses Development

In this part of the study, 3 main hypotheses are developed. Among these 3 hypotheses, 2 of these are further subdivided into 7 hypotheses each. Figure 2 represents the summarized form of hypotheses development.

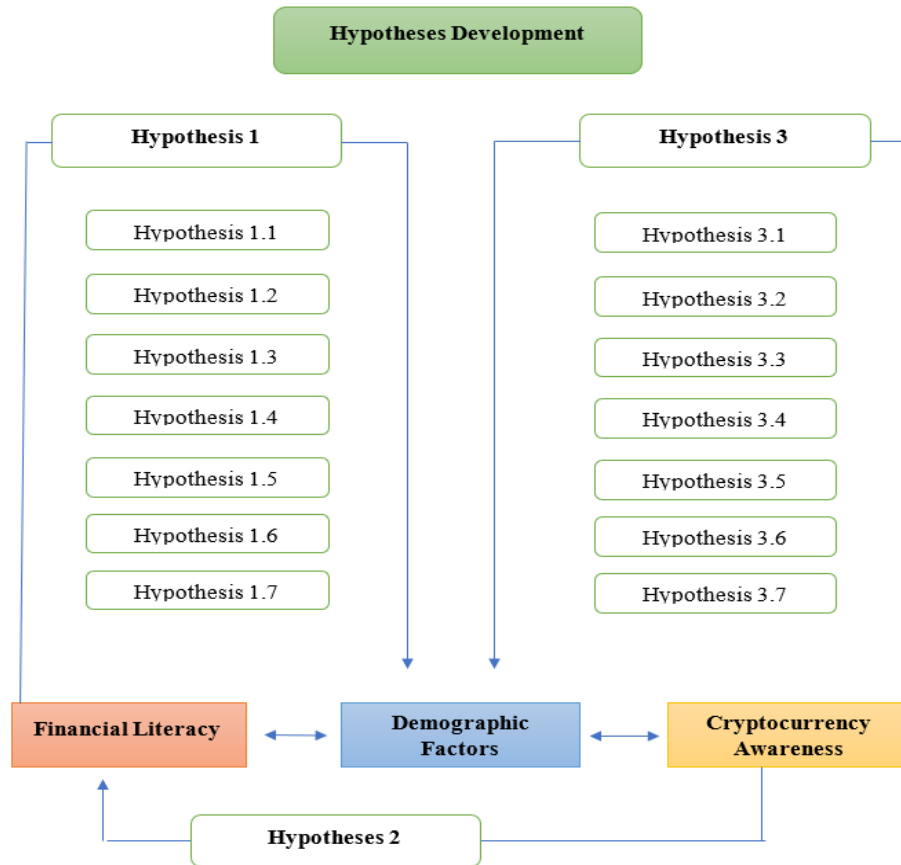


Figure 2. Hypotheses Development of this Study

Based on the research questions mentioned in *Chapter 1*, a set of hypotheses statements are developed and presented as follows:

**H1.** There is a statistically significant relationship between financial literacy level and demographic factors (age, gender, education level, marital status, having children, income level, and employment status) in Turkey.

**H1.1.** There exists a statistically significant relationship between financial literacy level and gender.

**H1.2.** There exists a statistically significant relationship between financial literacy level and age.

**H1.3.** There exists a statistically significant relationship between financial literacy level and education level.

**H1.4.** There exists a statistically significant relationship between financial literacy level and marital status.

**H1.5.** There exists a statistically significant relationship between financial literacy level and having children.

**H1.6.** There exists a statistically significant relationship between financial literacy level and income level.

**H1.7.** There exists a statistically significant relationship between financial literacy level and employment status.

**H2.** Cryptocurrency awareness differs significantly with respect to financial literacy level.

**H3.** Cryptocurrency awareness differs significantly with respect to demographic factors (age, gender, education level, marital status, having children, income level, and employment status).

**H3.1.** Cryptocurrency awareness differs significantly with respect to gender.

**H3.2.** Cryptocurrency awareness differs significantly with respect to age.

**H3.3.** Cryptocurrency awareness differs significantly with respect to education level.

**H3.4.** Cryptocurrency awareness differs significantly with respect to marital status.

**H3.5.** Cryptocurrency awareness differs significantly with respect to having children.

**H3.6.** Cryptocurrency awareness differs significantly with respect to income level.

**H3.7.** Cryptocurrency awareness differs significantly with respect to employment status.

Once this research provides answers to these research questions, it will be helpful to take further steps. It will also help to let us know whether there is a lack of financial literacy or cryptocurrency awareness. In addition to this, this study also aims to find out whether financial literacy has any relationship with demographic factors and then, to figure out whether cryptocurrency awareness differs significantly with respect to

financial literacy and demographic factors or not. Either of the situation would benefit us to find and further research the solution to the existing problems.





## **CHAPTER 3: METHODOLOGY AND DATA COLLECTION**

### ***3.1. Introduction***

*Chapter 1* of this study is about the introduction of the research topic. It briefly explained the topic background, laid emphasis on the importance of the research questions, the aims, and main objectives of this study. Considering the main objectives of this research paper, 6 research questions were formulated to address the aim of the study. *Chapter 2* gives brief information about the literature review related to financial literacy, cryptocurrency awareness and cryptocurrency ownership. Additionally, it also presented some theoretical framework about financial literacy. Moreover, this chapter presented research gap and developed a conceptual framework for this study, represented in Figure 1. As a summary of the literature review, the testable relationships between financial literacy, cryptocurrency awareness, cryptocurrency ownership and several demographic factors like gender, age, education, marital status, children, income, and employment status would be formulated. Besides three main research hypothesis, seven sub-hypotheses are also derived for the two main hypotheses, represented in Figure 2.

### ***3.2. Research Approach***

This current chapter incorporates research procedure and methodology applied in this paper to address the research questions and to assess the hypotheses developed based on these questions. It also discovers the research methodology used to examine the data and talk over the development of research instruments and methods used to check the validity and reliability of the survey tool. This thesis depends on the positivistic approach to conduct this research. Collins, and Hussey (2013), suggested “positivistic approach” to be used where a researcher needs to explain a phenomenon based on scientific data, experiments, examples, and statistics to delve into the facts of the society. This approach aspires to inspect, explore, and assess the phenomenon by giving realistic and persuasive arguments. Denscombe (2008), stated that the elucidation of positivistic approach can help find a rational relationship between variables or factors relevant to phenomenon to relate the findings to a specific theory. Furthermore, Collins, and Hussey (2013), added that this approach supports to the view that people react to norms, rules, and regulations when they encounter phenomena by using rational, causal, and systematic procedures. As the quantitative

research is suitable for the positivist paradigm, hence, this philosophy seems to be the most appropriate one. In this approach, reality is single yet measurable. In such type of research, the main aim of the researchers is to identify the relationship between different variables, using the known data as the comparative method.

It was important to develop the suitable approach for this research paper. Denscombe (2008), mentioned that research can be differentiated based on numerous research methods considering the factors such as, the aim of the research, the procedure, the rationale, and the results. In addition to this, he discussed that the purpose of any research could be derived from four intentions, exploratory, explanatory, descriptive and predictive. Collins, and Hussey (2013), gave some specific explanations that exploratory research is considered when there is not much literature about a certain topic, or a researcher is unable to find scientific data. For this form of research, instead of testing a hypothesis, the researcher would search for models or other ideas to conduct the research. Based upon the ideas of Denscombe (2008), descriptive research is considered when the research problem has real existence, and it can be employed using one of the two techniques either quantitative or qualitative. Teddie, and Teshakkor (2009), moreover, suggested that with respect to the descriptive method, the studies can be further classified as, quantitative, qualitative, or mixed methods. According to Collins, and Hussey (2013), explanatory research is considered when a researcher tries to explain how and why a certain problem existed and intend to evaluate logical relationships of individuals. Whereas predictive research explained by Denscombe (2008), is considered when a researcher aims to foresee the possibility of an issue in particular situations. Furthermore, he supported the idea that as this form of research is akin to quantitative research, so it intends to find quantifiable variables that can be swayed to get quantifiable impact.

On the other hand, another logic-based aspect of the explanatory approach can be that if research is deductive or inductive (Denscombe, 2008). The deductive form of approach refers to quantitative and the researcher assesses; and forms hypothesis based on realistic insight and estimation of deduction. This approach is about moving toward more specific result instead of generalizing those. However, the inductive approach is about moving from specific to generalizing the results. Finally, as far as the outcomes are concerned, research can be divided into two categories, applied and basic research.

Applied research is used when a specific problem is researched about, and the results are applied to a particular problem or scenario. Whereas the aim of the basic research also known as academic research, it is just to add on to the existing knowledge.

Having summarized the basic explanation of all the research methods and approaches, it is crucial to decide the most appropriate approach to reach to the objectives of this research. The purpose of this study made it is obvious that a descriptive approach might be used, as the research problem has real existence and can be researched using descriptive approach for RQ 1 and RQ 2 (Research question 1 and 2). For RQ 3, RQ 4, and RQ 5 (Research question 3, 4 and 5) explanatory research will be used whereas, for RQ 6 (Research question 6) predictive approach will be used. Regarding the process of this research, it might use quantitative approach and the logic used is deductive as it will provide specific solution to the research problems with testing hypotheses. Lastly, this study is considered as applied form of research as the findings of the research will be used to provide information about financial literacy level, cryptocurrency awareness and cryptocurrency ownership. Furthermore, the result of this research will be used by policy makers to move the economy towards the direction that best suits the interest of all people. Later, it might also be used as the basis for further studies by other researchers intending to explore this topic in more detail.

Table 1. Research Approach used in this Study

Process	Purpose	Logic	Outcome
Quantitative	RQ1 and RQ2: Descriptive RQ3, RQ4 and RQ5: Explanatory RQ6: Predictive	Deductive	Applied research

The major purpose of this paper is reached through research objectives mentioned in the *Chapter 1*. These can be achieved using a systematic approach for data collection and analysis via quantitative approach. This approach is chosen as it can envisage the influence of demographic factors on financial literacy level and cryptocurrency awareness. It is also considered as a useful approach to find the relationship between financial literacy level, cryptocurrency awareness, and cryptocurrency ownership. Considering the complex research problems, along with the aims of this study, overall quantitative method is found to be the best used for this study.

### ***3.3. Research Instrument***

This research is intended to explain the behavior of a population sample regarding cryptocurrency awareness and cryptocurrency ownership. It also tries to investigate whether cryptocurrency awareness differs with respect to financial literacy level of the sample. Furthermore, this study aims to provide a basic descriptive statistics of demographics factors that are related to financial literacy level. These factors include all the demographic factors like gender, age, education level, marital status, having children, income level, and employment status. This research is more likely to be quantitative research of exploratory nature describing, explaining, and validating the findings of the previous limited number of research done on this topic. The instrument used to collect quantitative data is questionnaire. Several other studies have used this method to collect their data, for instance the research conducted by Fujiki (2021), on crypto assets ownership, financial literacy, and investment experience; also used data from Radar. It was a web-based survey conducted to check knowledge and usage of latest financial services; cryptocurrency is also one of those.

Reviewing few other studies (Fujiki, 2021; Halaburda et al., 2020) of the same field, assuming survey method to be the best suitable one, for this research, a survey questionnaire was prepared with a set of predesigned questions for meeting the aims of the research. Another research survey conducted by authors (Tetgk, 2019; Sarıgül, 2015) was used as a guidance to edit for more precision of the financial literacy survey questions. The reason for using the question from these surveys was the shortage of time and validity of the data was also kept in mind. Using the questions from the previous surveys with an intention to get more reliable and valid data was the major aim. It was expected that predesigned questions will prove to be exceedingly effective, to provide dataset to report the research question and to test the hypotheses statements. As this questionnaire aims to find financial literacy level of the respondents, assuming the individual to be literate this survey was delivered online via google forms.

### ***3.4. Questionnaire Design***

This survey questionnaire was designed to be filled anonymously by the respondents. The format was developed as per professional appearance with a clear, tidy, and easy to understand design, accompanying precise instructions. A survey introductory note

was also added to inform the respondents and get the responses with their full consent to answer the survey. This note explained the aim of the research and the possible use of the data collected through this. It also ensured the respondents that their data will be kept confidential, and that averages of data will be analyzed instead of individual data. An utmost attention was given while designing the questionnaire, that it must not contain any question that might require personal information of the respondents such as name or exact age etc.

The survey had four sections based on the aim of the research. The first section was about getting the knowledge regarding financial literacy level of the respondents, and it had total 10 questions. This section of the survey was adapted from a previously conducted survey in 2014 by S&P's global Finlet Survey; a mutual work done by Gallup. Inc, Global Financial Literacy excellence center and The World Bank development research group (Klapper et al., 2014). This is one of the largest, most thorough, and global measurement of financial knowledge hence making this survey questions to be the valid and most reliable ones. It tends to examine four generic concepts of financial knowledge like numeracy, inflation, interest, and risk diversification.

#### ***3.4.1. Financial Literacy section***

The ten questions in the first section of my research survey were to examine individuals' understanding of interest, inflation, time value of money, risk, volatility, diversification of portfolio, and investment in bonds, stocks, and mutual funds. These questions had 4 multiple options, only 1 of the 4 options is the correct, an option of "I do not know" was also added, keeping in mind that respondents should give fair answers. This option was kept assuming that some respondents might really do not know the answers, although survey questionnaire was kept simple, understandable, and yet serving the purpose of the research. A couple of true/false questions were also added to this section. Regarding this section, I assume 4 different levels of financial literacy in the following manner based on the number of correct answers given by the respondents. Based on the correct answers, a total score was given to each respondent.

Out of 10 financial literacy questions if a respondent gives 9 or 10 correct answers, he/she will have "*high level of financial literacy*" and will get a score of 4. If a

respondent gives correct answers in the range of 6-8, he/she will have “moderate level of financial literacy” and will get a score of 3. If one gives correct answers in the range of 3-5 that respondent will have “average level of financial literacy” and will get a score of 2. If one gives 1 or 2 correct answers, he/she will have “low level of financial literacy” and will get a score of 1 and 0 correct answer will also be accommodated in this level.

To determine the level of financial literacy for each respondent, creating scores based on the correct answers like mentioned above; seems more appropriate since it would not be so appropriate using the percentage method in this case. This is due to fact that the total number of questions can not be divided according to 25% given to each level, as it will give a value of 2.5 to fit in each level. Hence percentage method does not seem so suitable. Then, however, depending on the scores that each respondent can obtain will be given a percentage.

As these questions are adapted from a well-known and authentic source, hence, there exist no doubts about the reliability of data collected through this part of survey. This section is not specific to a certain context, hence it can be generalized and used to check the financial literacy level of the respondents regardless of the boundaries.

Table 2. Financial Literacy Score Card

Correct answers	Score	Level	Percentages
0, 1, 2	1	Low	11.2 %
3, 4, 5	2	Average	35.7 %
6, 7, 8	3	Moderate	34.9 %
9,10	4	High	18.2%

Note: The percentage figures used in this table are extracted from the descriptive statistics analysis, applied to financial literacy score.

Table 2 represents the financial literacy score card of the respondents, who have answered the financial literacy questions of the survey. Based on the above table, approximately 35% of the total respondents have the average and moderate level of financial literacy, however, 11.2% of them are least financially literate, and 18.2% are

highly financially literate.

### ***3.4.2. Demographic Factors section***

The second section of the survey consists of demographics questions. It includes seven demographics factors of age, gender, marital status, having children, education level, income level, and employment status. This section includes questions with different number of options depending on the demographic being asked. Especially, it is kept in mind that no personal questions are asked, as the respondents might not be comfortable to give personal details. As a result, they might not respond correctly to the other sections of the survey as well. Hence, the option of “prefer not to answer” is given in gender related question and for income related question, instead of asking exact income, income ranges are given as options. The first range is set keeping in mind the updated minimum wage rate in Turkey as of January, 2022. This section has been added to my survey for the reason to check whether financial literacy level of the respondents differs with respect to demographic factors.

Table 3. Demographic Factors used in this Study

Demographics	Options
Age	5
Gender	3
Education level	6
Marital status	2
Children	2
Income	5
Employment status	6

### ***3.4.3. Cryptocurrency Awareness section***

The third section of the questionnaire consist of ten questions adapted from the study of Karaođlan, Arar, and Bilgin (2018). These questions are included to analyze cryptocurrency awareness of the respondents of survey. This part includes questions related to having basic knowledge about the crypto assets, knowing the well-known cryptocurrencies, their market being a bubble, it being financial and technological innovation, about its usage and value, also about whether it is a wise investment, whether risk factor is involved, and lastly about its adoption in workplaces. A very few

of the questions are put in the survey to cross check whether the respondents have carefully read and then answered the questions or not. These questions are designed using mixed methods, as one question is a multiple-choice question, another one has a list of cryptocurrencies for which more than one option could be selected, the remaining eight questions will be answered using Likert scale. This scale ranges from 1-5, 1 being strongly disagree, 2 being disagree, 3 being neutral with mixed opinion, 4 being agree, and finally 5 being strongly agree. The logic behind using five-point Likert scale is that it would help to capture respondents answer to these opinion-based questions, in a measurable way.

Table 4. Five-point Likert Scale used in this Study

Description	Scale
Strongly disagree	1
Disagree	2
Undecided	3
Agree	4
Strongly agree	5

#### ***3.4.4. Cryptocurrency Ownership section***

The last section of the questionnaire is about cryptocurrency ownership. This section includes six questions, that aims to check the intentions of respondents to own cryptocurrency and to know which crypto assets investors have owned or would be interested in owning. Few of the questions are adapted and adjusted from a survey done by Fujiki (2021). This section includes questions with only two options (Yes or No) and questions with a list of cryptocurrencies, for which more than one crypto asset from the list could be selected. For getting accurate answers the option of “Others” is also given, so that respondents might not select any option randomly that might risk the reliability of the data. Moreover, through this section, we will get to know if the respondents ever owned any crypto assets and which of the assets they have owned. It will also give us idea about if the respondents do not own any crypto assets in the current time and the possible reason of not owning these. Hence, the questionnaire is detailed enough to provide all the necessary data to conduct the further analysis for this research. (See Appendix A)



Table 5. Questionnaire with Section and Items

Section	Heading	Questions	Items	Responses	Type
1	Financial literacy	1-10	10	Multiple choice	Knowledge based
2	Demographic factors	11-17	7	Multiple choice	Fact based
3	Cryptocurrency awareness	18-27	10	Polar, Multiple choice and five-point Likert scale	Opinion based
4	Cryptocurrency ownership	28-33	6	Polar and Multiple choice	Fact and opinion based

### 3.5. Sampling

Bernard (2013), explained that sampling is known as the procedure of choosing a sample, of a portion of a population. It may also be known as a subset intending to represent the population. Although the purpose of the research is to check the financial literacy level of the people living in Turkey and to get specific knowledge about the cryptocurrency awareness and cryptocurrency ownership in Turkey, but the results might be generalized to other similar economies like Turkey. This work may also prove to be a base for the similar studies in other countries, whose citizens might have similar characteristics and somewhat live in the similar economic situations.

The hypothetical population for this research consists of individuals having minimum age of 18 years or are considered as work-age individuals. Although an option of age below 18 was given in the questionnaire considering the unusual situation. According to the book published by Robin, and Babbie (2016), the term population can be defined as the group of people whose members also known as respondents of the survey, provide data. Based on these data results, findings and inferences are built. Beal, and Delpachitra (2003), argued that most of the previous studies have been focusing on specific age groups, which might lead to biased selection of the sample and hence, biased collected data resulting in biased results. For this reason, the survey in this study includes all the age group from all the sectors either private or public, regardless of their gender and income levels. The study aims to focus individuals who might be able

to make their financial decisions, or they might be current or potential future users of crypto assets. The link of the survey was shared to around 500 people in total using “*convenience sampling technique*”.

### **3.6. Data Collection**

The main aim of the study is to get some knowledge about the financial literacy level of the respondents, and then to analyze whether cryptocurrency awareness differs with respect to financial literacy level scores as well as the demographic factors of the respondents. The survey was conducted for pilot testing before the actual data collection had started to find out if it lacks any of the essential parts or to check whether it requires some corrections or modifications. Once the pilot testing was done by few of my advisors’ colleagues and my colleagues, a very few minor corrections were made. Two-way pilot testing was used, one with professionals, professors, and experts of the survey from IEU. The other was conducted by the individuals that might be respondents of the survey, but their responses were not included in the data to be analyzed. This step was compulsory to check the validity of the survey. It was then ready to be used for data collection process. The survey was conducted online from 10<sup>th</sup> April- 25<sup>th</sup> April 2022, with a final sample size of 258 respondents.

These were selected through “*convenience sampling method*” keeping in mind the method used by the previous researchers. Convenience sampling method seems to be the best fit for this research, as it provides real-time huge amount of data through which analysis can be made easier. Moreover, it is a fast method to collect data while being less costly. There are many studies which use “convenience sampling method” in the literature. Following the guidelines, similar approach is used and a link to google survey was created and requested people to fill this questionnaire with utmost care. These respondents are requested to forward the questionnaire if possible.

The link to this survey was forwarded to people in the mobile contact list, at campus, outside campus, to offices, colleagues and most importantly to the cafe where seminars related to cryptocurrency were being conducted via online platform. The online survey has various advantages but at the same time it has some disadvantages. Such as individuals lack motivation to fill the survey, as the researcher is not physically there to explain them about ambiguous questions or if the survey is too long. To avoid this

situation, an email id was provided along with the survey link to get back to the researcher, in case of any query related to questionnaire.

Hence, I tried my best to get authentic data without focusing to only one sector, yet I must agree that due to lack of access and shortage of time I was only able to conduct my survey in Izmir. Moreover, the respondents had some difficulty in answering the questionnaire, especially for less financially literate individuals. They found it difficult to understand the questions, as the opening survey questions were based on mathematical calculations. Although these calculations were kept to the basic level but still there were individuals who found it difficult, and they simply refuse to answer the questionnaire. Hence, I assume that the data collected through this survey is actual and real time data as respondents who were not interested to fill the questionnaire already refused to do so. Moreover, it was forwarded to many individuals, using the idea based on “*convenience sampling technique*” but almost half of the people accessed via social media platform did not respond to the survey question, so the actual response was less than the expected response. Because this study is based in Turkey although the language of this research paper is English, the survey was translated to Turkish language using bilingual expertise of Prof. Dr. Gülin Vardar.

## **CHAPTER 4: EMPIRICAL RESULTS AND DISCUSSION**

This chapter is about the results extracted from this study. This study collected data from 258 respondents in Turkey. Although many survey link was forwarded but this study could only get 258 responses which were completely answered. This makes around 50 % of the total links forwarded. The main aim behind this research is to check the financial literacy level and its relationship with cryptocurrency awareness. In addition to this cryptocurrency awareness is examined, whether it has statistically significant difference with demographic factors or not. Moreover, it also examines the trend in cryptocurrency ownership. This research provides essential information for policy makers, governments to make rules that would best suit, better economy interest, and laid basis for further research. Using SPSS, the survey data was analyzed. The discussion on the findings of this survey is based on the sections according to the sequence discussed in *Chapter 3*. This current chapter is about the explanation of data preparing process and extracting the results. The research questions will be addressed along with the analytical techniques. This chapter starts with the second section of the questionnaire about demographics and moved toward discussion of each hypothesis statements in a sequence.

Once the data was collected through the surveys, all the data was cleaned aptly and prepared for the analysis. Before starting to analyze the data, each question of the survey was given a unique title, so that it can be easily understood what the question is about. The next step was to give labels to each question and each option of a question was given a code. These codes range from 1-4 or depending upon the number of options, for multiple choice questions. The questions with yes or no options was given 0 or 1 codes. Likewise, these questions where more than one option could be selected was given 0 or 1 code, 1 for each selected option and 0 for each not selected option. Questions with Likert scale were coded from 1-5. Once the coding was done, the data was prepared in a format suitable to be imported to SPSS to run the analysis.

### ***4.1. Descriptive Statistics***

After the data was collected and recorded in the SPSS, in the first step, frequency and percentages were calculated to analyze the demographics of the respondents. The percentages and frequency distributions of the participants who answered the

questionnaire are provided in the Table 6-12.

The sample size for this survey is 258 and out of these 132 are male respondents, 120 are female respondents whereas, only 6 of the respondents preferred not to mention their gender. Out of 258 respondents, 4 respondents fall below 18 years of age, the majority 169 of the respondents fall in the age range of 18-28 years, 47 of the respondents fall in the age range of 29-38 years, 26 of the respondents fall in the age range of 39-48 years, a very few respondents around 12 belong to age 49 or above. Regarding education only 2 of the respondents have primary/secondary education, 58 of the respondents have high school diploma, 19 of the respondents have associate degree, the majority of 137 respondents have bachelors' degree, a very few 27 of the respondents have master' degree and only 15 of the respondents have doctorate degree. Moving forward, majority of the respondents around 198 are single whereas, only 60 of the respondents are married. Out of the 60 married respondents, 49 of the respondents have children whereas, 209 of the respondents do not have any children. For the income level, majority of the sample population belongs to students thus 105 of the respondents have income less than 4,250 TRY, 37 of the respondents have income in the range of 4,251-6,000 TRY, 34 of the respondents earn in the range of 6,001-8,000 TRY, 23 of the respondents earn in the range of 8,001-10,000 TRY whereas, surprisingly 59 of the respondents earn income above 10,000 TRY. According to the distribution of employment status of the respondents, a huge majority are unemployed, 15 of the respondents are self-employed, 11 of the respondents work in public sector whereas, 99 of the respondents work in private sector, and only 6 of the respondents are retired.

#### ***4.1.1. Gender***

Table 6 and Figure 3 represents the frequency distribution of the respondents with respect to their gender. 51.2% of the respondents were male, 46.5% of them were female and the remaining 2.35% prefer not to mention their gender. The fact that the number of the male and female respondents are so close to each other shows us that the distribution of the respondents with respect to gender is in balance (N=258), (SD=0.545).

Table 6. Frequency Distribution of Gender

Gender	Frequency	Percentage
Male	132	51.2
Female	120	46.5
I prefer not to say	6	2.3
Total	258	100

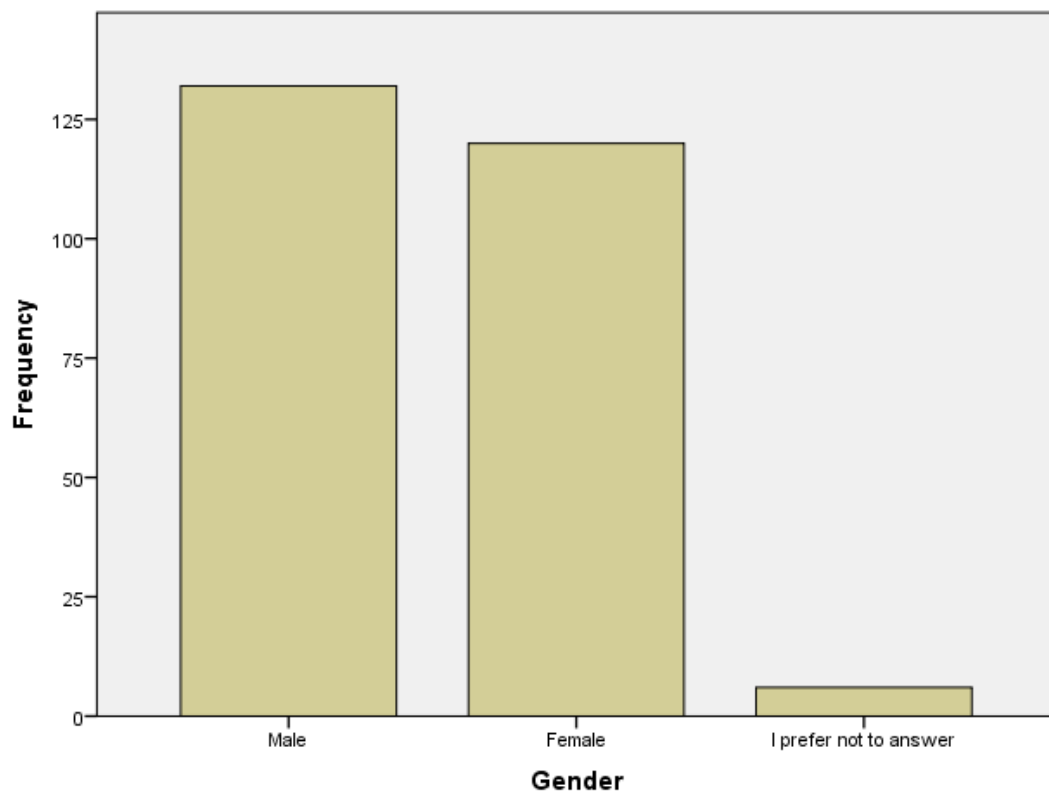


Figure 3. Frequency Distribution Bar Chart (Gender)

#### 4.1.2. Age

Ages of the respondents range from below 18 years to above 49 years. The frequency distribution of the respondents based on age is provided in Table 7 and Figure 4. 1.6% of the respondents were below 18 years, 65.6% of them were within the range of 18-28 years, 18.2% of them were in the range of 29-38 years, 10.1% and 4.7% of the respondents were in the range of 39-48 years and 49 years above, respectively (N=258), (SD=0.874).

Table 7. Frequency Distribution of Age

Age	Frequency	Percentage
Below 18 years	4	1,6
18-28 years	169	65.6
29-38 years	47	18.2
39-48 years	26	10.1
49 and above years	12	4.7
Total	258	100

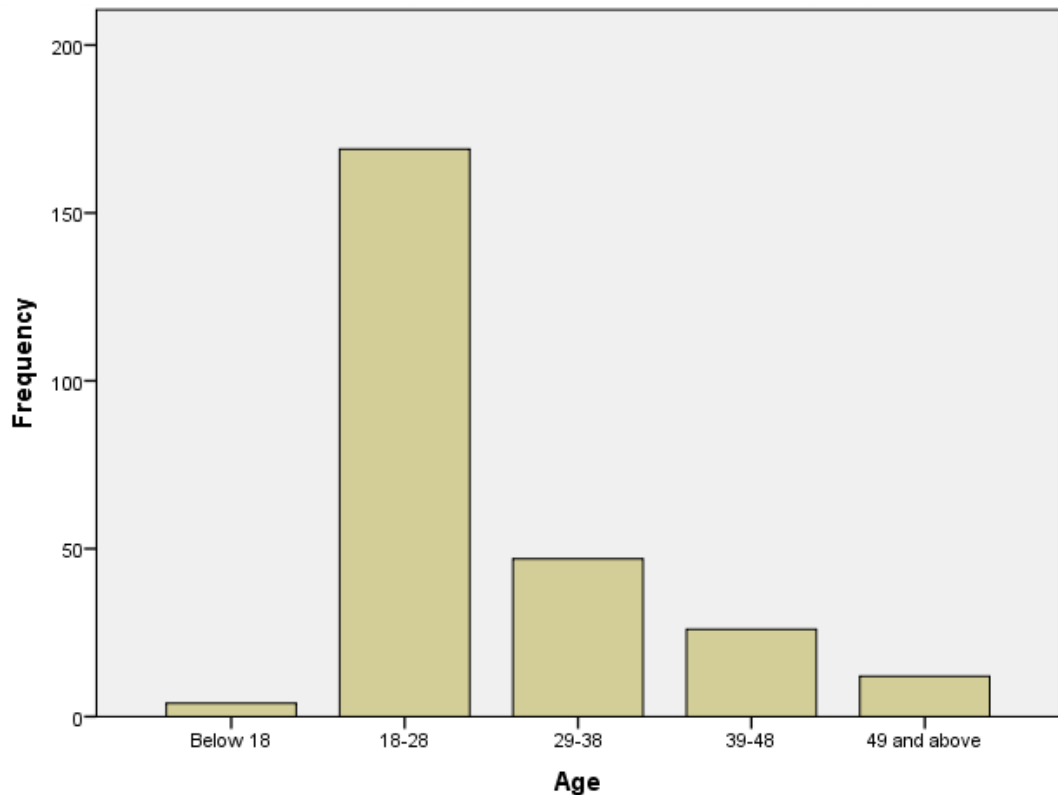


Figure 4. Frequency Distribution Bar Chart (Age)

#### ***4.1.3. Education Level***

As to educational attainment, presented in Table 8 and Figure 5, those who reported having bachelor's degree correspond to the highest portion 53.1% and they were followed by those with high school graduates 22.5%, and master graduates 10.5%. The remaining respondents fall into associate degree, doctorate degree, and primary/secondary school education level. Nearly half of the respondents had the

bachelor's degree (N=258), (SD=1.131).

Table 8. Frequency Distribution of Education Level

Education	Frequency	Percentage
Primary / Secondary education	2	0.8
High school diploma	58	22.5
Associate degree	19	7.4
Bachelors' degree	137	53.1
Masters' degree	27	10.5
Doctorate degree	15	5.8
Total	258	100

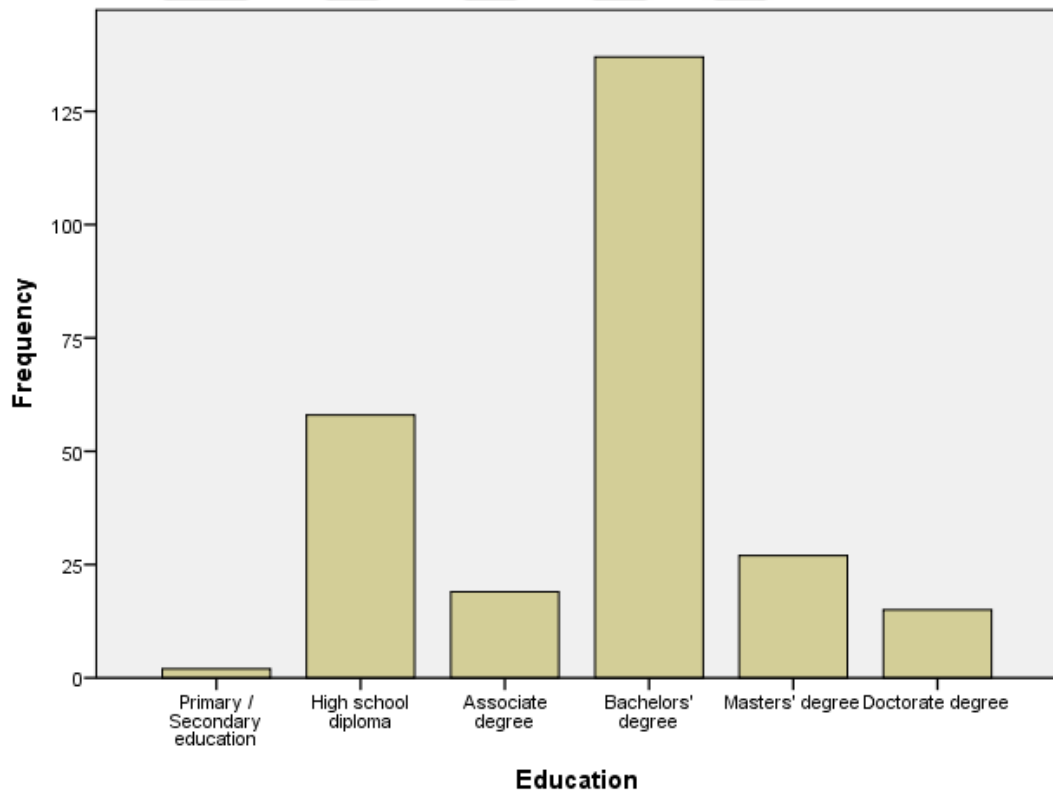


Figure 5. Frequency Distribution Bar Chart (Education Level)



#### 4.1.4. Marital Status

Table 9 and Figure 6, which presents the frequency distribution of the marital status of the respondents, states that 76.6% of them were single, the remaining 23.3% were married (N=258), (SD=0.423).

Table 9. Frequency Distribution of Marital Status

Marital status	Frequency	Percentage
Single	198	76.6
Married	60	23.3
Total	258	100

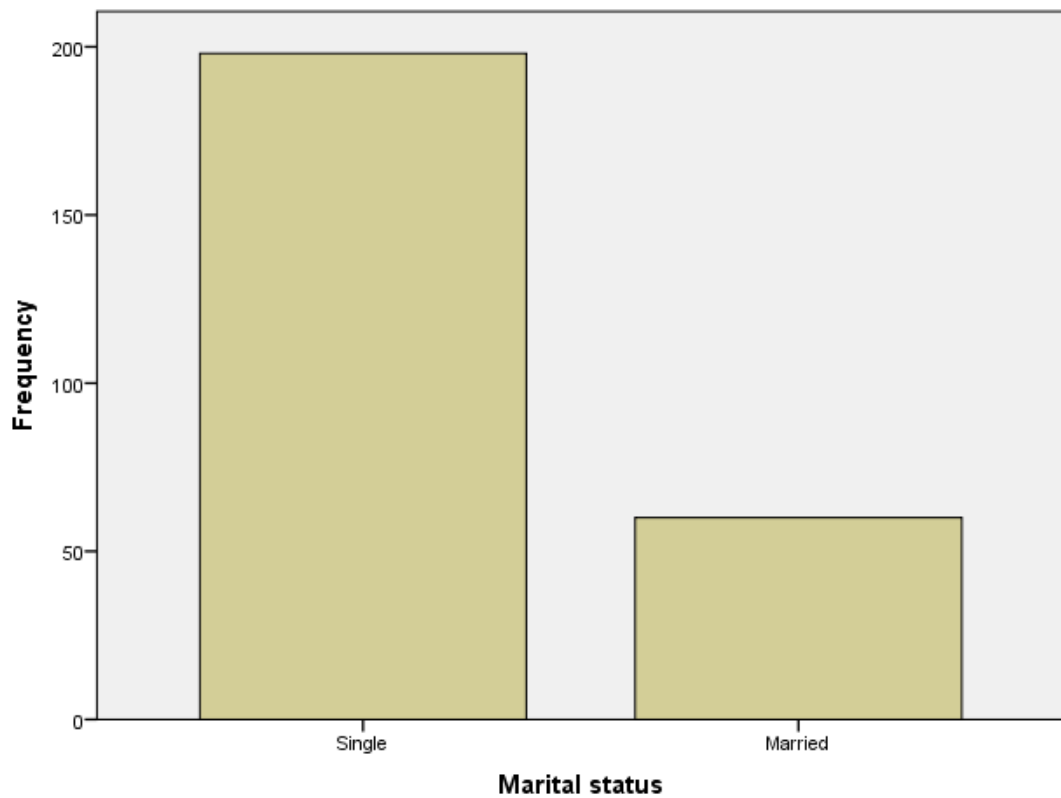


Figure 6. Frequency Distribution Bar Chart (Marital Status)

#### 4.1.5. Having Children

According to the frequency distribution presented in Table 10 and Figure 7, 19% of the respondents have children whereas, 81% of them do not have (N=258), (SD=0.393).

Table 10. Frequency Distribution of having Children

Children	Frequency	Percentage
Yes	49	19
No	209	81
Total	258	100

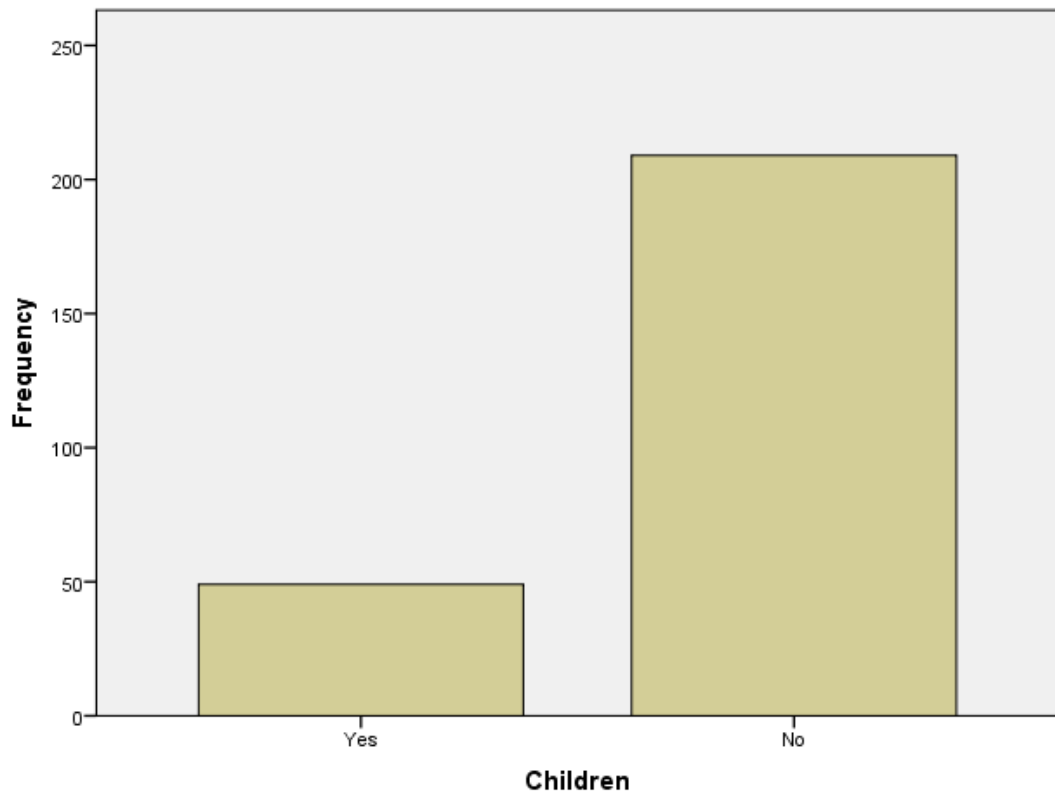


Figure 7. Frequency Distribution Bar Chart (having Children)

#### **4.1.6. Income Level**

According to Table 11 and Figure 8, which provides the information about the frequency distribution of the income levels of the respondents, 40.7% of the respondents had the income level “4,250 TRY and below”, 22.9% were in the income group “above 10,000 TRY”, 14.3% were in the income group “4,251-6,000 TRY”, 13.2 % were falling in the income group “6,001-,8000 TRY” and finally 8.9% of the respondents were in the “8,001-10,000 TRY” income group (N=258), (SD=1.618).

Table 11. Frequency Distribution of Income Level

Income	Frequency	Percentage
Below 4,250 TRY	105	40.7
4,251-6,000 TRY	37	14.3
6,001-8,000 TRY	34	13.2
8,001-10,000 TRY	23	8.9
Above 10,000 TRY	59	22.9
Total	258	100

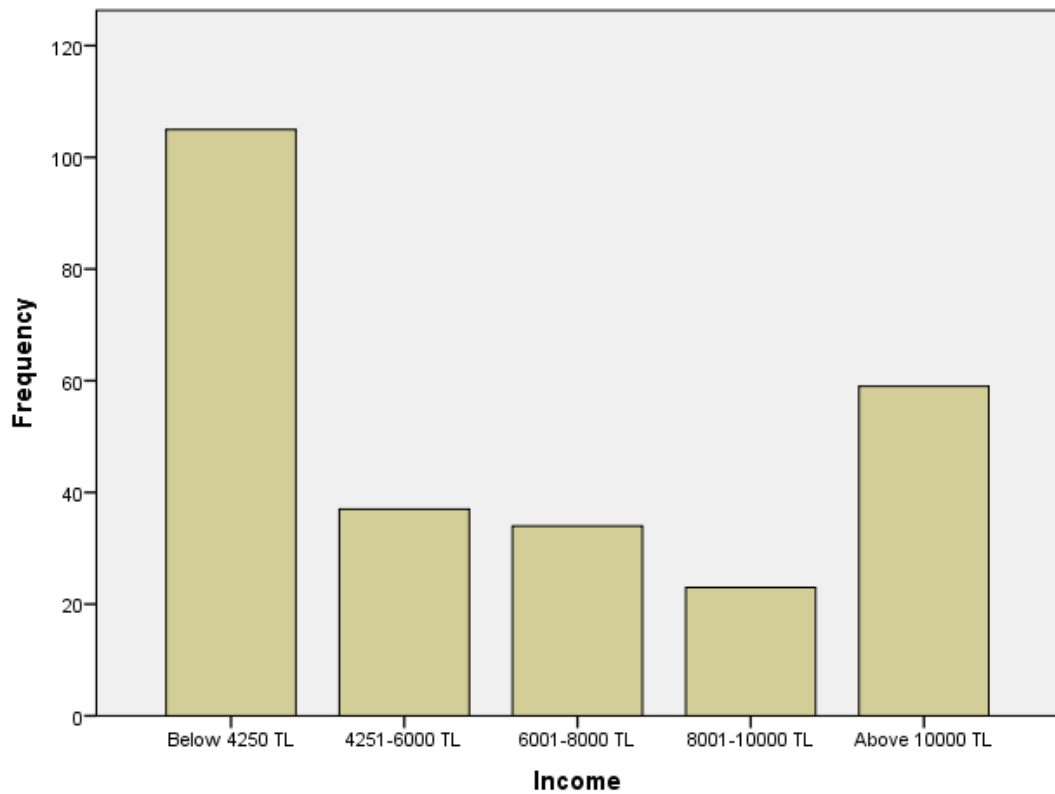


Figure 8. Frequency Distribution Bar Cart (Income Level)

#### 4.1.7. Employment Status

As to employment status in Table 12 and Figure 9, nearly half of the respondents 45.3% were student, 38.4% of them were in the private sector, 5.8% of them had their own businesses. Among the remaining, 4.3% of those who participated in the survey were working in the public sector, 3.9% and 2.3% of those are unemployed and retired, respectively (N=258), (SD=1.910).

Table 12. Frequency Distribution of Employment Status

Employment status	Frequency	Percentage
Student	117	45.3
Unemployed	10	3.9
Self-employed	15	5.8
Public sector	11	4.3
Private sector	99	38.4
Retired	6	2.3
Total	258	100

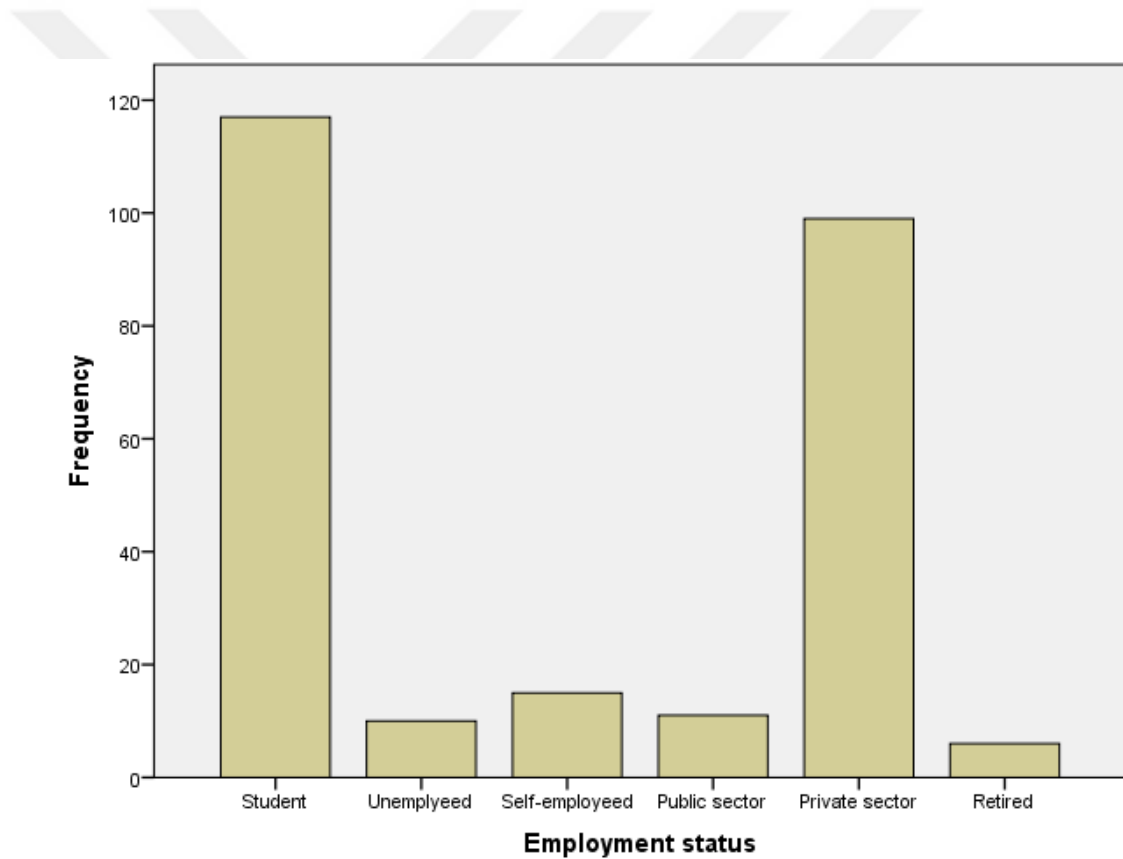


Figure 9. Frequency Distribution Bar Chart (Employment Status)

Given the summary of all the descriptive statistics of the data, almost equal number of male and female participated in the survey. However, majority of the respondents are young adults falling in the age category of 18-28 years. Even if these young adults might not be considered the current user of the crypto assets, but these might prove to be potential future users. Moreover, since there is not any age limit or any other

constraints with respect to age, to own the cryptocurrencies, it is considered that it does not create any problem for the sake of the analysis. Based on education level of the respondents' majority of them holds a bachelors' degree, that might be a clue that these respondents are financially literate depending on their education level. Looking at the marital status, it stands out that there exists a significant difference in the marital status of the respondents. Majority of the respondents are single and might not have a fixed income and the responsibility to earn a living. Hence, even if these might not be the potential users of crypto assets in the current time, since minimum investment requirement is very low for the trade in the cryptocurrency markets, and most of them are able to trade with a small amount of 2.00 (in any local currency), it is thought that it will not be a problem for the validity of the analysis. In the cryptocurrency markets, this is one of the most important things that one does not have to register into a crypto market with his/her age. Likewise, a significant difference exists for having the children or not in the survey. As can be reported, majority of the respondents were single. If well thought and well planned these individuals might prove to be potential user of crypto assets and these can be easily trained on the financial literacy concepts. Apparently, a higher majority of the respondents fall in the first income level "4,250 TRY or below", followed by the income level "above 10,000 TRY". Lastly, students and respondents who are working in the private sectors occupy a large percentage.

#### ***4.2. Methodology***

To assess the relationship between financial literacy level of the respondents and demographic factors, cross-tabulation analysis was employed. Cross-tabulation analysis, also known as contingency table analysis, is one of the most useful techniques to be used to investigate the relationship between categorical-nominal measurement scale – data.

The Chi-square statistics is the key statistic employed to test the statistical significance of the cross-tabulation analysis. Chi-square tests measure whether two variables are independent of each other or not. If the result of the Chi-square statistic, along with the associated probability of chance observation (5% or 0.05), is found to be "not statistically significant", the null hypothesis, which states that there is not any relationship between variables, are accepted. However, if the chi-square statistic is "statistically significant" at 0.05 or 5% significance level, then, the null hypothesis is

rejected, supporting the existence of a relationship between variables.

Then, this study aims to shed light on whether cryptocurrency awareness differs with respect to financial literacy level and demographic factors. After the measurement of the financial level scores of the respondents, it is so crucial to analyze how financial literacy level and demographic (gender, age, education level, marital status, having children, income level, and employment status) make any difference on the cryptocurrency awareness. Therefore, one-way analysis of variance (ANOVA) was employed to detect whether there exist statistically significant differences between the means of different groups in the analysis.

One-way ANOVA test, which compares the means of different groups in the sample, determine whether the means of the groups in the analysis differ significantly from each other. To use this ANOVA test for the analysis, the following assumptions have been met:

- The variables should be normally distributed.
- Homogeneity of variances assumption, which supports that the population variances in each group are equal, should be satisfied.

If p-value is equal to or less than 0.05, then, you find a statistically significant difference between the groups as determined by one-way ANOVA. Even if ANOVA test statistic tells you whether there is a significant difference between the groups, it does not give you any information about which groups differ. In this case, post-hoc tests are conducted to confirm where the differences occur within the groups.

Among several post-hoc tests, Tukey's test is preferred to be employed since our data satisfies the homogeneity of variances assumption.

### ***4.3. Empirical Analysis***

This part of the study is related with the analysis of the relationships between the pair of variables in the study to test the hypotheses developed.

#### ***4.3.1. Descriptive Statistic of Financial Literacy Levels and Demographic Factors***

The first hypothesis to be tested is as follows:

***H1. There is a statistically significant relationship between financial literacy level and demographic factors (age, gender, education level, marital status, having children, income level, and employment status) in Turkey.***

A descriptive statistical analysis, called as “cross-tab tabulation” will be run in the SPSS to check the relationship between financial literacy and demographic factors like gender, age, education level, marital status, having children, income level, and employment status. This analysis is run to check whether financial literacy level changes with the different demographic factors, or not. This first hypothesis is divided into seven sub-hypotheses to check the relationship among the pairs of variables, as in the following.

##### ***4.3.1.1. Cross-tabulation Analysis on Financial Literacy and Gender***

***H1.1. There is a statistically significant relationship between financial literacy level and gender.***

Table 13. Financial Literacy and Gender

Financial literacy score	Gender			Total
	Male	Female	I prefer not to answer	
0,1,2	8	17	4	29
3,4,5	41	50	1	92
6,7,8	54	35	1	90
9,10	29	18	0	47
Total	132	120	6	258

According to the results of the cross-tabulation analysis in Table 13 between financial literacy level and gender, 8 male respondents, 17 female respondents, and 4 I do not prefer to answer respondents, which make a total of 29 respondents who got 1 score for financial literacy. Moreover 41 male respondents, 50 female respondents, and 1 I prefer not to say respondents, which make a total of 92 respondents who got 2 scores

for financial literacy. Likewise, 54 male respondents, 35 female respondents, and 1 I prefer not to answer respondents, which make a total of 90 respondents who got 3 scores for financial literacy. Lastly 9 male respondents, 18 female respondents, and 0 I prefer not to answer respondents, which make a total of 47 respondents who got 4 scores for financial literacy.

In this case scores for financial literacy are given in ascending order meaning 1 is the lowest score and moving up 4 is the highest score. The analysis results of this test revealed that maximum number of respondents got 2 and 3 scores. There exists almost no difference in the number of respondents at each score level. The third highest number of respondents achieved the highest score. The least number of respondents got 1 the least score.

Table 14. Chi-Square Test

	Value	df	Sig.
Pearson Chi-Square	28.932 <sup>a</sup>	6	.000

The Chi-Square test of independence is used to measure whether there exists a relationship between two categorical variables or not. The above Table 14 represents the results from Chi-Square test, which is used to measure relationship between financial literacy level of the respondents and gender. This table also shows whether the results are significant or not. The answer to all these points lies in the value of Pearson Chi-Square. The Pearson correlation is used to measure if there is a linear relationship between variables or not. Pearson developed the correlation and Chi-Square; both measures the relationship between variables. Unlike Chi-Square, the Pearson correlation is used when the variables are quantitative. The relationship is assessed by assessing the p-value using alpha 0.05. Summarizing this test result for gender using Pearson Chi-Square that is .000, which is less than 0.05. this indicates that there is statistically significant relationship between financial literacy level and gender.

Additionally, it can also be stated that there exists a significant relationship between financial literacy level and gender  $X^2 ( 6, N = 258 ) = 28.932, p = .000$ . Therefore,



on this basis the null hypothesis is rejected and the alternative hypothesis H1.1 is accepted.

#### **4.3.1.2. Cross-tabulation Analysis on Financial Literacy and Age**

***H1.2. There is a statistically significant relationship between financial literacy level and age.***

Table 15. Financial Literacy and Age

Financial literacy score	Age (years)					Total
	Below 18	18-28	29-38	39-48	49 and above	
0,1,2	0	21	6	2	0	29
3,4,5	4	70	16	2	0	92
6,7,8	0	52	18	14	6	90
9,10	0	26	7	8	6	47
Total	4	169	47	26	12	258

The above Table 15 represents the result of the cross-tabulation analysis between financial literacy level and age. According to the result of the above table, 21 of the respondents belong to 18-28 years age range, 6 of the respondents belong to 29-38 years age range, and 2 of the respondents belong to 39-48 years age range, which results in a total of 29 respondents who got 1 score for financial literacy. Whereas 4 of the respondents belong to below 18 years of age, 70 of the respondents belong to 18-28 years age range, 16 of the respondents belong to 29-38 years age range, and 2 of the respondents belong to 39-48 years age range, which results in a total of 92 respondents who got 2 score for financial literacy. Likewise, 52 of the respondents belong to 18-28 years age range, 18 of the respondents belong to 29-38 years age range, 14 of the respondents belong to 39-48 years age range, and 6 of the respondents belong to 49 years and above age, which result in a total of 90 respondents who got 3 score for financial literacy. Lastly, 26 of the respondents belong to 18-28 years age range, 7 of the respondents belong to 29-38 years age range, 8 of the respondents belong to 39-48 years age range, and 6 of the respondents belong to 49 years and above age, which result in a total of 47 respondents who got 4 score for financial literacy.

Table 16. Chi-Square Test

	Value	Df	Sig.
Pearson Chi-Square	35.131 <sup>a</sup>	12	.000

The above Table 16 represents the Chi-Square test results for age. The p-value of .000 which is less than 0.05, reveals that there exists a statistically significant relationship between financial literacy level and age.

Additionally, it can also be stated that there exists a statistically significant relationship between financial literacy level and age  $X^2 (12, N = 258) = 35.131, p = .000$ . Therefore, on this basis the null hypothesis is rejected and the alternative hypothesis H1.2 is accepted.

#### 4.3.1.3. Cross-tabulation Analysis on Financial Literacy and Education Level

**H1.3. There is a statistically significant relationship between financial literacy level and education level.**

Table 17. Financial Literacy and Education Level

Financial literacy score	Education level						Total
	Primary / Secondary education	High school diploma	Associate degree	Bachelors' degree	Masters' degree	Doctorate degree	
0,1,2	0	9	2	15	2	1	29
3,4,5	2	24	9	48	6	3	92
6,7,8	0	17	5	52	13	3	90
9,10	0	8	3	22	6	8	47
Total	2	58	19	137	27	15	258

Table 17 presents the results of the cross-tabulation analysis between financial literacy level and education level. According to the result of the above table, 9 of the respondents have high school diploma, 2 of the respondents have associate degree, 15 of the respondents have bachelors' degree, 2 of the respondents have masters' degree

and 1 of the respondents have doctorate degree, which result in a total of 29 respondents got 1 score for financial literacy. Moreover, 2 of the respondents have primary education, 24 of the respondents have high school diploma, 9 of the respondents have associate degree, 48 of the respondents have bachelors' degree, 6 of the respondents have masters' degree, and 3 of the respondents have doctorate degree, which result in a total of 92 respondents got 2 score for financial literacy. Likewise, 17 of the respondents have high school diploma, 5 of the respondents have associate degree, 52 of the respondents have bachelors' degree, 13 of the respondents have masters' degree and 3 of the respondents have doctorate degree, which result in a total of 90 respondents got 3 score for financial literacy. Lastly, 8 of the respondents have high school diploma, 3 of the respondents have associate degree, 22 of the respondents have bachelors' degree, 6 of the respondents have masters' degree and 8 of the respondents have doctorate degree, which result in a total of 47 respondents got 4 score for financial literacy.

Table 18. Chi-Square Test

	Value	Df	Sig.
Pearson Chi-Square	23.908 <sup>a</sup>	15	.067

The above Table 18 represents the Chi-Square test results for education level. The p-value of 0.067 which is greater than 0.05, confirms that there is not found any statistically significant relationship between financial literacy and education level.

Additionally, it can be stated that there exists a statistically significant relationship between financial literacy level and education level  $X^2 (15, N = 258) 23.908, p = .067$ . Therefore, on this basis the null hypothesis is accepted and the alternative hypothesis H1.3 is rejected.

#### ***4.3.1.4. Cross-tabulation Analysis on Financial Literacy and Marital Status***

***H1.4. There is a statistically significant relationship between financial literacy level and marital status.***

Table 19. Financial Literacy and Marital Status

Financial literacy score	Marital status		Total
	Single	Married	
0,1,2	24	5	29
3,4,5	80	12	92
6,7,8	65	25	90
9,10	29	18	47
Total	198	60	258

Table 19 presents the results of the cross-tabulation analysis between financial literacy level and marital status. According to the result of the above table, 24 of the respondents are single, and 5 of the respondents are married, which make a total of 29 respondents who got 1 score for financial literacy. Moreover, 80 of the respondents are single, and 12 of the respondents are married, which make a total of 92 respondents who got 2 score for financial literacy. Likewise, 65 of the respondents are single, and 25 of the respondents are married, which make a total of 90 respondents who got 3 score for financial literacy. Finally, 29 of the respondents are single, and 18 of the respondents are married, which make a total of 47 respondents who got 4 score for financial literacy.

Table 20. Chi-Square Test

	Value	Df	Sig.
Pearson Chi-Square	12.953 <sup>a</sup>	3	.005

The above Table 20 represents the Chi-Square test results for marital status. The p-value of .005 which is less than 0.05, supports the existence of statistically significant relationship between financial literacy level and marital status.

Additionally, it can also be stated that there exists a statistically significant relationship between financial literacy level and marital status  $X^2 (3, N = 258) = 12.953, p = .005$ . Therefore, on this basis the null hypothesis is rejected and the alternative hypothesis H1.4 is accepted.

#### 4.3.1.5. Cross-tabulation Analysis on Financial Literacy and having Children

*H1.5. There is a statistically significant relationship between financial literacy level and having children.*

Table 21. Financial Literacy and having Children

Financial literacy score	Having Children		Total
	Yes	No	
0,1,2	5	24	29
3,4,5	10	82	92
6,7,8	20	70	90
9,10	14	33	47
Total	49	209	258

Table 21 presents the results of the cross-tabulation analysis between financial literacy level and children. According to the result of the above table, 5 of the respondents have children, and 24 of the respondents have no children, which make a total of 29 respondents who got 1 score for financial literacy. Moreover, 10 of the respondents have children, and 82 of the respondents have no children, which make a total of 92 respondents who got 2 score for financial literacy. Likewise, 20 of the respondents have children, and 70 of the respondents have no children, which make a total of 90 respondents who got 3 score for financial literacy. Finally, 14 of the respondents have children, and 33 of the respondents have no children, which make a total of 47 respondents who got 4 score for financial literacy.

Table 22. Chi-Square Test

	Value	Df	Sig.
Pearson Chi-Square	8.173 <sup>a</sup>	3	.043

The above Table 22 represents the Chi-Square test results for having children. The p-value of .043 which is less than 0.05, supports the existence of a statistically significant relationship between financial literacy level and having children.

Furthermore, it can also be stated that there exists a significant relationship between financial literacy level and having children  $\chi^2 (3, N = 258) = 8.173, p = .043$ . Therefore, on this basis the null hypothesis is rejected and the alternative hypothesis H1.5 is accepted.

**4.3.1.6. Cross-tabulation Analysis on Financial Literacy and Income Level**

**H1.6. There is a statistically significant relationship between financial literacy level and income level.**

Table 23. Financial Literacy and Income Level

Financial literacy score	Income level (TRY)					Total
	Below 4250	4251-6000	6001-8000	8001-10,000	Above 10,000	
0,1,2	12	2	4	7	4	29
3,4,5	51	13	9	5	14	92
6,7,8	28	17	15	8	22	90
9,10	14	5	6	3	19	47
Total	105	37	34	23	59	258

Table 23 presents the results of the cross-tabulation analysis between financial literacy level and income level. According to the result of the above table, 12 of the respondents have income below 4250 TRY, 2 of the respondents have income ranging in 4251-6000 TRY, 4 of the respondents have income ranging in 6001-8000 TRY, 7 of the respondents have income ranging in 8001-10,000 TRY, and 4 of the respondents have income above 10,000 TRY, which make a total of 29 respondent who got 1 score for financial literacy. Moreover, 51 of the respondents have income below 4250 TRY, 13 of the respondents have income ranging in 4251-6000 TRY, 9 of the respondents have income ranging in 6001-8000 TRY, 5 of the respondents have income ranging in 8001-10,000 TRY, and 14 of the respondents having income above 10,000 TRY. Which make a total of 92 respondents who got 2 score for financial literacy. Likewise, 28 of the respondents have income below 4250 TRY, 17 of the respondents have income ranging in 4251-6000 TRY, 15 of the respondents have income in ranging in 6001-8000 TRY, 8 of the respondents have income ranging in 8001-10,000 TRY, and 22 of

the respondents have income above 10,000 TRY, which make a total of 90 respondents who got 3 score for financial literacy respondents. Finally. 14 of the respondents have income below 4250 TRY, 5 of the respondents have income ranging in 4251-6000 TRY, 6 of the respondents have income ranging in 6001-8000 TRY, 3 of the respondents have income ranging in 8001-10,000 TRY, and 19 of the respondents have income above 10,000 TRY, which make a total of 47 respondents who got 4 score for financial literacy.

Table 24. Chi-Square Test

	Value	df	Sig.
Pearson Chi-Square	31.800 <sup>a</sup>	12	.001

The above Table 24 represents the Chi-Square test results for income level. The p-value of .001 which is less than 0.05, support the existence of statistically significant relationship between financial literacy level and income level.

Additionally, it can also be stated that there exists a significant relationship between financial literacy level and income level  $X^2 ( 12, N = 258 ) = 31.800, p = .001$ . Therefore, on this basis the null hypothesis is rejected and the alternative hypothesis H1.6 is accepted.

#### ***4.3.1.7. Cross-tabulation Analysis on Financial Literacy and Employment Status***

***H1.7. There is a statistically significant relationship between financial literacy level and employment status.***

Table 25. Financial Literacy and Employment Status

Financial literacy score	Employment status						Total
	Student	Unemployed	Self-employed	Public sector	Private sector	Retired	
0,1,2	12	3	2	1	11	0	29
3,4,5	59	2	1	1	29	0	92
6,7,8	34	1	8	6	38	3	90

Table 25 (continued). Financial Literacy and Employment Status

9.10	12	4	4	3	21	3	47
Total	117	104	15	11	99	6	258

Table 25 presents the results of the cross-tabulation analysis between financial literacy level and employment status. According to the result of the above table, 12 of the respondents are student, 3 of the respondents are unemployed, 2 of the respondents are self-employed, 1 of the respondents work in public sector, and 11 of the respondents work in private sector, which make a total of 29 respondents who got 1 score for financial literacy. Whereas 59 of the respondents are student, 2 of the respondents are unemployed, 1 of the respondents is self-employed, 1 of the respondents work in public sector, and 29 of the respondents work in private sector, which make a total of 92 respondents who got 2 score for financial literacy. Likewise, 34 of the respondents are student, 1 of the respondents is unemployed, 8 of the respondents are self-employed, 6 of the respondents work in public sector, 38 of the respondents work in private sector, and 3 of the respondents are retired, which make a total of 90 respondents who got 3 score for financial literacy. Finally, 12 of the respondents are student, 4 of the respondents are unemployed, 4 of the respondents are self-employed, 3 of the respondents work in public sector, 21 of the respondents work in private sector, and 3 of the respondents are retired, which make a total of 47 respondents who got 4 score for financial literacy.

Table 26. Chi-Square Test

	Value	df	Sig.
Pearson Chi-Square	38.741 <sup>a</sup>	15	.001

The above Table 26 represents the Chi-Square test results of employment status. The p-value of .001 which is less than 0.05, supports the existence of a statistically significant relationship between financial literacy level and employment status.



Additionally, it can also be stated that there exists a significant relationship between financial literacy level and employment status  $X^2 ( 15, N = 258 ) = 38.741, p = .001$ . Therefore, on this basis the null hypothesis is rejected and the alternative hypothesis H1.7 is accepted.

#### ***4.3.2. ANOVA test between Financial Literacy Levels and Cryptocurrency Awareness***

Hypothesis 2 predicts that cryptocurrency awareness differs with respect to financial literacy level. To test this hypothesis, one-way ANOVA test between subjects is conducted to compare the effects of financial literacy level on cryptocurrency awareness.

#### ***H2. Cryptocurrency awareness differs significantly with respect to financial literacy level.***

ANOVA test stand for analyzing the variance and it is not indifferent to the independent samples t-test, as it is used to compare unrelated or independent groups. The difference lies in that t-test can only compare two groups and for comparing more than 2 groups ANOVA test is used. There is no limit to the number of groups that can be tested by using ANOVA test. Moreover, it is used to see if there exist a significant difference between these groups. These groups can also be called as levels. To employ one-way ANOVA test, some requirements should be met. One of the variables should be an independent variable; in this case, that is financial literacy scores, and it has four groups or levels, which have been mentioned above in detail. The independent variable is also known as factor. Whereas, the other variable should be dependent, in this case, that is cryptocurrency awareness average. There are two types of ANOVA test, one-way ANOVA test is to be used in this study as we have one independent variable. The other is two-way ANOVA test that might have been used if we had two independent variables.

The one-way ANOVA test used in this case will answer, whether the financial literacy level of the respondents have an impact on cryptocurrency awareness or not. The result of the analysis will also make clear if financial literacy levels make a difference. This test assumes that random individuals get scores that belong to these four groups. These individuals have an equal chance of getting any score, referring to any of these group.

Before using any of the test from post-Hoc test, it should be checked whether there is homogeneity of variance across the different groups, as each group will be compared to other groups. Hence, this assumption of the ANOVA test must be met. The result of this test are as follows:

Table 27. ANOVA Statistics for Financial Level on Cryptocurrency Awareness

Crypto Awareness average					
	Sum of squares	df	Mean Square	F	Sig.
Between groups	2.737	3	.912	3.939	.009
Within groups	58.818	254	.232		
Total	61.554	257			

ANOVA test result for H2, presented in Table 27, reveals that there are statistically significant differences between groups of “financial literacy level” at 5% significance level as p-value is 0.009, which is less than 0.05. The significance value, which is less than 0.05, means that the null hypothesis is rejected. It can also be explained as the effect of financial literacy level makes a significant difference on cryptocurrency awareness  $F(3,254)=3.939$ ,  $p=0.009$ . Based on this finding, the alternative hypothesis is accepted, stating that cryptocurrency awareness differs with respect to financial literacy levels, thereby, hypothesis 2 is accepted.

Table 28. Mean

1 score	2 score	3 score	4 score
3.2414	3.3927	3.5333	3.5585

Furthermore, from the descriptive in Table 28, the mean values for “financial literacy level” groups are analyzed. It displays that the least financial literacy score, which is 1, have the lowest mean value, and the highest financial literacy score, which is 4, have the highest mean value among all the four groups. It can be explained as that, cryptocurrency awareness is lowest at the lowest score of financial literacy. Likewise, cryptocurrency awareness is high at the highest score of financial literacy. It is obvious

that there are significant differences across the groups. Additionally, for further analysis post-Hoc test, will be used to check significant differences across each possible combination of groups. There are several choices in post-Hoc test based on whether there is equal variance assumed or equal variance is not assumed.

Table 29. Test of Homogeneity of Variance

Crypto awareness average			
Levene Statistics	df1	df2	Sig.
.566	3	254	.638

From the above Table 29 the result of Levene's test of homogeneity of variance, indicate that a significance value 0.638, that is greater than 0.05, means that the assumption of homogeneity of variance is not violated. Therefore, it will not be wrong to say that it met the condition for ANOVA test, that is, variances are not significantly different from each other.

After ANOVA tells us that there exist significant differences among the groups, the next step is to do post-Hoc tests to confirm which specific groups differ. Since the data meets the assumption of the homogeneity of variances, Tukey's honestly significant difference (HSD) post-Hoc test was conducted.

Table 30. Multiple Comparison table

Test		p-value (sig.)	Significant?
1 score	2 score	.453	No
1 score	3 score	.025	Yes (3>1)
1 score	4 score	.029	Yes (4 >1)
12 score	3 score	.201	No
2 score	4 score	.221	No
3 score	4 score	.991	No

The above Table 30 shows the results of Tukey Post-Hoc test. These findings demonstrated that there is not any significant difference between score group 1 and 2, as the significant value is of .453. There seems to have significant differences between score group 1 and 3, as the significant value is of .025. Similarly, it seems significant

difference between score group 1 and 4, as the significant value is of .029. However, it is found to have not any significant difference between score group 2 and 3 score group, as the significant value is of .201. Likewise, that there is no significance difference between score group 2 and 4, as the significant value is of .221. Lastly, there is no significant difference observed in between 3 and 4 score groups, as the significant value is of .991.

Referring to the mean table, the lowest mean value was for score 1 and the highest mean value was for score 4. These findings can be interpreted as 4 score for financial literacy would contribute to higher cryptocurrency awareness. Similarly, 3 score for financial literacy would also contribute to cryptocurrency awareness but less than 4 score of financial literacy. To conclude this section, high financial literacy levels lead to higher cryptocurrency awareness.

#### ***4.3.3. ANOVA test between Cryptocurrency Awareness and Demographic Factors***

Hypothesis 3 aims to test the effect of demographic factors on cryptocurrency awareness. There are seven sub-hypotheses to be tested. To compare the impact of demographic factors on cryptocurrency awareness, one-way ANOVA test was conducted.

Hypothesis 3 is as follows.

#### ***H3. Cryptocurrency awareness differs significantly with respect to demographic factors.***

The basic methodological details related to ANOVA test, which are explained in the previous section, stands for analyzing the variance and it is used to compare unrelated or independent groups. One-way ANOVA test, used to analyze the significant difference between cryptocurrency awareness and demographic factors like gender, age, education level, marital status, having children, income level, and employment status, aims to reveal the comparison among different groups. Based on hypothesis 3, seven sub hypotheses are developed to check the significant difference of cryptocurrency awareness with each demographic factor.

**4.3.3.1. ANOVA test between Cryptocurrency Awareness and Gender**

**H3.1. Cryptocurrency awareness differs significantly with respect to gender.**

Since gender is independent variable and cryptocurrency awareness is the dependent variable, the one-way ANOVA test used in this case will answer, whether gender has a significant impact on cryptocurrency awareness or not. This test will make it obvious if gender makes a significant difference. This test assumes that random individuals belong to these three “gender” groups. These individuals had an equal chance of being in any of these group. Before using any of the post-Hoc test, homogeneity of variance across the different groups must be checked, as each group will be compared to other groups. Hence, this assumption of the ANNOVA test must be met.

The result of this test are as follows:

Table 31. ANOVA Statistics for Gender on Cryptocurrency Awareness

Crypto Awareness average					
	Sum of squares	df	Mean Square	F	Sig.
Between groups	.394	2	.197	.822	.441
Within groups	61.160	255	.240		
Total	61.554	257			

The result of ANOVA test provided in Table 31, reveals that overall, there are no statistically significant differences between groups of “gender” as the significance value between groups is 0.441, that is greater than 0.05. The significance value greater than 0.05 means the null hypothesis is accepted. It can also be explained as the gender does not have a statistically significant impact on cryptocurrency awareness.  $F(2,255)=0.822, p =0.441$ . Based on this, the alternative hypothesis is rejected, that is, cryptocurrency awareness differs with respect to gender.

Table 32. Mean

Male	Female	I prefer not to answer
3.4820	3.4354	3.2500

Further from the descriptive Table 32, the mean value for “gender” groups is analyzed. It reveals that the “gender” group “I prefer not to answer” have the least mean and the “gender” group “Male” have the highest mean among all three groups. As can be seen above, it is so obvious from the p-value that there are no statistically significant differences across the groups, therefore, there is no need to do further post-Hoc tests.

Table 33. Test of Homogeneity of Variance

Crypto awareness average			
Levene Statistics	df1	df2	Sig.
2.750	2	255	.0666

The above Table 33 result of Levene’s test of homogeneity of variance, indicate that a significance value 0.066 that is greater than 0.05, which means that the assumption of homogeneity of variance is not violated. Therefore, it will not be wrong to say, that it met the condition for ANOVA test, that is, variances are not significantly different from each other.

**4.3.3.2. ANOVA test between Cryptocurrency Awareness and Age**

***H3.2. Cryptocurrency awareness differs significantly with respect to age.***

For running the ANOVA test, to compare the effect of age, as the second demographic factor, on the cryptocurrency awareness, age is included into the analysis as the independent variable, whereas cryptocurrency awareness is the dependent variable. This test will analyze whether age has a significant impact on cryptocurrency awareness. This test will also make it obvious if age make a difference. This test assumes that random individuals belong to these five “age” groups. These individuals had an equal chance of being in any of these group. Before using any of the post-Hoc test, homogeneity of variance across the different groups must be checked, as each group will be compared to other groups. Thereby, this assumption of the one-way ANOVA test must be met. The result of this test is as follows:

Table 34. ANOVA Statistics for Age on Cryptocurrency Awareness

Crypto Awareness average					
	Sum of squares	df	Mean Square	F	Sig.
Between groups	1.622	4	.406	1.712	.148
Within groups	59.932	253	.237		
Total	61.554	257			

The result of ANOVA test, presented in the Table 34, reveals that overall, there are not any statistically significant differences between groups of “age”, since the significance value between groups is 0.148, that is greater than 0.05. The significance value which is greater than 0.05 means the null hypothesis is accepted. It can also be concluded that the age does not have any statistically significant impact on cryptocurrency awareness.  $F(4,253)=1.712$ ,  $p =0.148$ . Based on this finding the alternative hypothesis, that is cryptocurrency awareness differs with respect to age, is rejected.

Table 35. Mean

Below 18	18-28	29-38	39-48	49 and above
2.9063	3.4734	3.4309	3.5240	3.3229

Further from the above descriptive Table 35 the mean values for “age” groups are analyzed. It reveals that the “below 18” age group have the lowest mean value and the “39-48” age group have the highest mean value among all the five groups. As can be seen, obviously there are not statistically significant differences across the groups. Thereby, no further post-Hoc tests were conducted.

Table 36. Test of Homogeneity of Variance

Crypto awareness average			
Levene Statistics	df1	df2	Sig.
.860	4	253	.489

The result of Levene's Test of Homogeneity of Variance in Table 36 reports a significance value of 0.489, which is greater than 0.05. This test result validates that the assumption of homogeneity of variance is not violated. Hence, it can be suggested that it met the condition for ANOVA test, that is equal variance was assumed.

#### 4.3.3.3. ANOVA test between Cryptocurrency Awareness and Education level

### H3.3. Cryptocurrency awareness differs significantly with respect to education level.

As the other sub-hypothesis to be tested, the impact of education level on the cryptocurrency awareness is analyzed by employing one-way ANOVA test. Hereby, the independent variable is “education level”, and the dependent variable is again cryptocurrency awareness. To check whether education makes any significant difference on the cryptocurrency awareness, this one-way ANOVA test assumes that random individuals belong to these six “education level” groups. These individuals had an equal chance of being in any of these group. Before using any of the Post-Hoc, Levene’s Test of Homogeneity of Variance across the different groups must be checked, as each group will be compared to other groups. Hence this assumption of the ANOVA test must be met. The result of this test is as follows:

Table 37. ANOVA Statistics for Education level on Cryptocurrency Awareness

Crypto Awareness average					
	Sum of squares	df	Mean Square	F	Sig.
Between groups	2.198	5	.440	1.866	.101
Within groups	59.357	252	.236		
Total	61.554	257			

Based on the finding of one-way ANOVA test in Table 37, there is found to have no statistically significant differences between groups of “education, level” as the significance value between groups is 0.101, that is greater than 0.05. The significance value which is greater than 0.05 means that the null hypothesis is accepted. Moreover,



it can also be interpreted that education level has no significant impact on cryptocurrency awareness.  $F(5,252)=1.866, p =0.101$ . Overall, the alternative hypothesis that is cryptocurrency awareness differs with respect to education level, is rejected.

Table 38. Mean

Primary/Secondary education	High school diploma	Associate degree	Bachelors' degree	Masters' degree	Doctorate degree
3.4375	3.4310	3.1513	3.5036	3.5000	3.4083

Further from the descriptive Table 38 the mean values for “education level” groups are analyzed. It reveals that the “Associate degree” group have the lowest mean value and “Bachelors’ degree” group have the highest mean value among all the six groups. As can be seen, obviously there are no statistically significant differences across the groups. Thereby, no further post-Hoc tests were conducted.

Table 39. Test of Homogeneity of Variance

Crypto awareness average			
Levene Statistics	df1	df2	Sig.
1.577	5	252	.167

The result of Levene's Test of Homogeneity of Variance in Table 39 reports a significance value 0.167 that is greater than 0.05. this means that the assumption of homogeneity of variance is not violated. Thereby, it will not be wrong to say, that it met the condition for ANOVA test, that is, variances are not significantly different from each other.

#### **4.3.3.4. ANOVA test between Cryptocurrency Awareness and Marital Status**

##### ***H3.4. Cryptocurrency awareness differs significantly with respect to marital status.***

As the fourth sub-hypothesis to be tested, the impact of marital status on the cryptocurrency awareness is analyzed by employing one-way ANOVA test. Hereby, the independent variable is “marital status”, and the dependent variable is again cryptocurrency awareness. To check whether marital status makes any significant

difference on the cryptocurrency awareness, this one-way ANOVA test assumes that random individuals belong to these two, “marital status” groups. These individuals had an equal chance of being in any of these group. Before using any of the post-Hoc test, homogeneity of variance across the different groups must be checked, as each group will be compared to other groups. As a result, this assumption of the ANOVA test must be met. The result of this test is as follows:

Table 40. ANOVA Statistics for Marital status on Cryptocurrency Awareness

Crypto Awareness average					
	Sum of squares	df	Mean Square	F	Sig.
Between groups	.236	1	.236	.985	.322
Within groups	61.318	256	.240		
Total	61.554	257			

The result of ANOVA test statistics in the Table 40 reveals that overall, there are no statistically significant differences between groups of “marital status” as the significance value between groups is 0.322, that is greater than 0.05. The significance value which is greater than 0.05 means the null hypothesis is accepted. It can also be explained as that the marital status has no significant impact on cryptocurrency awareness.  $F(1,256) = .985, p = 0.322$ . Based on this finding, the alternative hypothesis that is cryptocurrency awareness differs with respect to marital status, is rejected.

Table 41. Mean

Single	Married
3.4716	3.4000

Further from the descriptive Table 41 the mean values for “marital status” groups are analyzed. It reveals that the “married” group have the lowest mean value and “single” group have the highest mean value among all the six groups. As can be seen, obviously that there are no statistically significant differences across the groups, Therefore, no further post-Hoc tests were conducted.

Table 42. Test of Homogeneity of Variance

Crypto awareness average			
Levene Statistics	df1	df2	Sig.
.233	1	256	.630

The result of Levene's Test of Homogeneity of Variance in Table 42 reports a significance value 0.630 that is greater than 0.05. Implying that the assumption of homogeneity of variance is not violated. Hence, it will be true, that it met the condition for ANOVA test, that is equal variance was assumed.

#### **4.3.3.5. ANOVA test between Cryptocurrency Awareness and having Children**

##### ***H3.5. Cryptocurrency awareness differs significantly with respect to having children.***

As the fifth sub-hypothesis to be tested, the impact of having children on the cryptocurrency awareness is analyzed by employing one-way ANOVA test. Hereby, the independent variable is “having children”, and the dependent variable is again cryptocurrency awareness. To check whether having children makes any significant difference on the cryptocurrency awareness, this one-way ANOVA test assumes that random individuals belong to these two “having children” groups. These individuals had an equal chance of being in any of these group. Before using any of the post-Hoc, test homogeneity of variance across the different groups must be checked, as each group will be compared to other groups. Hence, this assumption of the ANOVA test must be met. The result of this test is as follows:

Table 43. ANOVA Statistics for having Children on Cryptocurrency Awareness

Crypto Awareness average					
	Sum of squares	df	Mean Square	F	Sig.
Between groups	.387	1	.387	1.618	.205
Within groups	61.168	256	.239		

Table 43 (continued). ANOVA Statistics for having Children on Cryptocurrency Awareness

Total	61.554	257			
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The result of one-way ANOVA test in the Table 43 indicates that overall, there are no statistically significant differences between groups of “having children”, as the significance value between groups is 0.205, that is greater than 0.05. The significance value which is greater than 0.05 suggests that the null hypothesis is accepted. Likewise, it can also be explained that having children has no significant impact on cryptocurrency awareness.  $F(1,256) = 1.618, p = 0.205$ . Based on this finding, the alternative hypothesis, that is cryptocurrency awareness differs with respect to having children, is rejected.

Table 44. Mean

Have children	Have no children
3.3750	3.4737

Further from the descriptive Table 44 the mean values for “having children” groups are analyzed. It reveals that the “having children” group have the lowest mean value and “having no children” group have the highest mean value among all the six groups. As can be seen, obviously that there are no statistically significant differences across the groups, Therefore, no further post-Hoc tests were conducted.

Table 45. Test of Homogeneity of Variance

Crypto awareness average			
Levene Statistics	df1	df2	Sig.
.297	1	256	.586

The result of Levene's Test of Homogeneity of Variance in Table 45 reported a significance value 0.586 that is greater than 0.05. Implying that the assumption of homogeneity of variance is not violated. Hence, it will be true, that it met the condition for ANOVA test, that is equal variance was assumed.

#### 4.3.3.6. ANOVA test between Cryptocurrency Awareness and Income Level

#### H3.6. Cryptocurrency awareness differs significantly with respect to income level.

Table 46. ANOVA Statistics for Income level on Cryptocurrency Awareness

Crypto Awareness average					
	Sum of squares	df	Mean Square	F	Sig.
Between groups	.325	4	.081	.336	.854
Within groups	61.229	253	.242		
Total	61.554	257			

As shown in Table 46 the result of one-way ANOVA test reveals that overall, there are no statistically significant differences between groups of “income level” as the significance value between groups is 0.854, that is greater than 0.05. The significance value greater than 0.05 means the null hypothesis is accepted. It can also be inferred that the income level has no significant impact on cryptocurrency awareness.  $F(4,253) = .336, p = 0.854$ . Based on this finding, the alternative hypothesis, that is cryptocurrency awareness differs with respect to income level, is rejected.

Table 47. Mean

Below 4250 TL	4251-6000 TL	6001-8000 TL	8001-10000 TL	Above 10000 TL
3.4476	3.4054	3.4706	3.4706	3.5085

Further from the descriptive Table 4.7 the mean values for “income level” groups are analyzed. It reveals that the “4251-6000 TRY” group have the lowest mean value and “above 10000 TRY” group have the highest mean value among all the 5 groups. To conclude, since there exist no statistically significant differences across groups, no further post-Hoc tests were conducted.

Table 48. Test of Homogeneity of Variance

Crypto awareness average			
Levene Statistics	df1	df2	Sig.
1.300	4	253	.270

The result of Levene's Test of Homogeneity of Variance in Table 48 reported a significance value 0.270 that is greater than 0.05. This validates that the assumption of homogeneity of variance is not violated. Hence, it will be true, that it met the condition for ANOVA test, that is equal variance was assumed.

#### ***4.3.3.7. ANOVA test between Cryptocurrency Awareness and Employment Status***

##### ***H3.7. Cryptocurrency awareness differs significantly with respect to employment status.***

As the last sub-hypothesis to be tested, the impact of employment status on the cryptocurrency awareness is analyzed by employing one-way ANOVA test. Hereby, the independent variable is “employment status”, and the dependent variable is again cryptocurrency awareness. To check whether employment status makes any significant difference on the cryptocurrency awareness, this one-way ANOVA test assumes that random individuals belong to these six income groups. These individuals had an equal chance of being in any of these group. Before using any of the post-Hoc test, homogeneity of variance across the different groups must be checked, as each group will be compared to other groups. Therefore, this assumption of the ANOVA test must be met. The result of this test are as follows

Table 49. ANOVA Statistics for Employment status on Cryptocurrency Awareness

Crypto Awareness average					
	Sum of squares	df	Mean Square	F	Sig.
Between groups	.287	5	.057	.236	.946
Within groups	61.268	252	.243		

Table 49 (continued). ANOVA Statistics for Employment status on Cryptocurrency Awareness

Total	61.554	257			
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As shown in Table 49 the result of one-way ANOVA test reveals that overall, there are no statistically significant differences between groups of “employment status” as the significance value between groups is 0.946, that is greater than 0.05. The significance value greater than 0.05 means the null hypothesis is accepted. It can also be inferred that the income has no significant impact on cryptocurrency awareness.  $F(5,252) = .236, p = 0.946$ . Based on this finding, the alternative hypothesis, that is cryptocurrency awareness differs with respect to employment status, is rejected.

Table 50. Mean

Student	Unemployed	Self-employed	Public sector	Private sector	Retired
3.4444	3.4000	3.5333	3.5455	3.4571	3.3542

Further from the descriptive Table 50 the mean values for “employment status” groups are analyzed. It reveals that the “retired” group have the lowest mean value and “public sector” group have the highest mean value among all the six groups. To conclude, since there exist no statistically significant differences across groups, no further post-Hoc tests were conducted.

Table 51. Test of Homogeneity of Variance

Crypto awareness average			
Levene Statistics	df1	df2	Sig.
1.576	5	252	.167

The result of Levene's Test of Homogeneity of Variance in Table 51 reported a significance value 0.167 that is greater than 0.05. This validates that the assumption of homogeneity of variance is not violated. Hence, it will be true, that it met the condition for ANOVA test, that is equal variance was assumed.

#### 4.4. Cryptocurrency Ownership

The last section of the study aims to provide descriptive statistics about cryptocurrency ownership in Turkey. This information is crucial to get insights from the collected data. The descriptive statistics of these scenarios gives some idea about the trend for cryptocurrency ownership, whether the trend is decreasing or increasing. Moreover, it can also benefit policy makers, potential investors, and cryptocurrency brokerage firms to forecast cryptocurrency ownership structure in the upcoming years. Getting some idea about the trend in cryptocurrency market will lead to do more future research about the other factors that might contribute toward cryptocurrency ownership.

As can be seen in Table 52, (46.1%) of the respondents owned crypto assets in past, and (53.9%) of them never owned crypto assets in past (N=258), (SD=0.499).

Table 52. Frequency Distribution of Past Owned Crypto Assets

	Frequency	Percent
Yes	119	46.1
No	139	53.9
Total	258	100

Table 53 reports the situation of the current crypto asset ownership. Based on this table below, 36% of the respondents own the crypto assets in the current time, whereas 64% of them do not hold any crypto assets in their portfolios. (N=258), (SD=0.481).

Table 53. Frequency Distribution of Current Crypto Assets Ownership

	Frequency	Percent
Yes	93	36.0
No	165	64.0
Total	258	100

According to Table 54, considering the fact, the statistics about the investors who intend to own crypto assets in the future, even if 57% of the respondents intend to own crypto assets in future, 43% of them do not intend to own these assets. (N=258), (SD=0.496). It is striking to infer that the number of these two groups are so similar to



each other.

Table 54. Frequency Distribution of Future Crypto Assets Ownership

	Frequency	Percent
Yes	147	57.0
No	111	43.0
Total	258	100

Summarizing, all the descriptive statistics there is an overall increasing trend in the ownership of the cryptocurrencies. In the past, the percentage of the respondents who did not own cryptocurrencies (53.9%) is a bit higher than the one of the respondents who own (46.1%). As can be seen, the difference between these responses is not so significant. At the time of the survey being conducted, 64% of the respondents do not own cryptocurrencies, that is again more than the 36% respondents who own cryptocurrencies. These two statistics confirms the decreasing trend till the time of survey being conducted, which implies that some of the owners have sold their cryptocurrencies. Interestingly, having a significant difference within these two is so surprising. According to the inferences about the future intentions for the cryptocurrency ownership, an increasing trend is observed. Although 43% of the respondents do not intend to own cryptocurrencies, 57% of them intend to own. There seems not to have a significant difference between them.

## CHAPTER 5: CONCLUSION

Recent technological innovations have changed the way of human endeavors and interactions. Agarwal et al. (2015) stated, assuming that money related matters are critical to individual behaviors concerning financial matters and wealth maximization, individuals have enhanced their financial knowledge. In line with the above statement, first, this research investigates financial literacy levels of Turkish people and the relationship between financial literacy levels and demographic factors such as (gender, age, education level, marital status, having children, income level, and employment status). In addition to this, this research aims to find out whether cryptocurrency awareness differs with respect to financial literacy levels and demographic factors mentioned previously, in Turkey. Lastly, it also intends to explore the trend of cryptocurrency ownership in different time spans. It also finds out that respondents know about which of the cryptocurrencies from the list mentioned in the questionnaire.

This chapter presents a summary of all the findings estimated in this research. First, the results of financial literacy levels of Turkish people are presented. Next to this, the discussion is directed towards the relationship between financial literacy levels and demographic factors, considering how the demographic factors are related to financial literacy level of the people living in Turkey. Secondly, this chapter continues to discuss whether the level of financial literacy makes any difference in the awareness of the respondents in the cryptocurrency market. Moreover, how cryptocurrency awareness is affected by the demographic factors mentioned. Finally, this chapter also concludes with implications and limitations of this study.

### *5.1. Concluding Remarks and Contributions of this Study*

This research aims to find answer to the following research questions: The first question to be answered is “what is the level of financial literacy in Turkey?”. This first objective was addressed with 10 questions from the first section of the survey, explained in detail in chapter 3. Surprisingly, the result unveiled that only 18% of the respondents had high level of financial literacy, followed by 35% having average and moderate level of financial literacy. However, 11% of the respondents had lowest level of financial literacy. This finding is inconsistent to the findings of studies in other countries. For example, the finding of this research is inconsistent to the study by Saber

(2020), who found out that 41% of the respondents had high level of financial literacy. Additionally, it is also inconsistent with the several studies done in US. For instance, Atkinson, and Messy (2012), found out that most of the respondents had a very low level of financial literacy. Similarly, Annamaria, and Olivia (2007), also found the same result as Atkinson, and Messy (2012), whereas this study finds only 11% of the respondents to have lowest level of financial literacy. This study is complementary to the study by Saber (2020), as he also used financial literacy questions in his questionnaire. To conclude, it can be inferred from this research that the level of financial literacy in Turkey is low as compared to other countries. Moreover, PISA conducted a financial literacy survey, comparing 72 countries, Turkey was ranked 50<sup>th</sup> back in the year 2015. Aydin (2018), in his study stated that, as financial literacy in Turkey is very low, therefore, it is necessary to increase level of financial literacy, as it is crucial to the success of economy and better functioning of capital markets. Whereas regarding financial literacy level in Turkey, if compared to previous years it has increased to 70 %, according to the Foder (2021) report. The results of this study are consistent with Foder (2011) report, as only 11% of the respondents had low financial literacy.

The second objective was to find an answer to the following question: Is there any relationship between financial literacy and demographic factors? The results indicate a statistically significant relationship between financial literacy levels and all the demographic factors (gender, age, education level, marital status, having children, income level, and employment status) mentioned in this study, except education factor. The result of the hypothesis H1.3, represented in the Table 55, was highly unexpected as in usual cases a great emphasis is laid on teaching the basic concepts of financial literacy at the high school level, assuming it a necessary part of an individuals' financial planning. This result is complementing to the results of the study by Fujiki (2021), as he found the link of financial literacy with investment experience in traditional risky assets. Adding to this, he also stated that the link might not be certainly casual, as he suggests that individual who lacks investment experience with risky assets might get benefit from educational investment programs. This also might be an indication that instead of education, investment experience relates to financial literacy when it comes to making investment decisions. Therefore, it can be concluded that the level of financial literacy is not related to educational level of the people. Apart from

this, all other demographics are considered as significant predictors of financial literacy.

Table 55. Results of First Hypothesis

Hypothesis 1	Hypothesis statements	Results (sig.)	Decision
H1.1	There exists a statistically significant relationship between financial literacy level and gender.	P=0.000	Accepted
H1.2	There exists a statistically significant relationship between financial literacy level and age.	P=0.000	Accepted
H1.3	There exists a statistically significant relationship between financial literacy level and education level.	P=0.067	Rejected
H1.4	There exists a statistically significant relationship between financial literacy level and marital status.	P=0.005	Accepted
H1.5	There exists a statistically significant relationship between financial literacy level and having children.	P=0.043	Accepted
H1.6	There exists a statistically significant relationship between financial literacy level and income level.	P=0.001	Accepted
H1.7	There exists a statistically significant relationship between financial literacy and employment status.	P=0.001	Accepted

Note: Decision is based on the rule that alternative hypothesis will be accepted, and null hypothesis will be rejected if  $\text{sig.} \leq 0.005$ , and alternative hypothesis will be rejected and null hypothesis will be accepted if  $\text{sig.} \geq 0.005$ .

The aim of the third objective to be answered is as follows: Is there any significant difference in cryptocurrency awareness with respect to financial literacy? The results suggest that cryptocurrency awareness is found to differ with respect to financial

literacy levels. The financial literacy level creates a significant difference on the awareness of cryptocurrency users. The results of this hypothesis are complementary to the study by Panos, Karkkainen, and Atkinson (2020), as they said that, it is more likely that financially literate individuals tend to be more aware of the crypto assets. In addition to this, they also said that as financially literate individuals are more likely to be aware of crypto assets, hence they tend not to invest in crypto assets. This result of Panos et al. (2020) is contradictory to the study by Fujiki (2021), and (2020), who said the most of crypto asset owners, tends to have high level of financial literacy and prefer to use cashless payment methods. Hence, his study contributes that cryptocurrency awareness differs with respect to financial literacy and being more aware individuals do not own crypto assets. Financial literacy is found to be a strong determinant of cryptocurrency awareness in Turkey. This result is represented in the Table 56 below.

Table 56. Results of Second Hypothesis

Hypothesis 2	Hypothesis statements	Results (sig.)	Decision
H2	Cryptocurrency awareness differs significantly with respect to financial literacy level.	P=0.009	Accepted

Note: Decision is based on the rule that alternative hypothesis will be accepted, and null hypothesis will be rejected if  $\text{sig.} \leq 0.005$ , and alternative hypothesis will be rejected and null hypothesis will be accepted if  $\text{sig.} \geq 0.005$

The fourth objective to be answered is the following: Is there any statistically significant difference in cryptocurrency awareness with respect to demographic factors? To address this question, Table 57 shows the result of the third hypothesis. Continuing the analyses, this hypothesis focused on whether cryptocurrency awareness differs with respect to demographic factors or not. Surprisingly, the result reveals that cryptocurrency awareness does not differ with respect to any of the demographic factors, meaning that there does not seem to have any statistically significant difference in the cryptocurrency awareness regarding demographic factors. Although cryptocurrency awareness differs with respect to financial literacy, and financial literacy have a statistically significant relationship with all demographic

factors except education, even then any difference could not be found in cryptocurrency awareness with respect to demographic factors. To my knowledge, this finding of the study that crypto awareness doesn't differ with respect to demographic factors have never been analyzed and reported by any previous studies.

Table 57. Results of Third Hypothesis

Hypothesis 3	Hypothesis statements	Results (sig.)	Decision
H3.1	Cryptocurrency awareness differs significantly with respect to gender.	P=0.441	Rejected
H3.2	Cryptocurrency awareness differs significantly with respect to age.	P=0.148	Rejected
H3.3	Cryptocurrency awareness differs significantly with respect to education level.	P=0.101	Rejected
H3.4	Cryptocurrency awareness differs significantly with respect to marital status.	P=0.322	Rejected
H3.5	Cryptocurrency awareness differs significantly with respect to having children.	P=0.205	Rejected
H3.6	Cryptocurrency awareness differs significantly with respect to income level.	P=0.854	Rejected
H3.7	Cryptocurrency awareness differs significantly with respect to employment status.	P=0.946	Rejected

Note: Decision is based on the rule that alternative hypothesis will be accepted, and null hypothesis will be rejected if  $\text{sig.} \leq 0.005$ , and alternative hypothesis will be rejected and null hypothesis will be accepted if  $\text{sig.} \geq 0.005$

The fifth and final objective was to find answer to the following question: what is the trend of cryptocurrency ownership? To address this question, the results of the descriptive of cryptocurrency ownership section of the questionnaire reveal, an increasing trend in cryptocurrency ownership through different time span. Although, at first, a sharp decreasing trend was observed as the individuals who owned crypto

assets in past said that they do not own any crypto assets at the time of survey being conducted. Later, they also showed their interest to own crypto assets in future, thereby referring to the increasing trend of cryptocurrency ownership.

According to the result of the frequency distribution of listed cryptocurrencies in the questionnaire in Table 58, the results reveal that (95.7%) of the respondents know Bitcoin, followed by Ethereum (74%), Bitcoin Cash (49.9%), Litecoin (45.3%), Ripple (43%), Stellar (30.6%), and Cardano (28.7%), respectively. Interestingly, the finding of frequency distribution of the cryptocurrency ownerships shows a totally different picture. Although these are well known cryptocurrencies, as per their market capitalization, as said by Karaoglan et al. (2018) yet most of the respondents owned other than the listed cryptocurrencies. Following the same trend, among the listed cryptocurrencies Bitcoin is mostly owned crypto asset. At last, the result of the frequency distribution of future intention to own cryptocurrencies indicated a decreasing intention to own other than listed cryptocurrencies. Only (10%) of the respondents intend to own other than the listed crypto assets, while (41.5%) of the respondents tends to own Bitcoin, and (34.5%) of the respondents tends to own Ethereum, the others in the list follow these top demanded crypto assets.

Table 58. Frequency distribution of listed cryptocurrencies

Crypto currencies	Respondents know	Respondents don't know
Bitcoin	95.7%	4.3%
Ethereum	74%	26%
Ripple	43%	57%
Bitcon cash	39.9%	59.1%
Cardano	28.7%	71.3%
Litecoin	45.3%	54.7%%
Stellar	30.6%	69.4%

## 5.2. Implications of this Study

Summing up the findings this study adds on to the current literature, by revealing that financial literacy level is not related to education, even though it is found to be related

to all other demographic factors. Moreover, cryptocurrency awareness differs with respect to financial literacy level, however, it does not differ with respect to demographic factors. It provides comprehensive implications for future researchers, policymakers, and other financial institutes and experts in Turkey. As financial literacy is found not to have any relationship with education, hence, authorities in the education department must give attention to the education system and must introduce some teaching projects related to financial concepts. As cryptocurrency awareness is found to have significant difference with respect to financial literacy, thus, these projects must also adjust to the rapidly changing environment and update the curriculum according to the innovations of financial products. Lastly, these projects must not be only restricted to the extent of adding to the curriculum, but also should be aimed to educate public. As this study shows an increasing intention to own cryptocurrencies, so government and financial experts could formulate demand and supply policies accordingly. Government could also use this information for making strategies that will help economic growth and this could be possible by enhanced financial literacy and efforts of Turkey's capable public.

### ***5.3. Limitations and Future Research***

Due to the shortage of time, resources and access to the public being a foreigner student, the limitation of this research is that the data sample is majorly consisting of respondents from Izmir. Hence, a broader study could be done to generalize the result to the Turkish population. This study can prove to be initial basis for future researchers. Also, I was unable to analyze the relationship between cryptocurrency awareness and cryptocurrency ownership as a very basic questions related to cryptocurrency ownership was included, keeping in mind the length of the questionnaire. This section only included questions whether if respondents had owned, or own, or intend to own cryptocurrencies. If yes, then which one from the list they had owned, own, or intend to own. Future researchers can focus on this section more specifically to check the relationship between cryptocurrency awareness and cryptocurrency ownership. Future researcher could also add more influencing variables in addition to financial literacy level and cryptocurrency awareness. Although there exists a significant difference between financial literacy level and cryptocurrency awareness, depending on the survey data it is still undetermined if there exists any causal relationship between these



two. Future researchers can focus on finding any causal relationships by performing experiments. Another limitation of this study is that the questionnaire was a bit long as it consisted of four sections, hence individuals did not complete the questionnaire resulting in incomplete data. Moreover, it also included a very few basic mathematical problems to measure financial literacy level, because of lack of financial knowledge, individuals refused to respond to the survey.

Concluding this study, these findings are essential to the economic activity of Turkey as it is suffering because of prevailing economic conditions. Although several studies have compared financial literacy level with several other variables like household wealth, investment in traditional assets and so on, yet there is scarcity of the existing literature about this topic. This literature had tried to fill the gap with adding knowledge regarding financial literacy level, cryptocurrency awareness level, and cryptocurrency ownership trends in Turkey.

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## APPENDICES

### *Appendix A- Sample Survey Form*

Dear Participant,

This research is an academic study for a master's thesis that examines the relationship between financial literacy, cryptocurrency awareness and ownership. Cumulative answers from the sample are important, not individual answers. Therefore, you do not need to specify your identity information. All your answers will be kept confidential for data privacy. It takes an average of 10 minutes to complete this survey and your participation is completely voluntary. Thank you in advance for your participation.

Regards,

Aqsa Afzal

Izmir University of Economics

Prof. Dr. Gülin Vardar

Izmir University of Economics

### **SECTION 1: Financial Literacy**

*NOTE: Please read the following questions carefully and tick the option you think is correct. Unless otherwise stated, only one option should be ticked in each question.*

**Question 1:** Suppose you have 100 TL in your savings account and the interest rate is 2% per annum. In this case, if you leave the money in your account, what will be the amount of money in your account after 5 years?

More than 102 TL       102 TL       Less than 102 TL       I do not know

**Question 2:** Suppose the interest rate applied to your savings account is 1% per annum and the inflation rate is 2% per annum. One year from now, how will the number of products and services you can buy with the money in your account compared to today?

More than today       Exactly the same

Less than today,       I don't know

**Question 3:** Let's say a friend inherited 10.000 TL today, and his brother inherited 10.000 TL 3 years later. Which is richer because of this legacy?

- Friend     Brother     Both are same     I do not know

**Question 4:** If a person buys the stock of company B in the stock market.

- It owns a portion of firm B.                       It gives a loan to firm B.

- It becomes liable for the debts of firm B.     I do not know

**Question 5:** Which of the following is true?

- If a person invests in a mutual fund, they cannot withdraw their money in the first year.

- Mutual funds can invest in a variety of assets, for example they can invest in both stocks and bonds.

- Mutual funds provide a guaranteed return based on their past performance.

- I do not know

**Question 6:** If a person buys the bond of firm B.

- It becomes a part of company B.

- It gives a loan to firm B.

- It becomes liable for the debts of firm B.

- I do not know

**Question 7:** Which of the following assets will generally have higher volatility over time than the others?

- Savings deposit     Bond                       Stock                       I do not know

**Question 8:** Risk of losing money when an investor invests money in various assets.

Increases       Decreases       stays the same       I do not know

**Question 9:** If you buy a 10-year bond and sell it after 5 years, will you pay a serious penalty?

True       False       I do not know

**Question 10:** Stocks are normally riskier than bonds.

True       False       I do not know

**SECTION 2: Demographic Information**

**Question 1:** What is your gender?

Female       Male       I prefer not to answer

**Question 2:** How old are you?

Under 18 years old       18-28       29-38

39-48       49 and above

**Question 3:** What is the school you graduated from or the highest degree you have ever received?

Primary/Secondary education

High school diploma (or equivalent)

Associate degree

Bachelors' degree

Masters'

PhD

**Question 4:** What is your marital status?

- Single       Married

**Question 5:** Do you have any children?

- Yes       No

**Question 6:** What is your monthly income range?

- Below 4250 TRY  
 4251-6000 TRY  
 6001-8000 TRY  
 8001-10.000 TRY  
 Above 10.000 TRY

**Question 7:** In which sector do you work?

- Student  
 Unemployed  
 Self-employed  
 Public sector  
 Private sector  
 Retired

**SECTION 3: Cryptocurrency awareness questions**

**Question 1:** How much do you know about crypto money (Bitcoin etc.)?

- I know a lot and own/had cryptocurrencies  
 I have knowledge but I do not own cryptocurrencies

- I have partial knowledge
- I heard it but I don't know what it is
- I have no idea

**Question 2:** Which of the following cryptocurrencies have you heard of?

(NOTE: You can tick more than one from the list)

- Bitcoin
- Ethereum
- Ripple
- Bitcoin cash
- Cardano
- Litecoin
- Stellar
- Other

Please specify others.....

*NOTE: Please rate the following questions between 1 and 5.*

(1- Strongly disagree 2- Disagree 3- Undecided 4- Agree 5- Strongly agree)

**Question1:** The cryptocurrency world is a bubble. 1 2 3 4 5

**Question2:** Cryptocurrency technology has brought a great innovation to the financial world. 1 2 3 4 5

**Question3:** Cryptocurrency technology has brought a great innovation to the IT world.  
1 2 3 4 5

**Question4:** After 10 years, many people will start using cryptocurrency. 1 2 3 4 5



**Question5:** Cryptocurrencies have no value in terms of value. 1 2 3 4 5

**Question6:** Is it wise to invest in cryptocurrencies. 1 2 3 4 5

**Question7:** Cryptocurrency is risky. 1 2 3 4 5

**Question8:** It would be better to use cryptocurrencies in more workplaces. 1 2 3 4 5

**SECTION 4: Crypto Ownership Questions:**

**Question 1:** Have you ever owned cryptocurrencies in the past?

Yes       No

**Question 2:** Do you currently have any cryptocurrency investments?

Yes       No

*NOTE: If your answer is NO, continue to question 3. YES, proceed to question 4.*

**Question 3:** Why did you choose not to have anymore?

Investing in cryptocurrency has become riskier.

Cryptocurrency prices are extremely volatile.

Cryptocurrency lacks intrinsic value.

There are cyber security issues.

Others

**Question 4:** Which of the following cryptocurrencies do you own?

*NOTE: You can tick more than one from the list*

Bitcoin

Ethereum

Ripple

- Bitcoin cash
- Cardano
- Litecoin
- Stellar
- Other,

Please specify others.....

**Question 5:** If you had the opportunity to invest, would you like to invest in cryptocurrencies?

- Yes
- No

**Question 6:** If yes, which of the following cryptocurrencies would you like to invest in? Why is that?

*NOTE: You can tick more than one from the list*

- Bitcoin
- Ethereum
- Ripple
- Bitcoin cash
- Cardano
- Litecoin
- Stellar
- Other,

Please specify others.....

**State the reason.....**

## *Appendix B- Definitions of terms used in this thesis*

### **Objective Financial Literacy:**

Objective financial literacy refers to the individual understanding of the concepts and theoretical knowledge.

### **Subjective Financial Literacy:**

Subjective financial literacy refers to the confidence with which an individual makes financial decisions.

### **Feedback Trading:**

Feedback trading refers to that when investors buy assets at rising prices and sell assets at decreasing prices.

### **Portfolio diversification:**

A method used to diversify risk, by investing in different types of assets, based on difference in the risk levels, associated with the assets.