

Digital currencies as an alternative investment

Heba Mohamed Srour

Finance, Business Department, Faculty of commerce and Business Administration, Future University in Egypt

Keywords

Digital currencies, stock exchanges, alternative investments, and the MENA area are discussed

Abstract

Purpose: The study intends to examine the movement of digital currency prices over time and compare it to the movement of financial indicators in various stock exchanges to determine whether or not modern digital currencies can represent a global alternative to investing in financial stock exchanges, given their low transaction costs and information confidentiality, which makes them more appealing to some investors.

Hypotheses: The research is based on testing two basic hypotheses (1) There is no statistically significant relationship between the movement of digital currency prices and stock index fluctuations. (2) Digital currencies cannot be used as a substitute for stock market investing.

Methodology: The statistical study was conducted from January 1, 2010, to July 15, 2022, using a sample of thirteen MENA region countries' indices, as well as three global indices represented by Nasdaq, Dow Jones, and American Standard & Poor's, to represent the fluctuations of these indices. The movements of financial stock exchanges, as well as the ten most active digital currencies in terms of transaction volume at the time of the research, were used as indicators. The STATA statistical program was also employed for correlation analyses.

Results: Standard deviations of samples showed that traditional currency markets are more stable than virtual ones. Because of this, it's clear that financial stock exchange traders can't use digital currencies as an alternative investment.

Introduction

The rapid development of information technology and its multiple applications in all spheres of life have shrunk the world to the size of a village, helped eliminate economic and cultural barriers between nations, and ushered in the so-called era of globalization, which has consequently led to the competition between nations to obtain the most of this technology and to implement it in the daily lives of their citizens and institutions.

One of the most important applications of information technology is electronic commercial practices through the Internet and by relying on computers or smart phone applications, using specific protocols, commercial agreements can be reached between many companies all over the world, where contract terms are negotiated and reviewed using meeting applications and previewing software. Purchases through camera applications, up until the possibility of paying and transferring money for the agreed-upon price of the goods using applications for high-security electronic cash transfers that are used not only for transferring from bank to bank within the same country, but rather to eliminate borders between all nations through the world. Following the transfer of funds, the goods are sent to the consumer at the agreed-upon address while maintaining the secrecy of the transactions. As a result, and to complete the circle of development of electronic commerce applications, digital currencies have emerged and gained popularity in recent years. However, they have not yet reached the strength of paper currencies, and no country has expressed a desire or willingness to recognize digital currencies as official currencies. Nonetheless, digital currencies have value in a society that relies on them for online transactions over the Internet.

The term Digital or Cryptocurrencies, which refers to digital currencies, originated when a man named Satoshi Nakamoto created Bitcoin, a new currency for Internet-based communication with the intention of becoming a global currency. Despite the popularity of the term "digital currencies," the multiplicity of types and uses of these currencies renders the term inaccurate, as the concept and specifications of currency are not available in these common types of electronic media developed for trading, as many of them were

created for purposes unrelated to traditional monetary purposes. In contrast to the concept and application of a currency such as Bitcoin, there are digital currencies used in the actual economy that can be exchanged for other paper currencies issued by central banks. In comparison to other means, such as gold, they share a number of characteristics, including limited supply and price volatility based on supply and demand forces. international transactions. (Benjamin J. Cohen, 1998).

As for the stock markets, they serve as the intermediary between individuals, businesses, and governments in need of financing on the one hand, and the same three groups with excess savings available for investment on the other. The financial markets assist companies in obtaining the capital they require by issuing stocks and bonds and assist individuals in investing their money by purchasing these securities. In addition, the growth of the Gross Domestic Product (GDP) contributes to an increase in the demand for goods and services, which is reflected in the desire of companies to borrow funds from the financial markets in order to meet the increased demand, which is reflected in the movement and development of the financial markets. Therefore, there has always been a correlation between stock market performance and economic growth. Numerous studies and scientific investigations have examined the connection between the movement of financial markets and economic development rates in an effort to describe their long-term relationship. (Radikoko, Mutobo, & Mphoeng (2019); Elhassan & Braima (2020); Kapaya (2020).

Global stock market indexes and GDP growth slowed as a result of the COVID-19 pandemic, the energy and food crisis during the Russia-Ukraine conflict. Many employments were lost, and economic growth suffered as a result of lower or nonexistent savings and investment. As a result, many businesses experienced a reduction in their ability to raise capital through the sale of stocks and bonds, and profits fell further. Because of this, business performance and economic activity both fell.

By comparing the prices of digital currencies over the same time period, it finds that they rose sharply as their use spread. This is because the volume of trading in these currencies rose sharply, which improved the efficiency of the markets for those currencies that are traded in high volumes over time, as indicated by numerous studies such as Urquhart (2016), Vidal-Tomas and Ibanez (2018), Jiang et al. (2018), Tran and Leiivik (2010), and others.

To determine the characteristics of investing in digital currencies and whether they are a viable alternative to investing in stock markets, this study analyses the price movement of digital currencies over a time series extending from January 1, 2010, to July 15, 2022, and compares it to the movement of a set of values of Arab and international stock exchange indices. Differentiating this study from others is the fact that no others have attempted such a comparison, and instead have focused on either explaining the theoretical aspect of digital currencies or attempting to establish a framework for dividing and distinguishing them. This is especially true in the Arab library.

Research Problem

Digital currencies have their own demand and supply, as their prices fluctuate in response to changes in demand and supply for and from them; thus, it can be said that the price movement of digital currencies reflects the extent to which investors rely on them as a tool for investment and profit-making, such as investing in stocks and financial bonds and trading on financial stock exchanges in general. Examining digital currency data from Table (1) reveals that there is a significant difference in the average values of digital currencies, as the averages range from \$1 to \$733,466 as a digital value. Similarly, the percentage change in the values of these currencies over a time series extending from January 1, 2010, to February 15, 2022, ranged from 21.84% to 821.45%, indicating a wide range in price volatility. Examining the data of the financial indicators of the various stock exchanges in Table (2) reveals that the average values range from 212,331 points to 10,895,441 points and the percentage of change in values ranges from 51.72% to 165.31%, which is significantly less than those of digital currencies. Therefore, it is necessary to analyze the relationship between the price movements of stock indices and those of virtual currencies.

Table (1): Price movement indicators for digital currencies

	USD	Cardano	Tether	Ethereum	XRP	TERRA	BITCOIN	Avalan c	BNB	Solana
average	1.000	0.484	1.000	733.466	0.338	55.796	10,068.44	46.700	113.604	61.820
Max	1.070	2.965	1.060	4,808.38	2.780	99.575	67,527.9	134.790	676.560	258.477
Min	0.852	0.023	0.904	6.700	0.004	25.071	111.600	3.470	1.490	1.004
Max-min	0.218	2.942	0.156	4,801.68	2.776	74.504	67,416.3	131.320	675.070	257.473
Change %	21.84%	607.92%	15.60%	654.66%	821.45%	133.53%	669.58%	281.20 %	594.23%	416.49%

Source: Prepared by author

	Nasdaq	Moroc o	Muscat	Dubai	DJI	tuninde x	Qatar	Amman	Manam a	Jerusale m	Kuwait	EGX30	sp	SaudiAr abia	Israel	Turkey
avearge	6,086.784	10,895. 442	5,403.4 18	2,743.0 58	19,909. 883	5,729.4 81	9,840.2 30	2,053.1 11	1,337.6 92	509.719	6,374.3 48	9,394.8 04	2,283.0 06	7,820.3 88	212.331	373.957
max	16,057.44	13,991. 470	7,547.6 50	5,374.1 10	36,799. 650	8,431.6 40	14,350. 500	2,648.3 60	1,872.1 30	617.240	8,430.7 30	18,363. 290	4,796.5 60	12,341. 560	291.070	697.020
min	2,091.790	8,356.4 00	3,383.5 40	1,301.2 40	9,686.4 80	4,058.5 30	6,502.9 30	1,533.3 50	1,035.3 00	416.260	4,661.1 60	3,586.5 50	1,022.5 80	5,323.2 70	131.910	157.670
max- min	13,965.650	5,635.0 70	4,164.1 10	4,072.8 70	27,113. 170	4,373.1 70	7,847.5 70	1,115.0 10	836.830	200.980	3,769.5 70	14,776. 740	3,773.9 80	7,018.2 90	159.160	539.350
	229.44%	51.72%	77.06%	148.48 %	136.18 %	76.33%	79.75%	54.31%	62.56%	39.43%	59.14%	157.29 %	165.31 %	89.74%	74.96%	144.23 %

Table (2): Change in value indicators for financial stock market indices

Source: Prepared by author

Then, the following research questions can be formulated:

- 1- Is there a relationship between the movement of digital currency prices and volatility in financial indicator values?
- 2- Can investment in digital currencies offer an alternative to stock markets?

Research aims and Objectives

1. To Present the concept of digital currencies and their most salient characteristics
2. To Compare the price fluctuations of digital currencies to the price fluctuations of financial indicators in the MENA region in order to determine which is more volatile and therefore more hazardous.
3. Examining the viability of digital currencies as an alternative to stock market investments.

Scientific and Practice significance

Importance from a scientific standpoint: The significance of this research derives from its contribution to the Arab library of recent studies on the concept of digital currencies, whose existence and function on Arab markets remain unclear.

Importance for practice: The researcher aims to provide results that Egyptian and Arab investors can rely on or consider when deciding between potential investment alternatives within the investment portfolio to achieve optimal diversification and risk reduction. The results of this study will clarify whether digital currencies can be recognized as an alternative investment to securities or not.

Research plan

The study begins with a presentation of digital currency definitions and the most important types of digital currency based on the volume of dealings with them; then presents some previous studies that dealt with digital currencies and concludes with the study's hypotheses; followed by uses applied statistical methods to test the hypotheses by comparing the price movements of the ten most traded digital currencies at the time of the study's preparation and ten stock market indices from MENA region, which, according to the World Bank, is (Iraq, Jordan, United Arab Emirates, Bahrain, Algeria, Saudi Arabia, Sudan, Somalia, Morocco, Yemen, Tunisia, Sultanate of Oman, Syria, Palestine, Qatar, Lebanon, Libya, Egypt, Mauritania, Turkey, Iran), along with a three other global indicators during period from January 2010 to July 2022, Finally, the study concludes with a discussion of the implications of the findings and recommendations.

Overview to the concept of virtual currencies

There is no standardized definition of digital currency; some refer to it as (virtual cash), others as (electronic money), and still others as (electronic cash) or (digital cash) (Ali, 2019). As defined by Baron et al. (2015), a cryptocurrency is a digital representation of a value that is transferred, stored, or circulated electronically, is not issued by the central bank or government agencies, is not necessarily related to another currency such as the dollar or the euro, etc., and is accepted as payment by its dealers. Al-Zalmi (2010) defines it as a digital currency issued by the government or private sector. The International Monetary Fund defines it as a cash value preserved in electronic form or electronic memory for the consumer's benefit. Therefore, it is possible to say that digital currency is a new form of currency, or that it is the electronic alternative to physical paper and metal money. (Al-Rasheed, 2014). This new currency is visible but cannot be handled, as it lacks actual dimensions and weight, as well as other physical characteristics of currency. This money consists of numbers that can be displayed on millions of screens around the globe. (Kartersman, 2010)

In its 2012 report on virtual currencies, the European Central Bank (ECB) also classified cryptocurrencies as a subset of virtual currencies. They can be traded against official currencies and used to purchase electronic or physical products. In a 2015 report on digital currencies, the European Central Bank defines virtual currencies as "a digital representation of value that is not issued by central banks, lending institutions, or electronic money issuers and that can be used as a substitute for cash in certain circumstances." as well as to specify that cryptocurrencies like Bitcoin are decentralized binary virtual currencies. The International Monetary Fund (IMF) defined cryptocurrency in 2016 as "a digital representation of value, issued by private developers and denominated in their unit of account." This definition included a variety of digital currencies, and it could also include bonds. In addition to virtual currencies backed by other assets such as gold and cryptocurrencies such as Bitcoin, unofficial parties' issue simple debt.

As defined by the Committee on Payments and Capital Markets Infrastructure (CPMI) of the Bank for International Settlements (BIS), cryptocurrencies are digital currencies with the following distinctive characteristics:

1. It is a commodity, like gold, whose value is determined by supply and demand; unlike electronic money, it does not constitute an obligation on the part of any individual or institution and is not backed by any government.
2. It is transferred electronically from one person to another, without intermediaries and in the absence of trust between all parties, and some of them use "distributed ledger" technology.
3. Its administration is not subject to supervision by any official body.

The World Bank (WB) also defined it as "a digital representation of value denominated in their own unit of account," distinguishing it from electronic money, a digital payment method denominated in traditional currencies. In addition, cryptocurrencies were classified as a digital currency founded on cryptographic technology.

The researcher can define encrypted digital currencies as follows: "It is a digital representation of value that is used for electronic commerce over the Internet. It depends on programming technology for its creation and exchange. It is not issued by a central bank or a supervisory or regulatory authority. Instead, its creator issues and monitors the token. It does not impose any obligations on either party. Digital currency characteristics can be summed up as follows.

1. It is a virtual currency that has no physical existence and is not backed by any government.
2. It is only utilized by businesses and individuals via the Internet.
3. The digital currency consists solely of electronically stored encrypted data.
4. Without the need for a third party, the two-party digital currency is transmitted directly between the consumer and the producer.
5. Can Any individual or organization create this form of currency?
6. It is not issued by any nation's central bank, but by private corporations or institutions.
7. The incapacity to keep track of operations that occur. (Al-Rasheed, 2014)

Table (3): significant distinctions between digital and conventional currencies

	Conventional Currency	Digital Currency
Issuer	Used by government	Self-issued
Offering	unlimited	limited
Legal Capacity	Not legally binding	Legally binding
Legalization	Guaranteed by the issuing government	It has no legal cover
The Shape	Paper and electronic	electronic
Value	Supply and demand in addition to economic policies	By supply and demand only
Centralization	centralized	decentralized

Source: Prepared by author

Bitcoin is the first station for the emergence of encrypted virtual currencies, which emerged as a result of an article titled "A Peer-to-Peer Electronic Cash System" published by an anonymous programmer named Satoshi Nakamoto. This article explains the "Bitcoin" currency system, which relies on presenting and trading on "distributed ledger technology" and the block chain, which is represented in a network of members to exchange transactions from peer to peer (P2P) without an intermediary of exchange such as banks and uses coding technology for the safety of transactions that occur through the network.

In January of 2009, "Bitcoin" emerged as the first digital currency in specific quantities. Only a small number of enthusiasts dealt with it, and it was anticipated that "Nakamoto," the creator of this currency, had released approximately one million units of "Bitcoin" that year. Only, however, he has not been seen in public since then, and no one has been able to accurately identify him until now. In 2010, using (Bitcoin talk), the first "bitcoin" transactions began with the purchase of a pizza for ten thousand units of "bitcoin" at a value of (0.003.) dollars per unit, after which prices rose gradually to (0.30.) dollars per unit in January 2011. The increase in the volume of "Bitcoin" transactions resulted in the establishment of an infrastructure within the Internet that enables users to trade and store the currency, as well as the emergence of the first "Bitcoin" exchange. In the same year, the value of each unit reached approximately thirty dollars before decreasing to approximately five dollars. This contributed to the emergence of new digital currencies such as Altcoins, an extension of the "Bitcoin" currency that has developed some of the characteristics of "Bitcoin," such as transaction speed and anonymity.

In 2012, many Internet merchants accepted Bitcoin as a form of payment, and (WordPress) was the first website to do so. Other companies, such as Microsoft, quickly followed, and this was considered a first step towards widespread acceptance. International acceptance of "Bitcoin" and other digital currencies, and the development of additional digital currencies such as the "Ripple" currency in the same year.

The first Initial Coin Offering (ICO) took place in 2013 as a form of crowdfunding, sparking controversy due to the absence of oversight that governed the transactions of this type of financing. During the period (2014-2016), the "Bitcoin" situation continued to progress, particularly after the first "Bitcoin ATM" appeared in February 2014; by October 2017, there were approximately 1,500 "Bitcoin" ATMs worldwide. And in 2015, the Coinbase platform based in the United States became the first regulated Bitcoin exchange. In terms of value, 2017 is the year of recovery for encrypted virtual currencies, as the price of "Bitcoin" rose to \$20,000 USD in December 2017. Simultaneously, the price of "Ethereum," one of the types of encrypted virtual currencies, rose by more than 9000%, while the price of "Ripple" rose by (36000%). The total value of all cryptographic virtual currencies in circulation was (100) billion US dollars in July, then peaked at (850) billion US dollars in January 2018 before falling by more than (50) percent by the end of the same year. Numerous encrypted virtual currencies have proliferated in the Internet space over the past several years, and the most well-known examples of these currencies are as follows:

Ripple XRP

The Ripple currency, introduced in 2012, seeks to facilitate secure, nearly cost-free, instant, global financial transactions of any size without chargebacks. Ripple is a peer-to-peer payment protocol and a peer-to-peer payment network. Also known as the Ripple Transaction Protocol (RTXP) or the Ripple Protocol, it is based on a distributed, open-source Internet protocol, consensus ledger, and XRP (XRP) native

currency. Ripple is based on a shared public database or registry that employs a consensus process to enable distributed payments, exchanges, and transfers.

Ethereum

The "Ethereum" currency is founded on a decentralized platform that was introduced in 2015 and processes its transactions using Block Chain technology. Technically speaking, the "Ethereum" platform is not a cryptocurrency, but it is used to operate smart contracts. This platform provides incentives for trading, and "Ether" is the platform's currency. As with Bitcoin, Ethereum employs Proof of Work (PoW) to validate transactions, where PoW stands for Proof of Work or Validity. Work is an economic measure to deter network attacks and abuses such as spam by imposing some work on the service requester, typically requiring more processing time from his computer. The currency of "ether" differs from that of "bitcoin" in a number of ways, including the fact that the block generation time in "Ethereum" is shorter than that in "bitcoin," spanning between (14-15) seconds compared to ten minutes in "bitcoin," and the number of "bitcoin" units versus the number of "ether" units. The amount generated decreases over time, whereas the number of "ether" units exported remains constant throughout the year.

Cardano coin

Cardano describes itself as "the most environmentally sustainable cryptocurrency" due to the blockchain's innovative Proof of Stake (POS) protocol, which estimates the proportion of coins a miner possesses as opposed to their processing power. Cardano was established in 2015.

Solana coin

It is a digital currency. In November 2017, Anatoly Yakovenko published a research paper on it, and in March 2020, it appeared in the cryptocurrency world as a cryptocurrency and blockchain network. As described by the American magazine Bloomberg in 2021 as "a strong competitor for Ethereum in the future" due to the speed of its transactions and its low transaction fees.

Avalanche currency

A coin that is an open, programmable smart contract platform for decentralized applications that will be introduced in June 2020. AVAX, Avalanche's native token, is used to pay transaction fees and can be layered for network security. Avalanche, like Ethereum, is capable of running a variety of applications, including stable coins and DeFi protocols (Decentralized Finance). Avalanche is also compatible with Solidity, the programming language used by the Ethereum network, meaning that developers from one of the largest and most active crypto communities can use it to deploy private or public blockchains as "subnets." Avalanche claims to be able to process more than 4,500 transactions per second, whereas the Bitcoin blockchain can typically process about seven transactions per second. And after reviewing the most prominent encrypted virtual currencies in the world, whose number exceeds (5260) cryptocurrencies according to coinmarketcap.com in March 2020, we conclude that there are more than (5260) cryptocurrencies. We find that what has been described will not differ significantly from the rest of the encrypted electronic currencies, as they are all founded on a similar strategy to ensure privacy, transaction speed, and decentralization. In behavior, which raises with it the desire of a certain type of investors to search for and deal with them, which has led to their prosperity, and the high demand for them in recent times, the importance of research on these cryptocurrencies and the possibility of considering them as an investment option available to all have emerged.

Literature Review

The majority of earlier research, both Arabic and English, dealt with digital currencies in various aspects, the most important and most important of which were It is a presentation of the notion of digital currencies, their various definitions, division, and how to deal with them, such as Al-Mashadani (2018), Al-Farhoud (2018), Hashim and Abu Jib (2019), Badew and Mathew (2014). Some, such as Badr (2020), Turpin (2014), Barito et al. (2014), Ammous (2014), Bjerg (2017), and Heller (2017), have investigated it in terms of its relationship to the economy and its impact on the gross domestic product or the monetary policy of countries and the financial system in general.

In terms of what was exposed to the study of digital currencies as their own market and an exchange for trading and transactions as an investment tool, or some research that dealt with the study of the efficiency of the digital currency market and its relationship to various financial markets in a few studies, and the question about digital currency markets and exchanges and their relationship to financial markets is still being researched. The research will next present a collection of past studies that dealt with the digital currency markets in the study, which will be organized chronologically from the most recent to the oldest as follows:

Leirvik (2021) investigated the relationship between the return on investment in digital currencies and liquidity volatility in cryptocurrency markets, discovering a positive relationship between liquidity volatility and predicted returns. He determined that the relationship between liquidity volatility and returns is generally positive, but extremely changeable over time, using a sample of the top five cryptocurrencies by market capitalization from 2016 to 2021. This suggests that investors are willing to pay a premium for bigger fluctuation in liquidity volatility. As a result, when liquidity is scarce, predicted returns are high.

The study conducted by Baur and Thomas (2017) sought to quantify the association between the movement of pooled assets and the quantity and form of bitcoin volatility. It found that Bitcoin cannot be called a currency because of its excessive volatility, which makes it hard to trust it as a medium of trade. Aside from the fact that it is not an official currency in any country and is not supported by any government, this means that the high level of volatility affects every Bitcoin transaction, whether local or international via Internet communication networks. However, the gains earned by bitcoin speculators can define bitcoin as a dangerous investment.

Sauer (2016) concluded in his study on the impact of increased demand for digital money on central bank monetary policy that, assuming that digital money has the ability to become currencies parallel to the local currency, it is currently not in a position to become an alternative to traditional currencies. As a result, it does not pose a significant risk or a genuine threat to central banks. It does, however, acknowledge the potential threats and challenges it may bring to policymakers if the exchange rate of private cryptocurrencies for domestic money rises. As the demand for digital currency grows, the central bank's ability to oversee monetary policy will deteriorate.

Briere et al. (2015) conducted a study from 2010 to 2013 to examine Bitcoin investment from the perspective of an American investor within a diversified portfolio containing traditional assets (global stocks, bonds, and hard currencies) and alternative investments (commodities, hedge funds, and real estate), and concluded that investing in Bitcoin provides significant diversification benefits. However, it is subject to considerable swings, thus caution should be exercised when relying on the initial outcomes of the investment, since the data may reflect early-stage behaviour that does not persist in the long term.

Based on prior study, it can be concluded that there is still a need to perform additional studies on this new type of investment and its relationship to financial markets, particularly Arab ones, emphasising the necessity of this research. The next sections will present the study's research hypotheses and how to statistically test them.

Research hypotheses

After reviewing the various types of digital currencies and comparing their price movements to the price movements of the financial market indices under study, as well as reviewing some previous studies that dealt with encrypted currencies, the researcher can formulate the following research hypotheses:

H₀₁: There is no statistically significant relationship between the movement of digital currency prices and stock index fluctuations.

H₀₂: Digital currencies cannot be used as a substitute for stock market investing.

To evaluate the research hypotheses, the research sample comprised of the ten largest digital currencies in terms of trading volume on July 15, 2022, which are (Bitcoin - Avalanche - BNB - Terra - Solana - XRP - Ethereum - Tether - Cardano - USD) and financial indicators. Financial markets in a group of MENA countries that represent North Africa and the Middle East, namely (Egypt, Tunisia, Morocco, Saudi Arabia, Qatar, Emirates, Kuwait, Bahrain, Palestine, Jordan, Oman, Turkey, Israel), as well as three American indices that represent global financial stock exchange movements (NASDAQ, Dow Jones, Standard & Poor's). The time series data for these indicators were taken from the Investing.com website and were analyzed from January 1, 2010, to July 15, 2022 - daily data. STATA is a statistical software tool.

Table No. (4) presents a summary of the most important statistical indicators of the time series data of the digital currencies used, and it can be stated that there is a large discrepancy between the different encrypted currencies, and the differences are very heterogeneous. (0.0000256) for the Tether currency, whereas the skew values ranged between (6.228383 for the XRP currency) and (-5.0301 for the USD currency), as indicated in the table, and other statistics.

stats	Avalan~e	BNB	Solana	Terra	XRP	Ethereum	Bitcoin	Tether	Cardano	USD
mean	.0119315	.0055	.0122924	.0052258	.0059989	.003951	.0028548	.0000452	.0023607	.0000514
sd	.0941678	.0658141	.0916257	.0739984	.0883369	.0561385	.042567	.0050575	.0631258	.0098052
kurtosis	12.67432	23.03428	9.405799	4.172697	108.3233	8.041133	9.742856	33.39874	7.770864	182.1675
variance	.0088676	.0043315	.0083953	.0054758	.0078034	.0031515	.0018119	.0000256	.0039849	.0000961
skewness	1.565461	1.843244	.9738103	.5135249	6.228383	.0107313	-.0956863	.2707247	.5677634	-5.0301
max	-.01	.7	.65	.32	1.8	.26	.26	.05	.42	.13
p50	.02	0	0	0	0	0	0	0	0	0
min	.02	-.44	-.42	-.17	-.48	-.45	-.39	-.06	-.41	-.2

Table (4): Statistics for time series of digital currency prices

Source: Prepared by author

As for the time series data of the various financial market indicators, they were more homogeneous in the statistical indicators, as shown in Table No. (5), and we find that the values of the coefficients of variation in the time series data of the different financial market indicators are clearly lower than their counterparts in the statistical indicators. Digital currencies are more comparable, with a maximum of (0.0005091) and a minimum of (0.0000221).

Table (5): Statistics for time series of financial Market indices

stats	Turkey	Israel	Saudi	standard	Egypt	Kuwit	eIcodth	Elmanama	Oman	Qater	Todandex	Dawjonz
mean	-.0002838	-.0000779	.0002894	.0003951	.0001224	-.0000223	.0001725	.0000668	.000089	.0000946	.0001725	.0004174
sd	.0225634	.0128896	.0118512	.0115603	.0134887	.0108851	.0046984	.0055234	.004915	.010539	.0049297	.0118685
kurtosis	25.63897	13.32379	12.02191	20.57173	7.482023	172.4759	11.74134	15.8999	9.859669	14.2082	13.29783	24.28624
variance	.0005091	.0001661	.0001405	.0001336	.0001819	.0001185	.0000221	.0000305	.0000242	.0001111	.0000243	.0001409
skewness	.7174493	-.6299705	-.5577898	-.75186	-.3258856	-8.224667	-.5237129	-1.047675	.133267	-.5726646	-.9093123	-.7262093
max	.3	.1	.09	.09	.07	.06	.03	.03	.03	.08	.03	.11
p50	0	0	0	0	0	0	0	0	0	0	0	0
min	-.18	-.11	-.08	-.12	-.09	-.25	-.04	-.06	-.04	-.1	-.04	-.13

stats	Dubai	Maskat	Morroco	Nasdak
mean	-.0000779	-.0002727	.0001169	.0006789
sd	.013142	.006681	.0074123	.0132218
kurtosis	16.15102	19.06257	24.93986	12.0427
variance	.0001727	.0000446	.0000549	.0001748
skewness	.196915	-.7197479	-1.380729	-.5657743
max	.13	.06	.05	.09
p50	0	0	0	0
min	-.08	-.06	-.09	-.12

Source: Prepared by author based on STATA output

By using the Pearson correlation coefficient to conduct correlation tests between the movement of price data series of financial market indices and the movement of price data series of digital currencies. Through analyzing the correlation coefficient test results shown in Table No. (6), it was discovered that the statistical significance values (Sig.) are greater than the acceptable level of 5%, indicating that there is no linear relationship between changes in currency rates and changes in the prices of financial indicators in countries. The topic of the research.

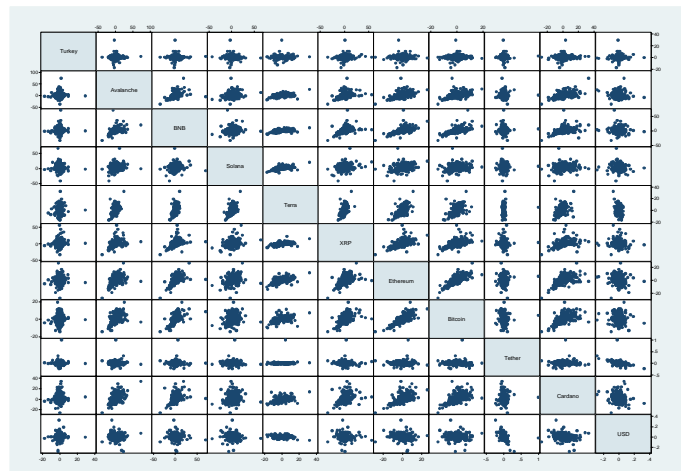
Table (6): shows the Pearson correlation coefficient between the value of digital currencies and the value of financial indicators.

Currencies	Avalanche	BNB	Solana	Terra	XRP	Ethereum	Bitcoin	Tether	Cardano	USD Coin
Saudi Arabia	-0.1195	0.0523	-0.004	-0.043	-0.010	0.0015	-0.029	0.1192	0.0840	0.0130
Sig. (2-tailed)	0.220	0.120	0.310	0.410	0.276	0.347	0.720	0.840	0.330	0.290
Egypt	0.0777	0.0158	0.0406	0.0985	0.0622	0.0953	0.0603	0.0505	-0.0045	-0.1557
Sig. (2-tailed)	0.412	0.512	0.612	0.345	0.133	0.444	0.788	0.188	0.790	0.880
Kuwait	-0.0030	-0.032	-0.046	0.0301	-0.007	-0.0293	0.0175	0.0347	-0.0222	0.0609
Sig. (2-tailed)	0.212	0.311	0.455	0.911	0.611	0.766	0.121	0.132	0.112	0.199
El kodth	-0.0672	-0.113	-0.160	-0.037	-0.174	-0.1190	-0.183	0.1183	-0.0959	0.0088
Sig. (2-tailed)	0.510	0.610	0.580	0.480	0.330	0.70	0.60	0.54	0.33	0.94
Elmanama	0.0855	0.1079	0.0654	0.1802	0.0626	0.1056	0.0677	0.0158	-0.0252	0.0640
Sig. (2-tailed)	0.341	0.666	0.727	0.629	0.148	0.330	0.222	0.70	0.60	0.54
Oman	-0.0909	-0.018	-0.082	-0.105	-0.098	-0.1239	-0.098	0.0243	-0.1004	-0.0898
Sig. (2-tailed)	0.595	0.275	0.193	0.131	0.431	0.412	0.405	0.496	0.159	0.421
Maskat	-0.0585	-0.082	-0.124	-0.050	-0.015	-0.0356	0.0149	-0.069	-0.0921	0.0861
Sig. (2-tailed)	0.971	0.230	0.205	0.296	0.259	0.721	0.971	0.530	0.175	0.696
Morocco	0.0065	0.0531	0.0048	-0.029	0.0012	0.0550	-0.002	-0.060	0.0400	0.1061
Sig. (2-tailed)	0.838	0.497	0.764	0.896	0.659	0.392	0.641	0.434	0.185	0.896
Turkey	-0.0433	-0.07	0.0013	0.0394	0.0001	-0.0484	0.0099	0.0178	0.0546	0.0007
Sig. (2-tailed)	0.432	0.532	0.632	0.332	0.122	0.252	0.732	0.165	0.122	0.177
Israel	-0.1053	-0.026	-0.192	-0.125	-0.123	-0.1077	-0.146	-0.104	-0.0972	0.0433
Sig. (2-tailed)	0.116	0.126	0.311	0.211	0.111	0.340	0.501	0.211	0.243	0.610
Dawjonz	0.0805	0.0100	-0.053	0.0307	0.0457	0.0424	0.0409	0.0110	0.0353	-0.030
Sig. (2-tailed)	0.333	0.228	0.541	0.722	0.167	0.331	0.650	0.976	0.790	0.899
ستاندر آند بورز	-0.0275	-0.023	-0.076	0.0376	0.0212	0.0169	0.0451	-0.056	-0.0398	0.0776
Sig. (2-tailed)	0.116	0.126	0.311	0.211	0.327	0.620	0.140	0.330	0.222	0.147
Todandex	-0.0134	0.0080	-0.027	-0.058	-0.059	-0.0241	0.0029	-0.011	-0.1139	0.0729
Sig. (2-tailed)	0.225	0.335	0.567	0.222	0.771	0.430	0.105	0.896	0.659	0.321
Nasdak	0.0032	-0.102	-0.062	-0.005	0.0062	-0.0837	-0.106	-0.004	0.0315	-0.022
Sig. (2-tailed)	0.221	0.510	0.705	0.116	0.67	0.35	0.78	0.49	0.115	0.196

Source: Prepared by author based on STATA output

The scatterplot depicted in Figure No. 1 is a type of data presentation that illustrates the relationship between two numerical variables. There are both positive and negative correlations. Variables that are positively correlated move in the same direction, whereas variables that are negatively correlated move in opposite orientations.

Figure No. (1) The spread chart between the change in the financial indicator data and the digital currency data.



Source: STATA-V15 output

This scheme demonstrates that there is no correlation between the values of financial indicators and the prices of digital currencies.

A comparison of the magnitude of the hazards associated with the digital currency market and the stock markets.

By calculating the coefficient of variation (CV), which is the ratio of the standard deviation to the mean return, the extent of the sample data's variance relative to its mean can be determined. The greater the value of the coefficient of variation, the greater the dispersion, which implies an increase in the volume of fluctuations and a decline in the stability of the data. The researcher discovered that the coefficient of variation for stock market time series data is more stable than for digital currency data, as the coefficient of variation in Table No. 8 is less than that in Table No. 7.

Table (7): variation coefficient for digital currency data

Avalanche	17.887736
BNB	18.971427
Solana	16.10022
Terra	13.8802
XRP	12.83896
Ethereum	12.48697
Bitcoin	26.22998
Tether	30.45277
Cardano	10.7147
USD Coin	37.71

Source: Stata -V₁₅ output

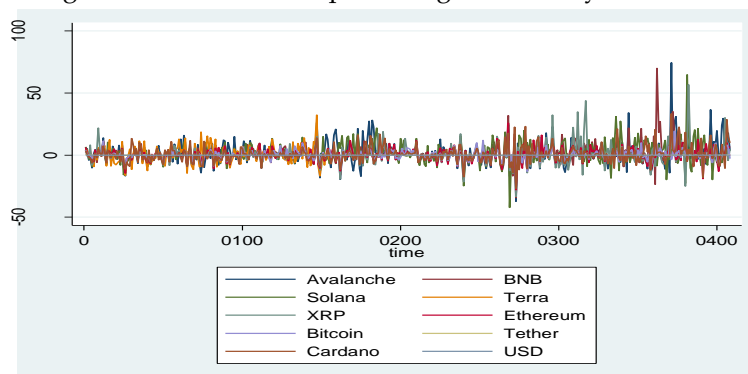
Table (8): Variation coefficient for digital currency data

Market Index	Turkey	Israel	Saudi	standard	Egypt	Kuwait	Elkodth	Elmanama	Oman
C.V	4.3	6.1	5.6	10.63	8.4	7.07	7.24	4.63	7.63
Market Index	Qater	Todandex	Dawjonz	Dubai	Maskat	Morroco	Nasda		
C.V	6.91	21.7	11.677	8.05	12.14	7.0534	15.7		

Source: created by the researcher using Stata -V₁₅ outputs.

The following chart illustrates the fluctuations in the analyzed digital currencies, as the risks of investing in digital currencies range from zero to more than fifty percent of their value, indicating high risks and market instability. Obviously, high risks result in high returns, which is what many investors pursue, those who enjoy taking risks in order to obtain rapid and substantial profits.

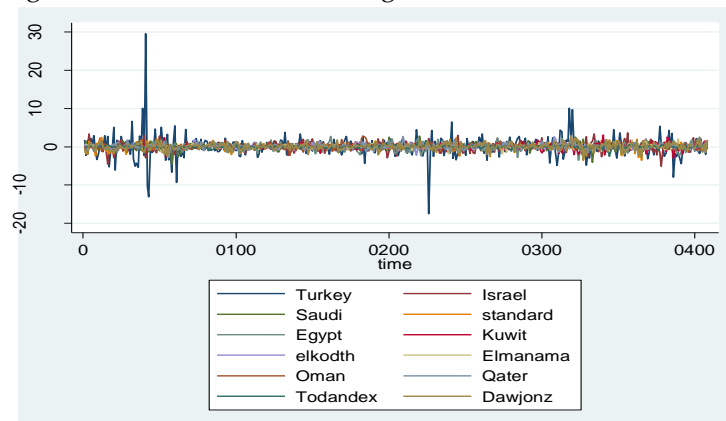
Figure No. 2. The scatterplot of digital currency data time series



Source: Stata -V₁₅ outputs.

As depicted in the following figure No.3, which depicts the fluctuations of the stock market indices in the countries under study, the risks range from zero to ten percent of the investment in these markets, as the stock markets offer excellent investment opportunities with low risks in comparison to investing in digital currencies, which entail numerous risks, whether systematic risk or technological risk.

Figure No. 3: Time series scattergram of financial indicator data



Source: Stata -V₁₅ outputs.

Checks For Data Fit in Regression Analysis

Under the assumption that there is no high correlation between the independent variables (Multicollinearity), the Variance Inflation Factor (VIF) test and the Tolerance test for each independent variable are used, with the VIF not exceeding the value of (10) and the Tolerance test value being greater than (0.05). It was further verified that the data follow a normal distribution by computing the skewness coefficient, as shown in the table, as the null hypothesis stipulates that the data follow a normal distribution if the skewness coefficient value is smaller than 1.

Table (9); tests the variables' skewness, allowed variance, and variance inflation coefficients.

No.	Independent Variables	Variation Inflation Factor (VIF)	Tolerance	Skewness
1	USD	2.897	0.5197	0.9892
2	Cardano	2.736	0.4907	0.7334
3	Tether	2.902	0.5577	0.8678
4	Ethereum	2.889	0.4787	0.2284
5	XRP	3.234	0.6487	0.6201
6	TERRA	3.009	0.1037	0.9347
7	BITCOIN	3.535	0.5284	0.9317
8	Avalanche	3.652	0.4994	0.7707
9	BNB	3.398	0.5664	0.9057
10	Solana	3.661	0.4874	0.2937
11	Nasdaq	4.745	0.6574	0.6867
12	Morocco	3.882	0.1124	0.9347
13	Muscat	3.755	0.5371	0.9404
14	Dubai	3.872	0.5081	0.7794
15	DJI	3.618	0.5751	0.9144
16	tuneindex	3.881	0.4961	0.3024
17	Qatar	4.965	0.6661	0.6954
18	Amman	4.102	0.1211	0.9434
19	Manama	3.239	0.5458	0.9491
20	Jerusalem	4.324	0.5168	0.7881
21	Kuwait	4.441	0.5838	0.9231
22	EGX30	4.187	0.5048	0.3111
23	S&P	4.456	0.6748	0.7041
24	Saudi Arabia	5.534	0.1298	0.9521
25	Israel	4.671	0.4152	0.2964
26	Turkey	3.808	0.9602	0.6172

Source: created by the researcher using Stata -V₁₅ outputs.

The previous table clearly shows that all variables' variance inflation coefficient test values are less than 10 and range between 2.73 and 5.53, and that all variables' tolerance test values are higher than 0.05 and range between 0.1073 and 0.661, respectively. This shows that there is no significant multicollinearity between the independent variables, which would prevent accurate results from being obtained when

analyzing the regression.

Analysis of regression

In order to ascertain the impact of simple linear regression, it is necessary to examine the linear relationship between the CREP variable, which expresses the digital currency variable, and the EQU variable, which expresses the stock indices in the group of chosen countries. This will help to reveal the degree to which each variable influences the other. To assess the effects of each, the following two models were suggested:

The first model that has been put forth looks at the relationship between stock and cryptocurrency investments and individual investor preferences. The first equation has the following form:

$$\text{CREP} = a + \beta_1 \text{Equity} + \varepsilon \quad (1)$$

Results of the first equation's linear regression's outputs

Table (10): results of regression analysis for the first equation

crep	Coef.	St.Err.	t-value	p-value	[95% Conf	Interval]	Sig
Equ	1.301	.023	55.48	0	1.255	1.347	***
Constant	-6136.669	138.08	-44.44	0	-6407.408	-5865.929	***
Mean dependent var	1428.781	SD dependent var	1700.790				
R-squared	0.502	Number of obs	3051				
F-test	3078.169	Prob > F	0.000				
Akaike crit. (AIC)	51923.864	Bayesian crit. (BIC)	51935.910				
*** p<.01, ** p<.05, * p<.1							

Source: created by the researcher using Stata -V₁₅ outputs.

At a confidence level of 95%, the R-squared coefficient of determination of 0.50 indicates a high explanatory power of the independent variable in the model, which is a very excellent percentage. The quality of the estimated model as a whole from a statistical standpoint and the value of the determination coefficient indicate that 50% of the changes that occur in investing in digital currencies are due to the change in investment in stocks, while the remaining percentage is due to other factors that are unrelated to the interrelationship between the study variables.

The preceding table demonstrates that the F test value for the model was 0.000, which is a function at the level of 0.05, indicating that the proposed model has a high level of suitability and explanatory power. Therefore, there is a significant correlation between investors' preferences to invest in equities and their investment preferences in digital currencies.

The results of the regression test indicate that the parameters of the independent variable, stock investment, are significant at a level of statistical significance less than 5%, where the significance value is 0.00, and the calculated t value is greater than the tabular t, confirming the existence of a significant effect of the stock variable on investment in digital currencies. Consequently, the following regression equation can be deduced:

$$\text{CREP} = a + 1.301 \text{Equity} + \varepsilon \quad (1)$$

By examining the value of the Beta coefficient for the model variable, it is evident that investing in equities has a positive effect on investing in digital currencies. The greater the investment in stocks by 100 percent, the larger the investment in digital currencies by 130 percent.

The second model under consideration looks at the relationship between stock and cryptocurrency investments and the preferences of individual investors. The following is how the second equation is written:

$$\text{Equ} = a + \beta_1 \text{CREP} + \varepsilon \quad (2)$$

Table (11): results of regression analysis for the second equation

Equ	Coef.	St.Err.	t-value	p-value	[95% Conf	Interval]	Sig
crep	.386	.007	55.48	0	.373	.4	***
Constant	5265.046	15.464	340.48	0	5234.726	5295.366	***
Mean dependent var	5816.943		SD dependent var	926.888			
R-squared	0.502		Number of obs	3051			
F-test	3078.169		Prob > F	0.000			
Akaike crit. (AIC)	48219.854		Bayesian crit. (BIC)	48231.900			

*** $p < .01$, ** $p < .05$, * $p < .1$

Source: created by the researcher using Stata -V₁₅ outputs.

R-squared coefficient of determination of 0.50 indicates a high explanatory ability of the independent variable in the model, at a 95% confidence level, which is a very excellent percentage to indicate high explanatory ability. The statistical quality of the estimated model as a whole and the value of the coefficient of determination indicate that 50% of the changes in investment in stocks are attributable to the change in investment in digital currencies, which is the same percentage as the previous equation, indicating that investors are influenced by events on both markets. As for the remainder of the ratio, it is due to factors unrelated to the interrelationship between the study's variables.

The previous table demonstrates that the F test for the model yielded a value of 0.000, which is a function at the level of 0.05, indicating that the proposed model is highly applicable and explanatory. Accordingly, there is a significant correlation between investors' preferences and their propensity to invest in digital currencies. Invest in equities, which is the same as the previous model's conclusion.

The results of the regression test indicate that the parameters of the independent variable, investment in stocks, are significant at a level of statistical significance less than 5%, where the significance value is 0.00, and the calculated t value is greater than the tabular t, confirming the existence of a significant effect of the variable investment in digital currencies on stocks. This confirms the existence of a robust relationship between the two markets. Consequently, the following regression equation can be deduced:

$$\text{Equ} = a + 0.386 \text{ CREP}_{it} + \varepsilon \quad (2)$$

By examining the value of the Beta coefficient for the variable of the study model, it is evident that investing in digital currencies has a positive effect on investing in equities. Investments in digital currencies increased by 100 percent, while investments in equities rose by 38 percent.

$$\text{CREP} = a + 1.301 \text{ Equ}_{it} + \varepsilon \quad (1)$$

$$\text{Equ} = a + 0.386 \text{ CREP}_{it} + \varepsilon \quad (2)$$

Comparing the results of models 1 and 2, find that the results of model 1 indicate that investment in the stock market in the sample has a significant impact on investment in the digital currency markets, indicating that the stock markets are less risky and that their stability encourages investment in the digital currency markets. Which leads to the *rejection* of the first hypothesis: There is no statistically significant relationship between the movement of digital currency prices and stock index fluctuations. And adopting the alternative hypothesis that the movement of the values of financial indicators is related to the movement of the prices of digital currencies. While the second hypothesis, which states that Digital currencies cannot be used as a substitute for stock market investing, can be *accepted*.

Research findings

The results of the comparisons between the time series data of the change in the prices of sixteen financial indicators and the change in the values of the time series of ten different digital currencies confirmed the existence of a correlation between the movement of stock prices on the financial markets and the movement of the prices of digital currencies, thereby rejecting the first hypothesis of the study, which states that There is no

statistically significant relationship between the movement of digital currency prices and stock index fluctuations.

This resulted in the acceptance of the second hypothesis: "Digital currencies cannot be used as a substitute for stock market investing." This means that the expectations of investors (which represent both sides of demand and supply) in both markets are different, which is to be expected given that most investors prefer to invest in the stock market because trading within the stock market is more stable and historically safer than this type of investment. The new investment, which is still relatively new in comparison to the lengthy history of global stock exchanges, will undoubtedly require more time to persuade investors around the world to trade their money in this type of investment.

This confirms that, from the investor's perspective, the levels of demand for each of the two types are driven by different factors; that is, it can be said that the investment characteristics that govern and direct the levels of demand for each of them are different, which prevents them from being alternative investments for each other and instead makes them two investment commodities for each. Its varied qualities that attract a particular type of investor.

Recommendations

1. This study suggests a comparative examination of the impact of the COVID -19 pandemic on the movement of financial markets and digital currencies for the duration of the pandemic and beyond.

2. The researcher suggests examining a different region to determine if there is a difference between the results of this study and those from a different region regarding the correlation between stock market performance and price fluctuations of digital currencies.

3. It is difficult to obtain stock market data in the majority of countries in the Middle East and North Africa, limiting the number of countries included in this study's sample; therefore, it is recommended to conduct the research among a different number of financial markets in regions where more data is available.

4. The researcher suggests that future researchers investigate the characteristics of investors in digital currencies using the behavioral finance approach to determine the reasons and incentives for the fluctuation of demand and supply levels for digital currencies.

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