

# Crypto Currencies in the Framework of Chaos Theory and the Relationship of Crypto Currency with Big Exchanges

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## Abstract

Technological developments have had an impact on the currency as in every part of our lives. The money market has become more intangible with virtual currencies. Every state and person wants to keep their own money under control. Crypto money, which is the subject of the study, is a sub-type of virtual currency. It is not created by any institution. The discussions about crypto currencies, which have been mentioned frequently in recent years, bring the butterfly effect to our minds by looking at the state it has reached recently. "A butterfly flapping its wings in the Amazon Jungle could cause a storm to break out in the USA". It is a summary expression of the chaos theory expressed in the form and applied in various ways in almost all kinds of science. So, how will the crypto currencies, which emerged in 2009 and reached a solid place in the market today, will have an impact on the stock market and financial market?

In this study, within the framework of Chaos theory, the impact analysis between the large stock market volume and the Bitcoin volume in the 11-month period between 2019-2020 was examined, and then the relationship between them and the world uncertainty index was examined. Has been tried to be analyzed until it has changed.

**Keywords:** Chaos theory, Crypto currencies, Stock Market, Causality Relationship

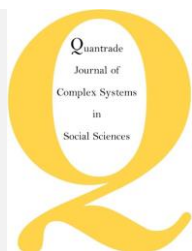
## 1. Introduction

If we look at the history of crypto money, it was announced for the first time in 2009 by the institution or person named Satoshi Nakamoto, with a project called "Peer to Peer". Technologically, this century is called a new century, with tremendous progress being made in the 21st century. As a natural consequence of this discourse, crypto currencies can be assumed and accepted as part of this progress. Before moving on to the definition of crypto money, it is necessary to look at the concepts of digital money and virtual money. From the point of view of users, it is seen that these concepts are often confused. Therefore, it is useful to mention the difference between virtual money and digital money.

Virtual Currency; It is the digital equivalent of the value injected into the system by the developers, which can be audited and accepted among the members of the community. Digital Currency; It represents the currency issued by the authorities accepted by the system and supervised by the authorized authorities (Yüksel, 2015: 173). In this sense, virtual money can be said to be a subset of digital money. While the digital currency is controlled by the authorities, the virtual currency is under the supervision and control of the group to which it is affiliated.

In recent years, crypto currencies, which are a highly debated and researched subject, have gained widespread use in the market. Undoubtedly, it is a natural result of technological development, but the reasons such as not being published and controlled by a center cause it to be regarded with suspicion. Many types of crypto currencies can be considered as a personal system. However, as a result of the applications made in the market, it has become the focus of speculation. As its use has become widespread, its aspects that are curious by the market and society have also increased. For this reason, it is frequently brought into the subject of research by many researchers.

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In this study, Chaos Theory, Crypto Money and the markets affected by Crypto Money will be mentioned, the relationship of this newly existing money in the market with other markets will be examined within the framework of this theory and its relationship with other markets will be examined. In the first part of the study, the emergence of crypto money, which is a digital currency sub-unit, the factors affecting the price and the mechanism will be explained. In the second part, chaos theory will be explained and the relationship between theory and this concept will be discussed. In the third part of the study, the possible relationship with BIST 100, together with Nikkei 225, Dow Jones, Shanghai, SP 500, JP stock exchanges, which are accepted as 5 big stock markets, was tested with Granger Causality Analysis. As a result of our findings; a causal relationship was determined between BIST 100 and Nikkei, Dow Jones. A causal relationship was found between SP 500 and Nikkei 225, Dow Jones and Bitcoin market. No causality was found between Shanghai Stock Exchange and other stock exchanges. A causal relationship has been determined between the Bitcoin market and BIST 100 and Dow Jones.

## 2. Literature Review

Baek and Elbeck (2014) examined Bitcoin volatility with the S&P 500 Index in their study. In their study, they found that the S&P 500 Index has more volatility than Bitcoin. Regression Model was used to analyze the variables affecting Bitcoin returns. According to the results obtained from the study, they determined that the monthly change of the daily lowest and highest price difference is the only factor that affects Bitcoin prices.

Ciaian Pavel et al.; (2018) examined the formation of Bitcoin's price model between 2009 and 2015. Garch analysis was used in the study. In the analysis, they found a relationship between financial developments and speculations and the formation of Bitcoin prices.

Eyüboğlu (2018) examined Bitcoin and Litecoin Markets in the Day of the Week, Month of the Year Review in his study. In the study, data from 2013 to 2017 were used. According to the results obtained from the study, the effect of the concept of month or day for Bitcoin and Litecoin Market has been determined. According to the results obtained from the study, Monday, Tuesday and Friday create significant changes for Bitcoin. According to the result obtained from the study, it was determined that the highest return for Litecoin was achieved on Friday.

Kahyaoğlu (2012) analyzed investor behavior within the framework of chaos theory in his study. In the study, a correlation study was conducted between the trading volumes and market parameters of 68 investors trading in Borsa Istanbul, covering the 2009-2011 period data. In the results obtained, it was concluded that the number of negative correlations among investors increased in periods when market movements and stock prices decreased.

In his study, Kendirli (2006) talked about the definition and basic assumptions of Chaos Theory. He talked about the harmonization of the efficient markets hypothesis of the chaos theory, the regular markets hypothesis and the capital asset pricing model theories and the regular markets hypothesis. He mentioned the points where these theories are insufficient. In the study, he stated that the lack of market information will cause chaos. He concluded that getting out of these situations would be possible with competitive prices and full access to information.

In the study of Kesici (2006), within the framework of chaos theory, it has been tried to analyze the complex system in the economy and the difficulties encountered for the Nash Equilibrium. In his work, he investigated the existence of chaos on market dynamics. He found that chaos theory provides successful explanations in the Lorenz curve and the Henan Map. However, he concluded that the same success cannot be achieved in every theory.

In their study, Moore and Christin (2013) examined that after the 2008 crisis, Bitcoin offered an advantage to quantitative easing policies. In their study, they examined the relationship between Bitcoin's current risks and the stock market. They examined the risks experienced in the Bitcoin stock market and their relationship with the stock market volume and pointed out the danger situation proportionally.

In his study, Nakamoto (2008) put forward the idea that with Bitcoin, which was introduced with the idea of Crypto currency, Nakamoto distributed database could be a solution to the problem of multiple spending on virtual money.

Sümer (2016) stated in his study that chaos theory facilitates overcoming difficulties in establishing equilibrium in the market. In the study, the existence of chaos in the current market has been investigated. He made time series analysis for BIST, Gold and Foreign Exchange by making discrete variable and continuous variable analysis. According to the results obtained, it has been found that there is no chaos situation in these markets.

In his study, Şahin (2018) tried to perform Price Prediction of Crypto currency Bitcoin with ARIMA and Artificial Neural Networks. In his study, he made a price prediction with the factors affecting the price of Bitcoin, which is the currency of our period. According to the results obtained, the model gave successful results for 2017.

In his study, Özbaş (2018) talked about the creation process of Bitcoin, its operation advantages and disadvantages. According to the results obtained from the study, he concluded that there is distrust towards Bitcoin in the world, although it is acceptable with the way it is processed.

In his study, Ünvana (2019) made causality analysis on the US, Japan, China and Turkey stock market indices of Bitcoin. In the study, data from 2016-2018 were used. According to the results obtained from the study, it has been determined that Bitcoin only affects BIST 100 unidirectionally. He concluded that there is a bidirectional relationship with Nikkei 225 and SSE 380 exchanges.

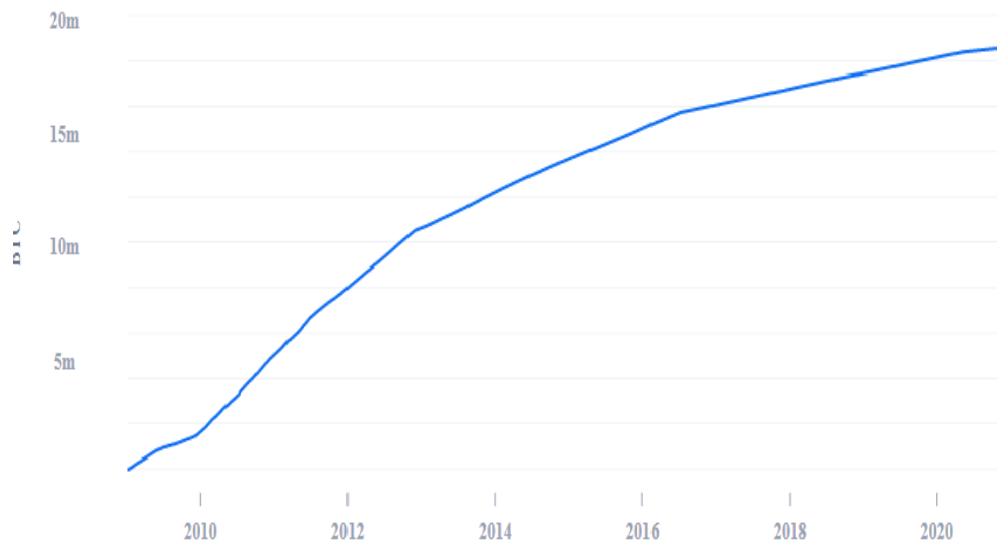
In the study by Yermack (2013), it was investigated whether Bitcoin is a currency or not. At the time of the research, almost zero correlation was observed between Bitcoin's daily exchange rates when compared to gold and commonly used currencies. That is, no relationship was detected between them.

### 3. Crypto currency

Cryptography from the Greek language means secrecy. The concept of crypto currency, which comes from the mystery, is virtual money that is produced on the basis of privacy in the virtual environment. The first type of crypto money that started to be produced in 2009 is Bitcoin (Çevik, 2016, p: 170).

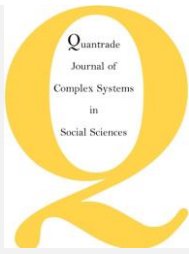
In the first published protocol of crypto money, it was stated that only 21 million units of one unit of crypto money would be produced. For this reason, considering the supply-demand balance, it is quite normal that the demand for virtual currencies has increased in recent years, taking into account the market conditions. In Chart 1, the price change of Bitcoin, which is the first money released to the market, over the years is given.

**Chart 1:** The Amount of Bitcoin Extracted by Data Mining over the Years (www.blockchain.com/erişim :23/12/2020)



The total supply of Bitcoin (BTC) is limited and is predefined in the Bitcoin protocol. According to this definition, a total of 21 million BTC can be mined and the mining reward (the method used to create Bitcoin) decreases over time. This chart shows how many Bitcoins have been mined or circulated over the years (Salhout, 2018:3).

The Bitcoin reward is divided by 2 every 210,000 blocks, or approximately every four years. Some Bitcoins in circulation are considered to be lost or unspendable forever, due to lost passwords, incorrect exit addresses, or errors in exit scripts. Crypto currencies have created a new stock market independent of economies, priced entirely according to supply and demand. There are 2,290 crypto currencies traded on various exchanges. Their total transaction volume is around 267 Billion Dollars.



Crypto currencies have a decentralized and distributed structure, unlike centralized electronic money produced by central banks or banking systems. The control of this distributed order is carried out through databases called Block-Chain (Yıldırım, 2019: 75).

The smallest unit of Bitcoin, which can be divided up to 8 digits, is called Satoshi (from the name of its founder, Satoshi Nakamoto). In other words, 100 Million Satoshi is 1 BTC. So 0.00000001 Bitcoin is 1 Satoshi and it is possible to transfer it in the system. (Çakraccioğlu, 2016).

Bitcoin is used to obtain a Bitcoin wallet by downloading applications to electronic devices such as mobile phones and computers, or by opening an account on existing sites. This wallet is used for interpersonal transfers and keeping Bitcoin in the wallet. Transactions are carried out via the block chain. Block chain is the basic system that enables the generation, transfer and storage of crypto currencies without a centralized registration and control. Anyone who wishes can download this database, keep it, examine it, and check the accuracy and validity of the transactions. Records to this database are written by miners. In other words, the security of the Bitcoin network is provided by the miners. Blok-Chain is actually a distributed, open and reliable consensus system (Çakraccioğlu, 2016).

### 3.1. Block chain

It is the name given to the database where the transactions are recorded, which is the block chain in Turkish. Transactions are recorded here in order. Transactions are kept here in chronological order. It is a distributed database system that provides encrypted transaction tracking. In money transfers, each step creates a block. Since Nakamoto did not give us a centralized system, this system is a guarantee of money to us (Dyhrberg, 2015: 56).

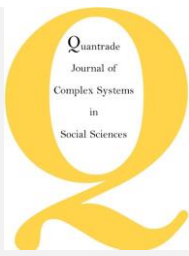
### 3.2. Bitcoin mining

In the early days of Bitcoin, it was possible to produce large amounts of Bitcoin in a very short time due to the small number of miners. In the current situation, both the system getting harder and the number of miners multiply makes Bitcoin production difficult and costly. Bitcoin mining describes people who both verify and record transactions. Bitcoin production and the process of verifying transactions are done by miners. While miners ensure the security of the block chain system and the realization of crypto money transfers, their transactions are recorded in the distributed data ledger. Since Block chain technology is open account, all users can control their transactions. With the electrical energy they spend and the processing power they provide, the miners circulate the Bitcoin they produce in return for the system verification and registration service, and the Bitcoin that enters the circulation is transferred to the wallet accounts of the miners. Thus, Bitcoin miners can circulate Bitcoin in exchange for the energy they physically consume and the service they provide, while on the other hand, they can earn profits (Şimşek, 2019: 28).

### 3.3. Bitcoin chronology

- October 31, 2008-Technical document published by Nakamoto.
- January 3, 2009-First Bitcoin Block created
- January 12, 2009-First Transfer was made
- October 5, 2009-New Liberty Standard stock exchange published the first Bitcoin rate. Initial Bitcoin rate; \$1 = 1,309.03 BTC. In February 2011, 1 dollar = 1 BTC.
- July 2010- The first BTC exchange was established. Name: MT.Gox. It was closed in 2014 due to technical problems.
- March 28, 2013-BTC's market value exceeded \$1 billion (Source: investing.com, accessed: 24/12/2020)
- Between 2013-2018, platforms such as the USA, China, Japan, Google and Facebook announced their Bitcoin decisions. The United States reported that it was perceived as a threat to the financial structure. Facebook and Google, on the other hand, went to ban advertising in general. The European Central Bank (ECB), on the other hand, announced that Bitcoin is seen as a balloon and compared to the tulip event. Japan announced that it does not look hot to Bitcoin, while China announced that they banned it. Iran agreed. In 2018, Dubai created its own crypto currency. NASDAQ has added Bitcoin and Ethereum to its products. The Central Bank of the Republic of Turkey, on the other hand, stated that they want to issue their own digital currency according to the 11th Development Plan (Source: Bloomberght, Accessed: 24/12/2020).

The phases of Bitcoin are briefly mentioned. As of today, its value in dollar terms has reached the level of 46,931.40 USD (as of 26.08.2021). With the figure given at the beginning of the study, considering the value it reached on 26.08.2021,



such a power of gaining value and influencing the market reminds us of the Chaos theory, which has recently been used for all branches of science. The flapping wing of the butterfly has caused a storm in the world stock markets in 11 years. This effect affected the transaction volumes in major stock exchanges and caused the functions of central banks to be questioned. The fact that it fluctuates frequently and is open to speculation, being open to cyber attacks, sometimes used for illegal purposes, as well as making money transfers at a lower cost and faster, has contributed to the increase of profits of these institutions thanks to the intermediation of these transfers by financial institutions (Şahin, 2007). 2018:80).

While its effect in financial markets was like this, BTC exchanges started to emerge in financial systems. Since personal information is given during registration to the exchanges, the famous secrecy of BTC is removed. In fact, we are seeing the understanding of crypto currencies in our time begin to evolve into what governments are planning to do.

#### 4. Chaos theory

Chaos theory is not a structural theory of physics or mathematical induction, but a method that helps to explain the tendency of parts of physical reality as a whole (Kendirli, 2006:1). The main argument of chaos theory is that even the smallest of variables can result in big changes. If we think about it in terms of today's technology, it is more accurate to say big potential changes instead of big changes. In this study, the purpose of combining the subject we focused on with this theory, a project that spread exactly via an e-mail has entered the world stock markets today. It has led to the questioning of the functions of Central Banks. It can be said that this situation did not only affect the financial structure, but also started to change the cultural understanding and some habits (Kahyaoğlu, 2015: 39).

Financial structure affects investor behavior due to the functioning of the systems it contains (Mandelbort 2015, p: 11). Mandelbort made an observation on this subject by creating a computer simulation. In this study carried out in 2011, a computer environment was set up, 2 investors and a single environment were prepared. Over time, it has been seen that the two investors began to influence each other's decision. So the more investors, the more divergent views, the more similarities or differences, that is, the more behaviors and opinions. So, the butterfly effect of the Lorenz's chaos theory can also explain the Bitcoin effect in this way. Let's express the effects of Bitcoin on financial markets in a simpler way, away from complexity. An increase in the general level of prices causes individuals to buy the goods or services they buy more expensive. This situation increases the financial demand, causing an increase in interest rates and results in higher borrowing costs. This causes a decrease in investments. Indirectly, as it affects investments, which are an item of national income, it may cause a decrease in national income. This is an effect. A small change results in a big change. Although Simon de Laplace was one of the first mathematicians working on disorder, it is accepted that J. Henri Poincare provided the conceptual and theoretical contribution to chaos theory. But undoubtedly the most important contribution was made by Edward Lorenz (Kendirli, 2006: 172).

Lorenz is a meteorologist. He was entering data into his computer for the weather forecast, and graphing the value he found. He observed that small changes in temperature had an incredible effect on the temperature values of the universe, and realized that the graph he created reminded him of butterfly wings.

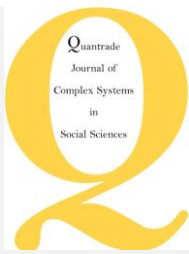
Chaos theory is a science that studies systems that cannot be predicted from the outside, which are carried out by mechanical and deterministic laws, contain order and chaos in such a way that they do not contradict each other. More simply, it tries to predict random and non-linear events. This was the point Lorenz was trying to get to. In other words, small and unpredictable changes can lead to big changes over time. The butterfly effect, on the other hand, was integrated with this theory and wanted to express that small changes, or events, can result in big changes.

The characteristics of chaos theory, which is used in many branches of science in the literature, can be listed as follows (Lale, 2018:480):

- ✓ Chaos theory helps us explain the nonlinear aspects of the universe.
- ✓ It is a bridge between Newton's reductionist approach and the randomness of quantum physics.
- ✓ -Small changes in the system can have big results in the end.
- ✓ It explains that the universe is an open system.
- ✓ Explains the human system, that is, the nature of the human body and weather events.

The basic propositions of the chaos theory are as follows ( Kendirli, 2006: 173):

- ✓ Order creates disorder.
- ✓ There is order in disorder.
- ✓ Order arises from disorder.
- ✓ Compromise in the new order manifests itself after a change of commitment.
- ✓ The new order reached develops in an unpredictable direction through the self-organizing process.



For this reason, we will of course have no difficulty in finding examples of chaos theory and especially the butterfly effect in social and financial life. When examining macroeconomic systems, the big consequences of small events are the best proof of this. The principle of nonlinearity in chaos theory involves events being independent of each other. We cannot mark the facts and events that prevail in the universe that they exist only from order. Gleick's; the phrase "complex systems have complex causes underlying" summarizes this situation.

Chaos theory examines the logic of classical science, while trying to explain the universe, searching for disorder in the whole, searching for order despite changing equilibrium conditions, giving place to predictions and using it in all branches of science are the integrative features of this theory (Yeşilorman, 2006: 84).

With crypto currencies, which are the main subject of this study, this is the purpose of our attempt to explain this theory. The value of crypto currencies, which were initially considered a crime by the governments, untrustworthy and frequently criticized, has come to affect the most important stock markets in the world today and create awareness with them.

## 5. Causality relationship between stock indices and Bitcoin

In this part of our study, the interactions between Bitcoin's Dow Jones, Nikkei 225, S&P 500, Bist100, Shanghai and NASDAQ stock indices and Bitcoin between the years 2019-2020 will be examined. The data used in the study were taken from the investing.com website.

Indices used in the study:

BIST 100: It is the name of the index in which the first 100 companies traded in the Turkish stock exchange and dominating the stock market (in terms of transaction volume and price) are listed.

S&P 500: One of the American stock exchanges.

Nikkei 225: Japanese stock exchange.

Shanghai: Shanghai stock exchange

Dow Jones: It is an index that includes the 30 largest companies in America.

In the first stage of the study, the extended Dickey Fuller Unit Test was applied to determine whether the series were stationary or not. Here, it is concluded that the data are stationary at the 1% significance level.

In the second stage, Granger Causality Analysis was performed. This test is a general approach in determining the existence of a causal relationship between two or more variables. According to this analysis, one variable can predict other variables. (Çil, 2018: 360).

Basic Assumptions of Granger Causality Analysis:

- The future cannot be the cause of the past.
- Causality can only be determined for a group of scotastic processes, causality cannot be known between two deterministic processes.

Granger (1969) developed a relatively simple test that identifies causality between variables. According to Granger, if the prediction of Y is more successful when the past values of X are used than when the past values of X are not used (other terms do not change); X is the Granger cause of Y. The Granger causality test with two variables such as  $y_t$  and  $x_t$  requires the first step of the estimation of the VAR model:

$$y_t = \alpha_1 + \sum_{i=1}^n \beta_i x_{t-i} + \sum_{j=1}^m \gamma_j y_{t-j} + \epsilon_{t1}$$

$$x_t = \alpha_2 + \sum_{i=1}^n \theta_i x_{t-i} + \sum_{j=1}^m \delta_j y_{t-j} + \epsilon_{t2}$$

The error terms  $\epsilon_{t1}$  and  $\epsilon_{t2}$  are clean sequence processes with no relation between them.

In the model, there are four possible different situations below;

The lagged x values in the first equation are statistically different from zero by the group, and the lagged y values in the second equation are not statistically different from zero. In this case, it causes  $x_t$ .

The lagged y values in the second equation are statistically different from zero by the group, and the lagged x values in the first equation are not statistically different from zero. In this case, it causes  $x_t$ .

All sets of x and y values in both equations are statistically nonzero. In this case, there is bidirectional causality between  $x_t$  and  $y_t$ .

Not all sets of x and y values in both equations are statistically different from zero. In this case,  $x_t$  and  $y_t$  are independent of each other.

$$H_0 : \sum_{i=1}^n \beta_i = 0 \quad x_t \text{ does not cause } y_t.$$

$$H1: \sum \beta_i n_{i=1} \neq 0 \text{ or } xt \text{ cause } yt.$$

While performing the analysis, the stationarity test was carried out and as a result of the test; the data were subjected to the stationarity test, which is the first condition for Granger causality analysis. After testing the series to be stationary, causality analysis was performed and the results were interpreted.

**Table 1:** VAR Granger Causality Test XU 100 (BIST 100) with Others

Dependent variable: XU100			
Examined	Chi-sq	df	Prob.
S&P 500	0.106624	2	0.9481
SHANGHAI	1.216403	2	0.5443
NIKKEI 225	22.37180	2	0.0000
DOW JONES	2.318175	2	0.3138
BTC	0.736267	2	0.6920
ALL	37.56962	10	0.0000

Considering the 0.05 significance level, no causality was found in the BIST 100 and SP 500, SHANGHAI with BITCOIN markets. There is causality in the NIKKEI 225 and DOW JONES markets.

**Table 2:** VAR Granger Causality Test S&P 500 with Others

Dependent variable: S&P 500			
Examined	Chi-sq	df	Prob.
XU100	4.856916	2	0.0882
SHANGHAI	0.623950	2	0.7320
NIKKEI 225	16.19686	2	0.0003
DOW JONES	8.521197	2	0.0141
BTC	7.422649	2	0.0244
ALL	48.15449	10	0.0000

For 0.05 significance level, causality was found between SP500 and NIKKEI 225, DOW JONES, BITCOIN

**Table 3:** VAR Granger Causality Test Shanghai with Others

Examined	Chi-sq	df	Prob.
XU100	1.731436	2	0.4207
S&P 500	1.164853	2	0.5585
NIKKEI225	1.249629	2	0.5354
DOWJ	0.604220	2	0.7393
BTC	0.361752	2	0.8345
ALL	6.477923	10	0.7736

When Shanghai stock market was analyzed for 0.05 significance level, no causality was found with other stock markets.

**Table 4:** VAR Granger Causality Test Nikkei 225 with Others

Dependent variable: NIKKEI 225			
Examined	Chi-sq	df	Prob.
XU 100	2.507369	2	0.2855

SP 500	7.010920	2	0.0300
SHANGHAI	12.41891	2	0.0020
DOW JONES	4.978050	2	0.0830
BTC	0.416925	2	0.8118
ALL	16.35633	10	0.0899

When NIKKEI 225 was analyzed for 0.05 significance level, causality was found between SP 500 and SHANGHAI exchanges, but no causality was found with other exchanges.

**Table 5:** VAR Granger Causality Test Dow Jones with Others

Dependent variable :DOW JONES			
Examined	Chi-sq	df	Prob.
XU 100	6.227476	2	0.0444
SP 500	3.525147	2	0.1716
SHANGHAI	1.044996	2	0.5930
NIKKEI 225	18.80564	2	0.0001
BTC	10.97140	2	0.0041
ALL	56.86787	10	0.0000

When the causality relationship with the DOW JONES market is examined, causality has been determined between BIST 100 and NIKKEI 225.

**Table 6:** VAR Granger Causality Test BTC with Others

Dependent Variable: BTC			
Examined	Chi-sq	df	Prob.
XU 100	11.95513	2	0.0025
SP 500	5.445529	2	0.0657
SHANGHAI	1.900361	2	0.3867
NIKKEI 225	0.303122	2	0.8594
DOWJ	8.265594	2	0.0160
ALL	29.55808	10	0.0010

#### Causality Detected Between Bitcoin Exchange and Bist100 and Dow Jones

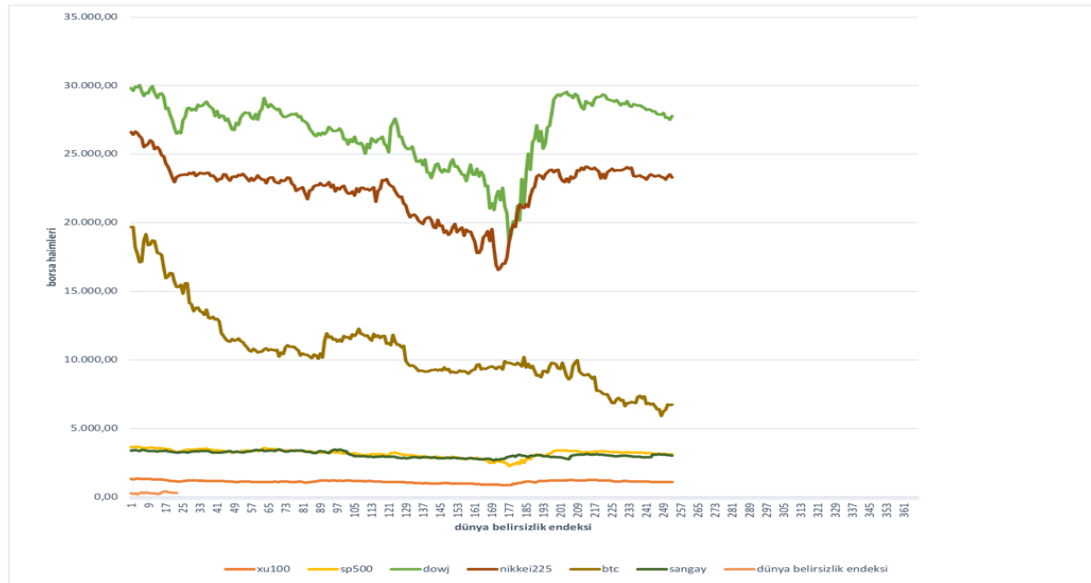
Interpretation of Results: For 0.05 significance level, there is a one-way causality relationship between Bist100 and Nikkei 225. There is a causal relationship between Dow Jones, BIST 100, Nikkei 225 and Bitcoin. There is causality between Nikkei 225, SP 500, and Shanghai Stock Exchange. A causal relationship has been found between Bitcoin and all stock markets. That is, according to our hypothesis, hypothesis H1 should be accepted. In Turkey, it is important for investors to be informed by following the Nikkei 225 and Bitcoin. When evaluated in the light of the results obtained, the plan of the Central Bank of the Republic of Turkey to create its own crypto money in the future is important and remarkable. Although, as a result of the fluctuations in the financial markets and crypto money markets, the Central Bank of the Republic of Turkey has suspended trading in crypto currencies, this perspective is important for the future.

Here, the relationship between the world uncertainty index and stock markets will be explained with the help of a graphic. The world uncertainty index is an index in which the records of 143 countries have been kept since 1996 (34 developed and highly developed economies since 1955). A graph was created between the data we used in the analysis and this index value. In the graph obtained, it was desired to monitor the change and fluctuation in order to see the effect of the crypto



money value on a global scale. Data on the world uncertainty index were obtained from the web address [https://www.policyuncertainty.com/financial\\_stress.html](https://www.policyuncertainty.com/financial_stress.html).

**Chart 2: Stock Exchanges and World Uncertainty Index**



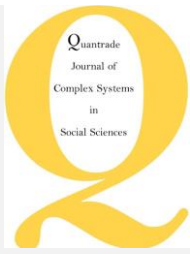
As a result of the study, it has been determined that there is a bidirectional causality relationship between Bitcoin and the Dow Jones Index. It has been determined that there is a one-way causality relationship between Bitcoin and Nikkei 225. It has been concluded that there is a one-way causality relationship between Bist100 and Bitcoin.

## 6. Conclusion

The influence of crypto currencies increasing in popularity is increasing day by day. In order to see the effect of Bitcoin among the static data, daily data of 2019-2020 were used. When we examine the relationship with the stock markets with the causality test, the causality relationship between Bitcoin and all stock markets has been determined. It was determined that there is a bidirectional causality relationship with Dow Jones and XU100. In 13 years, the crypto money market, which has made great progress in this way, is on its way to becoming the currency of the future. Because, the opinions of many political powers in the world are positive regarding crypto currencies. From time to time (as in the case of Turkey), temporary measures are taken against crypto currencies after financial fluctuations and economic difficulties in countries. However, in this process where the world has evolved, it will not be possible to stay away from crypto currencies. Moreover, in established crypto money exchanges, the identity information of investors and players is requested absolutely. This, on the other hand, removes the veil of privacy and personality that crypto currencies bring.

Crypto currency markets and crypto currencies have attracted the demand of individuals and institutions due to the fact that traditional banking and brokerage transactions involve intense bureaucracy as well as the necessity of being based on trust. In addition to all these, the illegal use of crypto currencies and the fact that they are not dependent on authority make governments nervous. The currency with such a low volatility threshold drives away investors who do not want to take too much risk. Aside from its effects on the stock market, governments are not in a hurry to work on crypto currencies because it does not take up much space in the world's deposits at the moment.

Looking at the studies on this subject, it has been seen that there is an interaction between Bitcoin and stock markets. However, the general perception in Turkey is that it is not viewed as a long-term investment tool. This is because it is not created by the authority. Despite all this, it is a conclusion drawn from our results that countries should carry out more clear and well-structured studies regarding crypto currencies in the future.



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