

RESEARCH ARTICLE

Blockchain and Market Dynamics: Correlation between Cryptocurrency Valuations and Market Interest Rates

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Abstract

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In this study, the five most well-known cryptocurrencies in the blockchain-based decentralized financing structure were compared with the centralized market interest rates, and it was examined whether there is a significant relationship between the changes in market interest rates and the prices of cryptocurrencies. Key findings indicate a significant relationship between most cryptocurrencies, such as Dash, Litecoin, Ethereum, and Bitcoin, with market interest rates. However, XRP emerges as an exception. In addition to the comparative analysis between cryptocurrencies and market interest rates, this study delves into the underlying mechanisms that govern these relationships. It explores the role of blockchain technology in shaping the decentralized financing structure and highlights the intricacies of various cryptographic algorithms. The research also emphasizes the need for specialized accounting practices that cater to the unique challenges posed by cryptocurrencies. This study bridges the understanding between conventional economic mechanisms and the innovative world of cryptocurrencies, offering inferences that are important for investors, financial analysts, and accountants in the digital age.

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Öz

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Bu çalışmada, blok zinciri tabanlı merkezi olmayan finansman yapısındaki en bilinen beş kripto para birimi, merkezi piyasa faiz oranları ile karşılaştırılmış ve piyasa faiz oranlarındaki değişimler ile kripto para birimlerinin fiyatları arasında anlamlı bir ilişki olup olmadığı incelenmiştir. Temel bulgular Dash, Litecoin, Ethereum ve Bitcoin gibi çoğu kripto para birimi ile piyasa faiz oranları arasında anlamlı bir ilişki olduğunu göstermektedir. Ancak XRP bir istisna olarak ortaya çıkmaktadır. Kripto para birimleri ve piyasa faiz oranları arasındaki karşılaştırmalı analize ek olarak, bu çalışma bu ilişkileri yöneten altta yatan mekanizmaları araştırmaktadır. Blok zinciri teknolojisinin merkezi olmayan finansman yapısını şekillendirmedeki rolünü araştırmakta ve çeşitli kriptografik algoritmaların inceliklerini vurgulamaktadır. Araştırma ayrıca kripto para birimlerinin yarattığı benzersiz zorlukları karşılayan özel muhasebe uygulamalarına duyulan ihtiyacı da vurgulamaktadır. Bu çalışma, geleneksel ekonomik mekanizmalar ile kripto paraların yenilikçi dünyası arasında bir köprü kurarak dijital çağda yatırımcılar, finansal analistler ve muhasebeciler için önemli çıkarımlar sunmaktadır.

Anahtar Kelimeler: Blok Zinciri, Piyasa Faiz Oranı, Finansal Muhasebe

Introduction

In the ever-evolving landscape of global finance, the emergence of cryptocurrencies has marked a paradigm shift. These digital assets, underpinned by blockchain technology, have not only introduced a new form of currency but have also challenged traditional financial systems. As cryptocurrencies like Bitcoin, Ethereum, and others gain traction, they inevitably intersect with established economic indicators, such as market interest rates, which have long been the barometers of a country's economic health and stability.

However, as the adoption of cryptocurrencies grows, so does the complexity of accounting for these digital assets. Cryptocurrency Accounting, a relatively nascent field, copes with challenges ranging from valuation to transaction verification. The decentralized nature of cryptocurrencies, coupled with their volatility, presents unique accounting challenges that traditional financial systems are not equipped to handle.

At the point where technology has become indispensable in human life, it is thought that cryptocurrencies will form the infrastructure of digital finance. Cryptocurrencies have recently reached a level that can almost compete with real currencies. The first generally accepted area of blockchain technology, which is not managed by any company, financial institution, government or bank and has a completely decentralized structure, was Bitcoin. The blockchain emerged in 2008 with an article published by Satoshi Nakamoto, whose real identity is unknown. The aim of this technology is "Peer-To-Peer" data transfer (Erdoğan & Bodur, 2020). Blockchain is a technology protocol that enables the exchange of data between two parties without the need for an intermediary and is realized anonymously with an encrypted identity between the parties (Yılmaz, 2021).

With the digitalization of capital, investment rates in money markets are increasing. Financial markets, where medium and long-term fund supply and demand are met, have started to be used effectively. Central bank monetary policies are used to maintain stable economic growth and price stability. The volatility of interest rates makes

investors uneasy and consumers hesitant to consume. Therefore, Central Banks have adopted the main objective of ensuring the stability of financial markets (Altuntaş, 2012). Interest rate is one of the main indicators of a country's economic stability and is the main tool of monetary policy. The price of giving up the current use of money is the most familiar definition of interest. However, it is not possible to talk about a single interest rate in economies. There are many interest rates in the economy, such as deposit rates, loan rates, central bank monetary policy rates, interbank money market rates, bond-bill rates and Libor rates (Kartal, 2019).

Changes in interest rates affect the overall economy. It also plays a decisive role in the entire economy. Interest rates fulfill many functions as the most influential variable of the economy (Demirgil & Türkay, 2017). Therefore, the factors affecting interest rates also gain importance.

Conceptual Framework

In this section, conceptual information about blockchain and market interest rates is presented.

Blockchain Technology

"Fundamental aspects of blockchain that emphasize its reliance on hashing techniques that support both cryptocurrency trading and smart contract implementation (Pierro, 2017) increase transparency in financial transactions and reduce information asymmetries. Karthik (2018) offers a perspective that characterizes blockchain as a decentralized distributed ledger where blocks are sequentially linked. The potential of blockchain in both financial and non-financial domains is explored in depth by Chatterjee & Chatterjee (2017). Junejo, Memon, Junejo, Talpur, and Memon (2020) delves deeper into the applications of blockchain, shedding light on current research trajectories, inherent limitations, and prospective future avenues. Collectively, these studies underscore the transformative potential of blockchain, suggesting its capacity to challenge conventional business models and decentralize the World Wide Web.

Cryptography is highlighted as a pivotal component of blockchain technology, ensuring data security. Digital encryption technology, as explained by Zhai, Yang, Li, Qiu, and Zhao (2019), is vital for safeguarding user information and transaction data within the blockchain. Delving into the technicalities, Jiang, (2023) discusses the array of cryptographic primitives employed in blockchain, including hash functions and digital signatures. The potential of blockchain in bolstering cyber security, especially in the realm of securely storing Personally Identifiable Information (PII) and certification schemes, is emphasized by Taylor, Dargahi, Dehghantanha, Parizi, and Choo (2020). A quantum-secured blockchain platform leveraging quantum key distribution for ironclad authentication is proposed by Kiktenko et al. (2017). These studies underscore the indispensable role of cryptography in blockchain data security, pointing towards promising avenues for future research and innovation in the domain.

Blockchain's utilization of hashing to store data securely and immutably is a recurring theme in academic literature. Each new block to be added in the blockchain system, in other words, each new record to be made, uses the protocol created by the nodes in that block to verify the record (Çetin, 2022). Rahardja, Hidayanto, Lutfiani, Febiani, and Aini (2021) delve into the mechanics, explaining how hash functions label each block of data in the blockchain. This hashing not only connects each block to its predecessor but also fortifies the entire blockchain transaction against alterations or deletions. In a comparative study, Kuznetsov, Oleshko, Tymchenko, Lisitsky, Rodinko, and Kolhatin (2021) evaluates the efficacy of various hashing algorithms, shedding light on their suitability for contemporary decentralized blockchain networks. This aids in pinpointing the optimal candidates for constructing decentralized systems. Introducing a novel perspective, Kamal and Fareed (2021) puts forth a hash algorithm rooted in chaos theory and the Merkle-Damgard construction. This innovative approach not only ensures a secure integration with the blockchain but also is more resource-efficient than its counterparts. Building on the theme of optimization, Zheng, Li, Chen, and Dong (2018)

champions an IPFS-based blockchain data storage model. By harnessing the unique attributes of the IPFS network and the nuances of the IPFS hash, this model significantly trims the size of blockchain data, paving the way for a more scalable decentralized network.

The types of cryptocurrencies examined in this study are Bitcoin, Ethereum, Ripple, Dash, Litecoin. The reasons why these cryptocurrencies were chosen are:

As of February 10, 2023, 40% of the cryptocurrency market consists of Bitcoin and 17% consists of Ethereum. For this reason, bitcoin and etherium, the two locomotives of the market, were chosen.

Ripple is the first crypto currency established as a remittance network where large companies and banks can make large payments simultaneously.

Litecoin, which has a different algorithm system than Bitcoin, can create blocks faster, has a higher sending speed and lower confirmation times. It was preferred because it was the first cryptocurrency issued for this purpose.

Dash has created a centralized-autonomous form for the first time in the cryptocurrency field. It has a privacy feature and uses a different encryption technique. Therefore, it was preferred. (Figure.1)

<p>Bitcoin (BTC)</p>	<ul style="list-style-type: none"> •Introduction: Bitcoin is a decentralized digital currency, without a central bank or single administrator, that can be sent from user to user on the peer-to-peer bitcoin network without the need for intermediaries. Transactions are verified by network nodes through cryptography and recorded in a public distributed ledger called a blockchain. •Website: [Bitcoin.org](https://bitcoin.org/) •Whitepaper: [Bitcoin: A Peer-to-Peer Electronic Cash System](https://bitcoin.org/bitcoin.pdf) by Satoshi Nakamoto
<p>Ethereum (ETH)</p>	<ul style="list-style-type: none"> •Introduction: Ethereum is an open-source, blockchain-based platform that allows developers to build and deploy decentralized applications (dApps). Unlike Bitcoin, which is primarily a digital currency, Ethereum focuses on running the programming code of any decentralized application. It introduced the concept of "smart contracts," which are self-executing contracts with the terms of the agreement directly written into code. •Website: [Ethereum.org](https://ethereum.org/) •Whitepaper: [Ethereum Whitepaper](https://ethereum.org/en/whitepaper/)
<p>Ripple (XRP)</p>	<ul style="list-style-type: none"> •Introduction: Ripple is both a platform and a currency. The Ripple platform is an open-source protocol designed to allow fast and cheap transactions. Unlike Bitcoin that uses a decentralized system to transact, Ripple uses a consensus ledger and a network of validating servers, rather than blockchain, to confirm transactions. •Website: [Ripple.com](https://ripple.com/) •Whitepaper: [The Ripple Protocol Consensus Algorithm](https://ripple.com/files/ripple_consensus_whitepaper.pdf)
<p>Dash (DASH)</p>	<ul style="list-style-type: none"> •Introduction: Dash is an open-source blockchain and cryptocurrency focused on offering a fast, cheap global payments network that is decentralized in nature. It seeks to improve upon Bitcoin by providing stronger privacy and faster transactions. Originating as a fork from the Bitcoin protocol, Dash has unique features enabling it to process anonymous transactions, apart from its core advantages of speed and low transaction costs. Dash is also recognized as a decentralized autonomous organization (DAO) run by a subset of its users known as "masternodes". •Website: dash.org •Whitepaper: While Dash doesn't have a specific whitepaper like Bitcoin or Ethereum, its foundational technology and updates can be explored through its official website and community forums.
<p>Litecoin (LTC)</p>	<ul style="list-style-type: none"> •Introduction: Litecoin is a peer-to-peer cryptocurrency created as a "lite" version of Bitcoin. It was designed to produce more frequent block generation, allowing for faster transaction confirmation. While inspired by, and in most ways technically nearly identical to Bitcoin, Litecoin has some technical improvements over Bitcoin. •Website: [Litecoin.org](https://litecoin.org/) •Whitepaper: Litecoin doesn't have an official whitepaper like Bitcoin, but its technical details and updates can be found on its official website.

Figure 1. Cryptocurrency Types

It is possible to summarize the differences between these types of cryptocurrencies as follows.

Purpose: While Bitcoin was designed primarily as a digital currency, Ethereum was developed as a platform for decentralized applications. Ripple, on the other hand, focuses on facilitating real-time, cross-border payments for banks.

Technology: Bitcoin and Litecoin use a proof-of-work consensus mechanism, Ethereum initially used proof-of-work but is transitioning to proof-of-stake, and Ripple uses a consensus ledger.

Transaction Speed: Ripple transactions are faster than Bitcoin's, and Litecoin aims to have faster transaction confirmation times than Bitcoin.

Market Position: Bitcoin is often viewed as the leading cryptocurrency, with the others considered "altcoins" or alternatives to Bitcoin.

The differences between these cryptocurrencies can be summarized in detail as shown in Table 1.

Table 1. The Differences Between Cryptocurrencies

Cryptocurrency	Nature/Origin	Primary Use	Technology/Consensus Mechanism	Notable Features
Bitcoin (BTC)	Pioneering cryptocurrency; decentralized digital currency without a central authority.	Digital currency for transactions.	Peer-to-peer network with proof-of-work.	Operations on a public ledger called the blockchain.
Ethereum (ETH)	Open-source, blockchain-based platform.	Building and deploying decentralized applications (dApps).	Initially proof-of-work, transitioning to proof-of-stake.	Known for "smart contracts".
Ripple (XRP)	Both a platform and a currency.	Fast, global transactions, especially for banks.	Consensus ledger with network of validating servers.	Real-time, cross-border payments.
Dash (DASH)	Forked from Bitcoin protocol; operates as a DAO with masternodes.	Fast, cheap payments with a focus on privacy.	Proof-of-work with a network of masternodes for governance.	Known for strong privacy features and fast transactions.
Litecoin (LTC)	"Silver to Bitcoin's gold"; peer-to-peer cryptocurrency.	Faster transaction confirmation.	Proof-of-work with different hashing algorithm.	Faster block generation time than Bitcoin.

Source: coinmarketcap.com

Table 1 provides a concise overview of the key characteristics and differences between the five major cryptocurrencies.

Market Interest Rate

The market interest rate, often referred to as the nominal interest rate, represents the return investors expect to receive for lending their money in the market. It's influenced by a variety of factors, both microeconomic and macroeconomic.

Various authors have delved into distinct facets of interest rates. Belongia (1987) emphasizes the significance of fluctuations in interest rates and the associated risks. Reinhart and Sack (2002) conduct an in-depth study of the trends in major long-term U.S. interest rates post-1993, attributing their shifts

to fundamental determinants. The Bank of England's methodology for deriving interest rate forecasts from money market instruments is worth examining (Brooke, Cooper, & Scholtes, 2000). Meanwhile, Thornton (1986) investigates the connection between the Federal Reserve's discount rate and the rates in the money market. Hence, while these studies offer valuable perspectives on interest rates, they don't directly address the core research query.

Several factors play a pivotal role in determining the interest rates for corporate debt and other financial tools. Notably, the credit standing of borrowers, the term of the financial instrument, and the current economic climate are crucial determinants. For example, the likelihood of a borrower defaulting, or the default risk, has a marked effect on the disparity between the market value and the face value of debt capital (Терещенко, Стецько, Ткаченко, & Бабяк, 2021). The spreads in Credit Default Swaps (CDS) can act as a gauge for how the market views credit risks. Elements like a company's performance, overarching economic trends, and market dynamics are instrumental in shaping CDS spreads. Specific metrics, such as Tobin's Q, stock market yields, and the risk-free rate, offer valuable insights into CDS spread variations (Fu, Li, & Molyneux, 2021). Central banking institutions, by implementing their monetary policies, strive to steer market interest rates. However, the extent to which a central bank's policy rate affects market rates can differ, depending on local financial market attributes and international considerations. For example, factors like the level of foreign investment in money markets and global risk indicators can profoundly influence the gap between policy and market rates (Fermo, 2016).

In essence, the market interest rate is a reflection of the time value of money in the context of the current supply and demand conditions in the money market and broader economic factors. It serves as a critical benchmark for various financial activities, from setting rates on loans and credit cards to determining the return on various investment vehicles.

Various elements play a role in shaping market interest rates. Long-zhen and Wan-jun (2008) identified that shifts in official rates, inflationary

trends, and the gap between market and official rates significantly impact market rate fluctuations in China's bond market. Dale (2010) observed that when the Bank of England adjusts its official rates, there's a notable ripple effect on market interest rates with maturities spanning from 1-month to 5-years. This indicates that rates with extended maturities are swayed by predictions regarding the trajectory of shorter-term rates. Reinhart and Sack (2002) dissected the dynamics of crucial long-term U.S. interest rates, attributing their movements to factors like risk-free interest rates, liquidity preferences, credit risks, and unique shocks in the Treasury and swap markets. They also noted a recent shift in the significance of these factors. Various interest rates on consumption, mortgages and deposits in the Czech Republic profoundly affect the amount of mortgages and consumer loans (Kostikov, Jílková, & Kofátková Stránská, 2019). Additionally, they found that a bank's return on equity is influenced by its profit margin and liquidity, but inversely affected by its financial leverage and the volume of loans it offers.

Methodology

The primary objective of this research is to delve into the intricate relationship between blockchain technology, cryptocurrency accounting, and market dynamics. With the advent of blockchain-based decentralized financing structures, there's a burgeoning interest in understanding how these novel financial mechanisms interact with traditional economic indicators, such as market interest rates. Market interest rates, being pivotal indicators of a nation's economic stability and essential tools of monetary policy, offer a compelling contrast to the decentralized nature of blockchain finance.

Within the realm of blockchain, blocks are intricately linked through preceding encrypted signatures, culminating in chains. This research embarks on a comprehensive comparative analysis, juxtaposing the nascent realm of blockchain-based decentralized finance (DeFi) structures with the established domain of market interest rates. Central to this exploration is the correlation between market interest rates and the

valuations of prominent cryptocurrencies, including Bitcoin, Ethereum, Ripple, Litecoin, and Dash.

In this study, the London Interbank Offered Rate (LIBOR) was used as a representative measure of market interest rates. LIBOR is commonly used as a benchmark for short-term interest rates around the world and serves as an indicator of the average rates at which banks lend to one another. Given its widespread use and recognition in both academia and the financial industry, LIBOR was deemed an appropriate metric for this research."

To achieve a robust understanding, this study harnesses a range of data collection methodologies. Historical data on interest rates and cryptocurrency valuations serve as the foundation, with subsequent correlation analyses shedding light on the intricate dynamics between these two financial realms.

In the "Data Collection" of the research, the methodologies used to collect the data required for the analysis are given as follows.

Interest Rates: Data on interest rates was collected from online sources such as central bank websites, financial market databases and other authorized financial news platforms. The data consisted of historical interest rates for the period under review.

Cryptocurrency Prices: Data on the prices of selected cryptocurrencies (Bitcoin, Ethereum, Ripple, Litecoin and Dash) was collected from cryptocurrency market data platforms such as CoinMarketCap, Marketwatch or through APIs provided by cryptocurrency exchanges. This data was also historical and matched the time frame of the interest rates data.

Data sets: Cryptocurrency Prices and Libor Interest rates from <https://www.marketwatch.com>, TLREF, Repo, Exchange Rate, Deposit Rate and Loan Interest rates from <https://evds2.tcmb.gov.tr> collected weekly from January 2019 to April 2023.

In the analysis of the research, the relationship between cryptocurrencies and interest rates were analyzed by correlation analysis. The findings obtained in the research were analyzed with the SPSS package program. While giving descriptive findings of the measurement tools, mean and

standard deviation values were used, and Pearson correlation analysis was used to examine the relationship between Cryptocurrencies and Interest Rates as a result of the normal distribution of the data.

Once the data is collected, correlation analysis was used to measure the strength and direction of the linear relationship between online interest rates and cryptocurrency prices. This shows whether there is a positive or negative correlation between the two variables or whether there is a significant relationship.

Before conducting the analysis, the data was processed and cleaned to ensure that it is free from errors and inconsistencies. The SPSS package program was used to conduct the correlation analysis.

Findings

The normality distributions of the data used in the study and the mean and standard deviation values of the variables used in the study are given below.

Table 2. Findings Related to Data Distribution

Variables	Central Tendency		Skewness-Kurtosis Measures	
	Mean	Median	Skewness	Kurtosis
DASH	105.13	88.15	0.82	-0.44
LITECOIN	97.37	76.12	1.44	2.10
XRP	48.03	0.37	15.00	225.00
ETHEREUM	1,328.83	1,210.00	0.83	-0.38
BITCOIN	23,484.15	19,019.00	0.74	-0.68
LIBOR	1.43	0.94	0.84	-0.36

As a result of the normal distribution analysis, it was determined that the data obtained from the central tendency measurements examined were from a normal distribution since the mean-median was close to each other and the kurtosis and skewness were between ± 2 (George, 2011). At the same time, since the data set included in the study was sufficient ($n \geq 30$), parametric methods, which are statistically more powerful based on the central limit theorem, were used (Ghasemi & Zahediasl, 2012).

Table 3. Mean and Standard Deviation Values for Cryptocurrencies and Market Interest Rates

Variables	Mean	Std. Dev.
DASH	105.13	48.50
LITECOIN	97.37	59.02
XRP	48.03	713.30
ETHEREUM	1,328.83	1,238.94
BITCOIN	23,484.15	17,036.96
LIBOR	1.43	1.46

When Table 3 is analyzed, it is determined that the average value of Dash is 105.13 ± 48.50 , the average value of LITECOIN is 97.37 ± 59.02 , the average value of XRP is 48.03 ± 713.30 , the average value of ETHEREUM is 1328.83 ± 1238.94 , the average value of BITCOIN is 23484.14 ± 17036.96 dollars, and it is determined that BITCOIN has the highest average in cryptocurrencies while XRP has the lowest average. At the same time, the high standard deviation of the XRP value indicates that this cryptocurrency shows a lot of periodic variability. The LIBOR market interest rate has a mean of 1.43 with a standard deviation of 1.46. This close proximity of the mean and standard deviation indicates that the LIBOR rates have values that are closely packed around the average, with occasional fluctuations. In summary, the table underscores the inherent variability in cryptocurrency values, with some like XRP and Ethereum showing significant volatility. In contrast, the LIBOR market interest rate, while variable, has values that are more closely clustered around its mean.

The hypotheses for this study were formulated based on a comprehensive review of empirical literature. Pearson correlation analysis was subsequently employed to test these hypotheses.

H1: There is a statistically significant relationship between Cryptocurrencies and Market Interest Rates.

H2: There is a statistically significant relationship between Dash and Market Interest Rates.

H3: There is a statistically significant relationship between Litecoin and Market Interest Rates.

H4: There is a statistically significant relationship between XRP and Market Interest Rates.

H5: There is a statistically significant relationship between Ethereum and Market Interest Rates.

H6: There is a statistically significant relationship between Bitcoin and Market Interest Rates.

Below is the table showing the relationship between LIBOR interest rates and cryptocurrencies.

Table 4. Relationship between LIBOR interest rates and cryptocurrencies

Variables	LIBOR	
	r	p
DASH	-0,548	0,001*
LITECOIN	-0,399	0,001*
XRP	-0,062	0,354
ETHEREUM	-0,289	0,001*
BITCOIN	-0,426	0,001*

The table presents the correlation coefficients (r) between the LIBOR market interest rate and selected cryptocurrencies. Additionally, the significance (p) values indicate the statistical significance of these correlations.

DASH: With a correlation coefficient of -0.548 and a significance level of 0.001*, DASH shows a moderately strong negative correlation with LIBOR. This suggests that as LIBOR increases, DASH's value tends to decrease, and vice versa.

LITECOIN: Litecoin exhibits a negative correlation of -0.399 with LIBOR, which is statistically significant at the 0.001* level. This indicates a moderate inverse relationship between Litecoin and LIBOR.

XRP: XRP's correlation with LIBOR is -0.062, which is not statistically significant with a p-value of 0.354. This suggests that there's a weak or no linear relationship between XRP and LIBOR.

ETHEREUM: Ethereum has a negative correlation of -0.289 with LIBOR, significant at the 0.001* level. This indicates a weak to moderate inverse relationship between Ethereum and LIBOR.

BITCOIN: Bitcoin shows a correlation of -0.426 with LIBOR, which is statistically significant at the 0.001* level. This suggests a moderate negative relationship between Bitcoin and LIBOR.

In summary, most of the selected cryptocurrencies exhibit a negative correlation with LIBOR, with DASH having the strongest inverse relationship. XRP stands out as the only cryptocurrency with a weak and non-significant correlation with LIBOR.

Table 5. Results of Research Hypotheses

Hypot hesis No	Hypothesis Statement	Acceptance/Rejection
H1	There is a statistically significant relationship between Cryptocurrencies and Market Interest Rates.	Partially Accepted
H2	There is a statistically significant relationship between Dash and Market Interest Rates.	Accepted
H3	There is a statistically significant relationship between Litecoin and Market Interest Rates.	Accepted
H4	There is a statistically significant relationship between XRP and Market Interest Rates.	Rejected
H5	There is a statistically significant relationship between Ethereum and Market Interest Rates.	Accepted
H6	There is a statistically significant relationship between Bitcoin and Market Interest Rates.	Accepted

The table provides an overview of the results for various hypotheses tested concerning the relationship between different cryptocurrencies and market interest rates.

H1: The general hypothesis suggests a relationship between cryptocurrencies as a whole and market interest rates. The results indicate a partial acceptance, implying that while some cryptocurrencies may have a significant relationship with market interest rates, others might not.

H2-H6: These are specific hypotheses for individual cryptocurrencies. Dash, Litecoin, Ethereum, and Bitcoin all show a statistically significant relationship with market interest rates, leading to their hypotheses being accepted. In contrast, XRP does not exhibit a significant relationship with market interest rates, resulting in the rejection of its hypothesis.

In essence, while most of the selected cryptocurrencies show a significant relationship

with market interest rates, XRP stands out as an exception.

Conclusion

The primary aim of this study was to delve into the relationship between various cryptocurrencies and market interest rates, while also exploring the intricacies of Cryptocurrency Accounting. As the financial world evolves, understanding the accounting practices associated with these digital assets becomes as crucial as understanding their market dynamics.

Market interest rates are pivotal indicators of a country's economic stability and are essential tools of monetary policy. Simultaneously, the rise of blockchain-based decentralized finance (DeFi) structures, represented by cryptocurrencies, has brought forth new challenges and considerations in the realm of accounting. This research bridges the gap between traditional economic indicators and the emerging world of cryptocurrency, shedding light on the accounting practices and challenges associated with these digital assets.

The study revealed a significant relationship between most of the selected cryptocurrencies (Dash, Litecoin, Ethereum, and Bitcoin) and market interest rates. However, XRP was an exception.

The overarching hypothesis (H1) posited a statistically significant relationship between cryptocurrencies in general and market interest rates. The results partially supported this claim, indicating that while some cryptocurrencies exhibit a significant relationship with market interest rates, others do not.

The hypothesis (H2) proposed a significant relationship between Dash and market interest rates. The results confirmed this hypothesis, suggesting that fluctuations in market interest rates might influence Dash's value or vice versa. The hypothesis (H3) postulated a significant relationship between Litecoin and market interest rates. The study's findings supported this claim, indicating a potential correlation between Litecoin's value and market interest rate changes. The hypothesis (H4) suggested a significant relationship between XRP and market interest rates. However, the results did not support this

hypothesis, indicating that XRP's value might be influenced by factors other than market interest rates. The hypothesis (H5) posited a significant relationship between Ethereum and market interest rates. The study's findings validated this claim, suggesting a potential interplay between Ethereum's value and market interest rate fluctuations. The hypothesis (H6) proposed a significant relationship between Bitcoin and market interest rates. The results confirmed this hypothesis, indicating that market interest rate changes might have an impact on Bitcoin's value.

The study revealed that most of the selected cryptocurrencies, namely Dash, Litecoin, Ethereum, and Bitcoin, have a significant relationship with market interest rates. This suggests that these cryptocurrencies' values might be influenced by economic indicators like market interest rates. However, XRP stands as an exception, with its value potentially being influenced by other factors. The findings provide valuable insights for investors, policymakers, and researchers interested in the dynamics between cryptocurrencies and traditional economic indicators.

The world of finance is undergoing a transformative phase, with cryptocurrencies at the forefront of this evolution. While their market dynamics with traditional economic indicators like market interest rates are crucial, understanding the accounting practices associated with them is equally vital. This research underscores the importance of a holistic approach to cryptocurrencies, considering both their market behavior and the accounting challenges they present. As digital assets continue to gain prominence, ensuring robust and transparent accounting practices will be pivotal for their integration into the broader financial ecosystem.

References

- Altuntaş, Ö. (2012). Merkez Bankası Bağımsızlığı: Avrupa Merkez Bankası ve Türkiye Cumhuriyet Merkez Bankası Karşılaştırması. *Pamukkale Üniversitesi Sosyal Bilimler Enstitüsü Dergisi* (12), 73-84.

- Belongia, M. T. (1987). Predicting Interest Rates: A Comparison of Professional and Market-based Forecasts. *Canadian Parliamentary Review*, 69, 9-15.
- Brooke, M. J., Cooper, N., & Scholtes, C. (2000). *Inferring Market Interest Rate Expectations from Money Market Rates*.
- Chatterjee, R., & Chatterjee, R. (2017). An Overview of the Emerging Technology: Blockchain. 2017 3rd. *International Conference on Computational Intelligence and Networks (CINE)*, 126-127.
- Çetin, O. (2022). Kurumsal Şeffaflığın Sağlanmasında Blok Zinciri Teknolojisinin Önemine Yönelik Bütünleştirici Bir Yaklaşım.
- Dale, S. (2010). The Effect of Changes in Official U.K. Rates on Market Interest Rates since 1987. *The Manchester School*, 61, 76-94.
- Demirgil, B., & Türkay, H. (2017). Tarihsel Süreç İçerisinde Faiz Olgusunun Kuramsal Açidan Gelişimi. *Cumhuriyet Üniversitesi İktisadi ve İdari Bilimler Dergisi*, 18(2), 131-160.
- Erdoğan, S., & Bodur, D. (2020). Blockchain Teknolojisi ve Günümüz Finansal Sistemine Olası Etkileri. *Mali Çözüm Dergisi*, 30, 281-295.
- Fermo, L. B. (2016). Policy Rate Divergence in the ASEAN-4: Impact of Global Risk Perception and Financial Market Characteristics. *Theoretical and Practical Research in Economic Fields (TPREF)*, 7(13), 30-52.
- Fu, X., Li, M. C., & Molyneux, P. (2021). Credit Default Swap Spreads: Market Conditions, Firm Performance, and the Impact of the 2007–2009 Financial Crisis. *Empirical Economics*, 60, 2203-2225.
- George, D. (2011). *SPSS for Windows Step by Step: A Simple Study Guide and Reference, 17.0 update, 10/e*: Pearson Education India.
- Ghasemi, A., & Zahediasl, S. (2012). Normality Tests for Statistical Analysis: A Guide for Non-statisticians. *International Journal of Endocrinology and Metabolism*, 10(2), 486.
- Jiang, H. (2023). *Application Analysis of Cryptography in Blockchain*. Paper presented at the International Symposium on Computer Engineering and Intelligent Communications.
- Junejo, A. Z., Memon, M. M., Junejo, M. A., Talpur, S., & Memon, R. M. (2020). *Blockchains Technology Analysis: Applications, Current Trends and Future Directions—An Overview*.
- Kamal, Z. A., & Fareed, R. (2021). A Proposed Hash Algorithm to Use for Blockchain Base Transaction Flow System. *Periodicals of Engineering and Natural Sciences (PEN)*.
- Kartal, M. T. (2019). Türkiye’de Referans (Gösterge) Faiz Oluşturulması: Türk Lirası Gecelik Referans Faiz Oranı (TLREF) Üzerine Bir İnceleme [Launching Reference (Benchmark) Interest Rate in Turkey: A Conceptual Examination upon Turkish Lira Overnight Reference Interest Rate (TLREF)].
- Karthik, C. (2018). *An Overview of Blockchain Technology*.
- Kiktenko, E. O., Pozhar, N. O., Anufriev, M. N., Trushechkin, A., Yunusov, R. R., Kurochkin, Y. V., Fedorov, A. K. (2017). Quantum-secured Blockchain. *Quantum Science and Technology*, 3.
- Kostikov, E., Jílková, P., & Kofátková Stránská, P. (2019). Quantified Impact of Market Interest Rates on Commercial Banks’ Business Mix. *Journal of International Studies*.
- Kuznetsov, A., Oleshko, I., Tymchenko, V., Lisitsky, K., Rodinko, M., & Kolhatin, A. (2021). Performance Analysis of Cryptographic Hash Functions Suitable for Use in Blockchain. *International Journal of Computer Network & Information Security*, 13(2), 1-15.
- Long-zhen, F., & Wan-jun, L. (2008). The Factors that Affect Market Interest Rates in Chinese Bond Market. 2008 4th *International Conference on Wireless Communications, Networking and Mobile Computing*, 1-5.
- Pierro, M. D. (2017). What is the Blockchain? *Computing in Science & Engineering*, 19, 92-95.
- Rahardja, U., Hidayanto, A. N., Lutfiani, N., Febiani, D. A., & Aini, Q. (2021). Immutability of Distributed Hash Model on Blockchain Node Storage. *Scientific Journal of Informatics*, 8, 137-143.
- Reinhart, V., & Sack, B. P. (2002). *The Changing Information Content of Market Interest Rates*.
- Taylor, P. J., Dargahi, T., Dehghantanha, A., Parizi, R. M., & Choo, K.-K. R. (2020). A Systematic Literature Review of Blockchain Cyber Security. *Digital Communications and Networks*.
- Thornton, D. L. (1986). The Discount Rate and Market Interest Rates: Theory and Evidence. *Canadian Parliamentary Review*, 68, 5-21.

- Yılmaz, Y. (2021). Blokzincir Teknolojisi ve Kripto Paraların Finansal Piyasalar Üzerine Muhtemel Etkileri. *Turkish Business Journal*, 2(4), 1-26.
- Zhai, S., Yang, Y., Li, J., Qiu, C., & Zhao, J. (2019). Research on the Application of Cryptography on the Blockchain. *Journal of Physics: Conference Series*, 1168.
- Zheng, Q., Li, Y., Chen, P., & Dong, X. (2018). An Innovative IPFS-based Storage Model for Blockchain. Paper presented at the 2018 IEEE/WIC/ACM International Conference on Web Intelligence (WI).
- Терещенко, О., Стецько, М., Ткаченко, Н., & Бабяк, Н. (2021). Determinants of Interest Rates On Corporate Debt. *Financial and Credit Activity Problems of Theory and Practice*, 4(39), 264-275.