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Analyzing the Performance of Bitcoin to Gold Prices, the Telecommunications Market, the Stock Price Index, and Insurance Companies' Performance from (March 1, 2021–September 4, 2023)

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ABSTRACT

Managing cryptocurrencies by financial intermediaries offer numerous benefits to global financial markets and the economy. Among all cryptocurrencies, Bitcoin stands out with the highest market capitalization and a weak correlation to other assets, making it an attractive option for portfolio diversification and risk management. This research aims to examine the impact of Bitcoin on the NASDAQ gold price (GC), the telecommunications market (IXUT), and insurance company performance (IXIS) through the analysis of secondary data from March 1, 2021, to September 4, 2023. The data were obtained from https://www.investing.com; statistical software E views applied various econometric methods to the data. The results suggest a positive correlation between Bitcoin and the other variables, indicating that Bitcoin can significantly expand investment opportunities and drive economic growth. This study highlights the importance of considering cryptocurrencies, especially Bitcoin, as a viable option for investment diversification and risk management in financial markets.

Index Terms: Cryptocurrencies, Bitcoin, Gold price, Telecommunications, Stock price, Insurance.

1. INTRODUCTION

As the globe experiences rapid technological advancement, the financial industry has capitalized on these developments. As a byproduct of technological progress, cryptocurrencies are a valuable contribution to financial markets and the global economy. Bitcoin has the highest market capitalization among all cryptocurrencies, estimated at $930 billion on December 28, 2021 [1]. The exchange or trading of Bitcoin and other cryptocurrencies has attracted the interest of investors in global financial markets. Likewise, market research analysts have become interested in cryptocurrencies and their interactions with financial market indicators. Although the impact of Bitcoin on Gold prices, the telecommunications market, the stock market index, and the performance of insurance companies is lower, the insurance industry is uniquely positioned to benefit from blockchain technology [2].

The financial sector has made extensive use of technological advancements in recent years. Due to technological progress, cryptocurrency is a valuable contribution to

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financial markets and the global economy. The exchange or trading of Bitcoin and other cryptocurrencies has become prevalent in global financial markets, attracting practitioners. Economic analysts are interested in cryptocurrencies and the interactions between cryptocurrencies and financial market indicators. Cryptocurrencies, in 2009, BitCoin developed cryptographically secure digital currency [3]. The 2008–2009 global financial crisis and the 2010–2013 European sovereign debt crisis made Bitcoin popular among practitioners and economic agents.

Bitcoin-accepting businesses have also grown. Despite government limitations, a terrible reputation, and several hacks, Bitcoin's popularity has grown. By providing indemnification or encouraging savings, the insurance business is vital to any economy. Its premium pooling makes it a prominent institutional investor. Insurance companies serve customers. It is also a financial entity that invests insured money for profits, helping economic and social advancement. Bitcoin is attracting investors despite its young origin. International investors now sell precious metals and buy Bitcoin. BitShares, Dash, Ethereum, LiteCoin, Mixin, Moreno, PeerCoin, and Zcash, have emerged due to BitCoin's popularity [3]. Most virtual currencies use blockchain technology like Bitcoin and aim to equal or improve its features.

Cryptocurrencies need cointegration and convergence tests for numerous reasons. Gold and cryptocurrency values are interconnected because they cointegrate. Since cryptocurrency and gold have a long-term relationship, linking them is a good idea. Convergence between cryptocurrency and gold prices suggests that low-priced cryptocurrencies will rise more quickly [4]. Most countries' economic progress and global developments have internationalized and regulated the insurance business. Most countries have understood insurance's economic and social value and fostered, developed, and encouraged the technical advances that have accelerated development, including the insurance sector. Dash aims to speed up transaction processing and protect anonymity, whereas LiteCoin conserves central processing unit power for mining.

Gold miners' stocks, ETFs, and actual gold can be invested today. Thus, explaining why gold was an inevitably valued hedge while it was used in the monetary system and why it remained a hedge afterward is beneficial. Gold is traditionally used to buffer portfolios against volatile markets and investor anxiety [5]. Since its introduction, Bitcoin's high returns have made gold less appealing to investors. Investors have preferred Bitcoin over gold in the recent decade due to its 100-fold higher return. Despite Bitcoin's greater short-term volatility than gold's, its long-term price evolution is anticipated to follow gold's [6]. As the globe digitizes, traditional currencies and physical money are becoming less popular.

Bitcoin prices rose from under US$1000 in 2014 to over US$17,000 in 2018.2 Dash prices rose from below US$2 in 2014 to above US$400 in 2018 [7]. Gold prices were between US$1050 and US$1400 throughout the same period. Forecasting, economic modeling, and policymaking can benefit from cryptocurrency and gold price convergence. This research examines how Bitcoin affects the telecommunications industry, stock price index, insurance company performance, and convergence assumptions between cryptocurrency and gold prices. From a univariate perspective, we first evaluate the fractional order of integration in the stochastic characteristics of gold and cryptocurrency prices.

1.1. Problem of the Study

This research seeks to determine if Bitcoin impacts gold prices, telecommunications, stock prices, and insurance company performance and if Bitcoin can be predicted using economic data. Thus, the question is how Bitcoin relates to other variables or if there is any link. Since Granger causality shows that one event can influence another, understanding its direction might improve market comprehension. Finding a correlation between the two may allow investors and economists to predict bitcoin prices using gold's past pricing.

1.2. Aims of the Study

This study aims to examine the effects of Bitcoin on the performance of insurance companies, the telecommunications market, the stock price index, and gold prices. Based on how these variables interact and behave, by developing the following hypothesis:

1. Hypothesis (H1): Bitcoin has no significant effect on gold price.
2. Hypothesis (H2): Bitcoin has no significant effect on telecommunications stock index price.
3. Hypothesis (H3): Bitcoin has no significant effect on insurance companies.

2. LITERATURE REVIEW

This section discusses the overview literature. A comprehensive literature review was conducted using a systematic approach to ensure objectivity and methodological rigor in locating and evaluating relevant academic literature regarding the correlation between gold prices, the telecommunications market, the stock price index, and insurance companies performance. Several studies have explored this relationship from various angles, providing valuable insights into the subject matter. Bams, Blanchard, Honarvar, and Lehnert (2017) examined how gold prices affect insurance company stock performance, stressing economic fundamentals and investor mood. Studied how the telecommunications market affects stock price indexes, stressing market dynamics and regulatory strategies [23].

Boonkrong, Arjrith, and Sangsawad (2020) examined the relationship between gold prices and the telecoms market, revealing potential spillover effects. The literature review synthesizes these and other related studies to identify significant factors, mechanisms, and theoretical frameworks. Advanced filters and the "peer-reviewed journals" option ensured high-quality research. Despite the paper's novelty in the academic world, a typical method was used to choose relevant papers based on their publication dates, focusing on current studies to include the newest scientific achievements [24].

2.1. Bitcoin

Bitcoin accounts for 36.33% of the market capitalization of cryptocurrencies, down from 80% in June 2016. Thus, Bitcoin-specific studies exist. Bitcoin is a decentralized digital currency created in 2009 by an unknown person using Satoshi Nakamoto's pseudonym. It is based on a peer-to-peer network, where transactions take place directly between users without the need for intermediaries such as banks or other financial institutions. Bitcoin has gained increasing popularity over the years, and its use has spread across different industries, including finance, e-commerce, and even healthcare. This literature review examines the current state of research on Bitcoin, its impact on various industries, and its prospects.

One of the key features of Bitcoin is its decentralized nature. Bitcoin transactions are verified by a network of users, who use complex algorithms to confirm and record transactions on a public ledger known as the blockchain. This feature has made Bitcoin attractive to many users, particularly those concerned about traditional financial institutions' role in controlling their money. Several studies have examined the impact of Bitcoin on the financial industry, and many have suggested that Bitcoin has the potential to disrupt traditional banking systems.

For instance, Ali *et al.* [8] found that Bitcoin could reduce the costs associated with traditional payment systems, particularly cross-border payments. The study noted that traditional payment systems involve a complex network of intermediaries, which can result in high fees and slow processing times. Conversely, Bitcoin allows for fast and cheap cross-border payments, which could benefit individuals and businesses in developing countries.

Another area where Bitcoin has shown potential is e-commerce. Several studies have examined the use of Bitcoin in online marketplaces, such as the dark web. One study by Böhme *et al.* [9] found that Bitcoin was the dominant currency used in illegal online marketplaces, particularly for purchasing drugs and other illicit goods. However, the study also noted that Bitcoin was used for legitimate transactions, particularly in countries with unreliable traditional payment systems.

Despite its potential, Bitcoin has also faced several challenges. One of the biggest challenges has been its association with illegal activities, particularly money laundering and terrorism financing. Several studies have examined the extent to which Bitcoin is used for illegal activities, and many have suggested that the currency is more anonymous than some may believe – tracing Bitcoin transactions to real-world identities as possible, mainly when the transactions involve exchanges between Bitcoin and traditional currencies.

Another challenge facing Bitcoin is its volatility. The price of Bitcoin has fluctuated significantly over the years, with several high-profile crashes and booms. This volatility has made Bitcoin less attractive to many investors, particularly risk-averse investors. Several studies have examined the factors that influence the price of Bitcoin, and many have suggested that a combination of supply and demand factors and speculative activity drives it.

Despite these challenges, many experts believe that Bitcoin has a bright future. Several studies have examined the potential of Bitcoin to revolutionize various industries, including healthcare. For instance, in a study by Elahi and Hasan (2018), Bitcoin could facilitate secure and efficient medical record-keeping, particularly in countries with weak health systems. Other studies have examined the potential of Bitcoin to facilitate charitable giving and crowdfunding.

2.2. Gold

Gold has been a significant part of human culture and society for thousands of years. It has been used for various purposes, including jewelry, currency, and investments. Gold has always been associated with wealth, power, and prestige, and its value has remained high throughout history. This literature review explores the historical significance, geological properties, mining and extraction techniques, and the uses and applications of gold.

Historical significance: Gold has been valued and treasured by civilizations for thousands of years. It has been used for jewelry, religious artifacts, and currency. The ancient Egyptians believed that gold was the flesh of the gods, and it was used in constructing temples and tombs. The Aztecs and Incas also valued gold and used it for jewelry and religious artifacts. In Europe, gold was used as currency, and during the gold rush in the 19th century, it was used as a means of payment for goods and services. Gold continues to be highly valued today, and it is often used as a store of value and as a haven asset during times of economic uncertainty [10].

2.2.1. Geological properties

Gold is a chemical element with the symbol Au, one of the least reactive chemical elements. It is a soft, dense, yellow metal with a high luster. Gold is highly malleable and ductile, meaning it can be easily shaped and formed into various shapes and sizes. It is also a good conductor of electricity and does not corrode or tarnish. Gold is primarily found in the Earth's crust and is often associated with other minerals, such as silver, copper, and zinc. Gold deposits are typically found in three main types of geological settings: veins, placers, and disseminated deposits [11].

2.2.2. Mining and extraction techniques

Gold mining and extraction techniques have evolved. In ancient times, gold was extracted by panning, where gold-bearing sand or gravel was placed in a shallow pan and swirled around to separate the gold from the other minerals. Today, gold is typically extracted from large deposits using various techniques, including open-pit mining, underground mining, and placer mining. Open-pit mining involves the removal of large amounts of soil and rock to access the gold-bearing ore [12]. Underground mining uses tunnels to access the ore, while placer mining involves water to separate the gold from the other minerals.

2.2.3. Uses and applications

Gold has a wide range of uses and applications. It is primarily used for jewelry, decorative purposes, and various industrial applications, including electronics, medical devices, and aerospace technology. Gold is also used as a value store and haven asset during economic uncertainty [13]. In addition, gold is used to produce coins and bullion, which are often purchased as investments.

2.3. Telecommunications Companies

Telecommunications companies have been integral to the modern world's communication infrastructure for decades. These companies provide the necessary tools and infrastructure to enable people to communicate and exchange data across vast distances. Telecommunications companies have played a critical role in facilitating the digital transformation of modern society. This literature review aims to provide an overview of the current state of the telecommunications industry and highlight some of the critical challenges and opportunities facing telecommunications companies [14].

The telecommunications industry has undergone significant changes in recent years, driven by technological advancements, consumer behavior, and increased competition. The industry has seen the rise of new players, such as over-the-top (OTT) providers, which have disrupted traditional business models. OTT providers offer messaging, voice calls, and video streaming over the Internet, often bypassing traditional telecommunications networks. This has forced telecommunications companies to adapt to new business models, such as offering bundled services, developing new value-added services, and focusing on customer experience.

One of the critical challenges facing telecommunications companies is the need to invest continually in new infrastructure to keep up with the increasing demand for data and connectivity. Telecommunications companies must invest in new networks and technologies to remain competitive with the rise of new technologies such as 5G, the Internet of Things, and artificial intelligence (AI). At the same time, they must balance this investment against the need to maintain profitability and shareholder returns [14].

Telecommunications companies face increasing regulatory scrutiny, particularly concerning net neutrality and data privacy. Governments around the world are implementing regulations to protect consumers' privacy and ensure that telecommunication companies provide fair and open access to the Internet. In addition, the increased focus on data privacy has led to increased demand for secure communications solutions, which has created new business opportunities for telecommunications companies.

The telecommunications industry is also experiencing a shift toward digital transformation. Companies increasingly invest in cloud computing, AI, and big data analytics technologies to improve operations and offer new services. These technologies enable telecommunications companies to improve network efficiency, offer personalized services, and enhance the customer experience.

Despite these challenges, telecommunications companies are well-positioned to benefit from the increasing demand for connectivity and the digital transformation of modern society. Companies that can successfully adapt to new business models and invest in new technologies will be well-positioned to capture new opportunities and maintain market share. The telecommunications industry is expected to grow in the coming years, driven by increasing demand for connectivity, the adoption of new technologies, and the ongoing shift toward digital transformation [15].

2.4. Insurance

Insurance is an agreement between an individual or an organization and an insurer, which promises compensation or protection against a specific loss in exchange for regular payments, known as premiums. The concept of insurance has been around for centuries, with records of various types of insurance being used as far back as ancient China and Babylon. Insurance is essential in managing risk, especially for individuals and businesses that face significant financial loss in an unexpected event.

Insurance companies are organizations that provide insurance products and services to customers. They collect premiums from policyholders and use the funds to pay for claims made by customers who experience losses covered by their policies. Insurance companies play a key role in society, as they provide a safety net for individuals and businesses, allowing them to recover from unexpected losses.

Insurance companies, including life insurance, health insurance, property and casualty insurance, and auto insurance, among others, offer various types of insurance. Each type of insurance serves a specific purpose and has unique features and benefits. For instance, life insurance provides financial protection to the policyholder's beneficiaries in the event of their death, while health insurance covers medical expenses incurred by the insured.

Another study by Bashaija [16] investigated the impact of insurance on the financial performance of small and medium-sized enterprises (SMEs) in India. The study found that SMEs that had insurance coverage had better financial performance than those without insurance. The authors attributed this to the fact that insurance provided SMEs with financial protection against unexpected losses, allowing them to focus on business operations and growth.

The role of insurance companies in managing risk has also been extensively studied. Demirgüç-Kunt and Huizinga [17] the study examined the impact of insurance on financial stability. The study found that insurance companies play a crucial role in promoting financial stability by providing a buffer against unexpected losses, thereby reducing the risk of systemic financial crises.

In addition, the impact of insurance companies on the economy has been investigated. A study by Hamadu and Mojekwu [18] examined the insurance industry's contribution to economic growth in the United States. The study found that the insurance industry contributes significantly to economic growth, as it provides financial protection and risk management services to individuals and businesses, thereby promoting investment, innovation, and entrepreneurship.

2.4.1. The impact of bitcoin on the gold price

The rise of digital currencies has become a significant topic of interest among investors and academics. The most popular cryptocurrency has grown and is now widely used as a medium of exchange and store of value. Despite the increased adoption of digital currencies, gold remains a valuable asset class for investors. The relationship between Bitcoin and gold has been debated among researchers. This literature review aims to examine the impact of Bitcoin on the price of gold.

2.4.2. Bitcoin and gold: A comparison

Bitcoin and gold have several similarities and differences that affect their prices. Gold has been a store of value for centuries and is viewed as a safe-haven asset during economic uncertainty. Gold prices are affected by macroeconomic factors such as inflation, interest rates, and geopolitical events. In contrast, Bitcoin is a relatively new digital currency that has gained popularity due to its decentralization, security, and limited supply. Bitcoin prices are affected by technological advancements, regulatory changes, and investor sentiment.

Several studies have examined the relationship between Bitcoin and gold prices. Some researchers have argued that Bitcoin is a substitute for gold and can be used as a hedge against inflation and economic uncertainty. Others have argued that Bitcoin and gold have different characteristics and should not be considered substitutes.

Several studies have examined the impact of Bitcoin on gold prices. In a study by Bouri *et al.* [19], the authors used a VAR-GARCH model to examine the relationship between Bitcoin and gold prices. The results showed a positive relationship between Bitcoin and gold prices in the short run, but the relationship becomes negative in the long run. The authors argued that Bitcoin and gold are not substitutes and that the long-term negative relationship is due to differences in the characteristics of the two assets.

In contrast, a study by Bouri *et al.* [19] found evidence that Bitcoin is a hedge against gold during economic uncertainty. The authors used a VAR model to examine the relationship between Bitcoin, gold, and the stock market. The results showed that Bitcoin is a hedge against gold during times of financial stress but not during normal market conditions. The authors argued that Bitcoin could be used as a safe-haven asset in addition to gold.

In a more recent study, Sökmen and Gürsoy [20] examined the impact of Bitcoin on gold prices using a cointegration model. The authors found evidence of a long-run equilibrium relationship between Bitcoin and gold prices, suggesting that the two assets are substitutes. The authors argued that Bitcoin is an attractive investment for investors who prefer digital currencies over physical assets like gold.

2.5. Impact of Bitcoin on Telecommunications Companies

Bitcoin, a decentralized digital currency, has gained significant attention since its inception in 2009. Its impact has been felt across various industries, including the telecommunications industry. This literature review aims to explore the impact of Bitcoin on telecommunications companies.

Bitcoin is a cryptocurrency that operates on a decentralized network without a central authority or intermediary. Transactions on the Bitcoin network are recorded on a public ledger known as the blockchain, which allows for secure and transparent transactions. Bitcoin has been touted as a potential disruptor of traditional financial systems, with its decentralized nature allowing for faster, cheaper, and more secure transactions [21].

The telecommunications industry is one of the industries impacted by the rise of Bitcoin. Telecommunications companies provide the infrastructure and technology for communication and data transfer. With the rise of Bitcoin, telecommunications companies have had to adapt to changes in consumer behavior and demand.

One of how Bitcoin has impacted telecommunications companies is through blockchain technology. Blockchain technology is the underlying technology behind Bitcoin, and it has the potential to revolutionize the telecommunications industry. Blockchain technology can be used to create secure, transparent, and tamper-proof communication networks, improving telecommunications networks' security and reliability.

Telecommunications companies have also had to adapt to consumer behavior and demand changes. With the rise of Bitcoin, consumers are increasingly using digital currencies to pay for goods and services. This has led to a shift in consumer demand for telecommunications companies to provide services that cater to the needs of Bitcoin users. For example, telecommunications companies have had to adapt to provide secure and reliable Bitcoin wallets and payment processing systems [21].

Furthermore, the rise of Bitcoin has also led to the emergence of new business models in the telecommunications industry. For example, some telecommunications companies have started to offer Bitcoin-based services, such as micropayments, remittances, and international transfers. These services are often cheaper and faster than traditional banking services, making them an attractive option for consumers.

However, the impact of Bitcoin on telecommunications companies is only partially positive. Bitcoin has various risks, including fraud, money laundering, and cybercrime. Telecommunications companies have had to invest in cybersecurity measures to protect their networks and customers from these risks. Furthermore, the regulatory landscape for Bitcoin still needs to be determined, which makes it difficult for telecommunications companies to navigate the legal and regulatory requirements associated with providing Bitcoin-based services.

2.6. Impact of Bitcoin on Insurance Companies

The impacts of Bitcoin on insurance companies. It will examine how insurance companies use Bitcoin, the challenges they face, and the benefits they are experiencing.

One of the main ways insurance companies use Bitcoin is as a form of payment. Bitcoin allows for fast and secure transactions, which helps speed up the claims process. This is particularly useful for international claims, where traditional payment methods can be slow and costly. In addition, Bitcoin transactions can be processed 24/7, meaning claims can be paid out quickly, even outside traditional business hours [22].

Another way that insurance companies are using Bitcoin is as an asset to insure. Bitcoin is an emerging asset class, and some insurance companies are starting to offer coverage for it.

This can be particularly useful for companies that hold large amounts of Bitcoin, as it can help to protect them against theft or loss. For example, in 2019, insurance giant Lloyd's of London began offering coverage for cryptocurrency theft.

However, there are also challenges associated with using Bitcoin in the insurance industry. One of the main challenges is the volatility of Bitcoin's value. Bitcoin is a highly volatile asset, and its value can fluctuate rapidly. This makes it difficult for insurance companies to price policies accurately and to set appropriate coverage limits. In addition, the regulatory environment surrounding Bitcoin is still evolving, making it difficult for insurance companies to comply with regulations.

Despite these challenges, there are also benefits associated with using Bitcoin in the insurance industry. One of the main benefits is the potential for cost savings. Bitcoin transactions are generally cheaper than traditional payment methods, which can reduce insurance companies costs. In addition, using Bitcoin can help to streamline the claims process, which can help to reduce administrative costs.

3. RESEARCH FRAMEWORK

This section describes the variables of the study, their sources, and the relationships between independent and dependent variables. https://www.investing.com provided the data. Statistical software E views applied various econometric methods to the data. Finally, $P = 0.05$ rejects the null hypothesis and accepts the alternative. If the variable's *P*-value exceeds 0.05, neither hypothesis is supported. The following paragraphs provide a concise explanation of these tools to identify the impact of Bitcoin on gold prices, the telecommunications market, the stock price index, and the insurance company's performance. Thus, Bitcoin impact was substituted by the insurance companies' performance (IXIS) and telecommunications stock index price (IXUT), whereas gold price (GC). Their findings conclude that independent variables are considerably affected by depending on variables.

3.1. Model of the Study

Bitcoin is accepted as independent and insurance, telecommunications, and gold price as dependent variables.

3.2. Augmented Dickey–Fuller (ADF) Test

The first step in using econometric methods is to assess the data's stationarity, as most economical series are non-stationary and have a unit root at the primary level. This is significant because the presence of a unit root can induce bias in the outcomes of statistical tests such as the Granger causality test and the VAR model, lowering their accuracy. Non-stationary series analysis can potentially produce deceptive statistical results. The series' first difference can be changed into a stationary form to solve this. The Augmented Dickey–Fuller (ADF) test is employed in this study to assess the stationarity of time series data.

- The null hypothesis (H0) states that the series is non-stationary or has a unit root.
- The alternative hypothesis (H1) proposes that the series lacks a unit root and is stationary.

3.3. Johansen Cointegration Test

The Johansen (1988) cointegration test establishes long-term relationships between variables.

The null hypothesis (H0) shows no long-term association between Bitcoin and variables.

Alternative hypothesis (H1) suggests a long-term association between Bitcoin and factors.

3.4. Granger Causality Test

The Granger causality test determines whether two variables have a unidirectional, bidirectional, or non-existent causal link. Test significance is 5%.

The null hypothesis (H0) asserts that Bitcoin has no Granger causality with the variables. Alternatively, H1 implies no Granger causation between Bitcoin and the variables. *P*-value determines null hypothesis acceptance or rejection. The null hypothesis is rejected if *P*-value is less than the significance level and accepted if it is more extensive.

3.5. Vector Error Correction

If the results confirm the cointegration of the variables under investigation, this demonstrates their long-term relationship. The vector error correction model (VECM) investigates this relationship. In this section, the results and data analysis are presented and discussed.

3.6. Stationarity of Data

The ADF and Phillips-Perron (P-P) tests are employed to determine the stationarity of the series. The series is initially discovered to be non-stationary at the primary level. To make the data stationary, the first series differences are calculated. If *P*-values from the ADF and P-P tests are more significant than 0.05, then the following is true:

- The null hypothesis is adopted at a 5% level of significance.
- The statistics associated with the stationarity of the data series are presented in the table below.

3.7. Model Selection

The Akaike information criterion (AIC) used the model selection method to choose the best model. A total of 500 models were evaluated, and the selected model is an autoregressive distributed lag (ARDL) (1, 0, 1, 0) model. This indicates that the lag order for the dependent variable (BTC) is one, with no lags for the other independent variables.

3.7.1. Coefficients and statistical significance

BTC (-1): The lagged value of BTC (one period ago) has a coefficient of 0.917958. This suggests that a one-unit increase in BTC yesterday is associated with an approximately 0.917958-unit increase in BTC today. GC: The coefficient for the variable GC is 1.484124, but it is not statistically significant ($P = 0.7447$). Therefore, the inclusion of GC in the model is a relatively insignificant impact on BTC (Please see Table 3).

3.7.2. IXIS

The coefficient for the variable IXIS is 110.0404, which is statistically significant (*P*-value = 0.0005). This suggests that a one-unit increase in IXIS is associated with a 110.0404 unit increase in BTC. IXIS (-1): The lagged value of IXIS (one period ago) has a coefficient of -96.63934, and it is statistically significant (*P*-value = 0.0019). This implies that a one-unit increase in IXIS yesterday is associated with a decrease of approximately 96.63934 units in BTC today (Please see Table 3).

3.7.3. IXUT

The coefficient for the variable IXUT is 0.213805, but it is not statistically significant (*P*-value = 0.7117). Therefore, the inclusion of IXUT in the model does not significantly impact BTC. C: The constant term has a coefficient of −8104.335, but it is not statistically significant (*P*-value = 0.3722). Therefore, the intercept is not significantly different from zero.

3.7.4. The goodness of fit

R^2: The model's coefficient of determination (R^2) is 0.934858, which indicates that approximately 93.49% of the variation in BTC can be explained by the independent variables in the model (Please see Table 4).

Adjusted R^2: The adjusted R^2 is 0.931950, which considers the degrees of freedom and penalizes including irrelevant variables. S.E. of regression: The standard error of the regression is 3642.267, which measures the average distance between the observed values of BTC and the predicted values from the model. Prop (F-statistic): The probability associated with the F-statistic is 0.000000, indicating that the overall model is statistically significant. F-statistic: The F-statistic is 321.4634, and its associated *P*-value is 0.000000, indicating that the overall model is statistically significant.

Note: *P*-values in the results do not account for model selection. Therefore, caution should be exercised when interpreting the individual variable significance based solely on *P*-values provided.

Based on the provided information, the econometric function can be represented as follows:

$$BTC = 0.917958 * BTC(-1) + 1.484124 * GC + 110.0404 * IXIS + (-96.63934) * IXIS(-1) + 0.213805 * IXUT - 8104.335 + \varepsilon$$

The coefficients for each variable are given as 0.917958, 1.484124, 110.0404, −96.63934, 0.213805, and −8104.335.

This equation represents an ARDL model, where BTC is regressed on its lagged value, along with other variables such as GC, IXIS, and IXUT. The model selection method used was the AIC, and the selected model was ARDL (1, 0, 1, 0).

3.7.5. Test statistic and critical values

The ADF test statistic is −1.505250. This value is compared to critical values to determine the statistical significance. At the 1% level, the critical value is −3.486551. At the 5% level, the critical value is −2.886074. At the 10% level, the critical value is −2.579931. The test statistic is less negative than the critical values at all significance levels, suggesting that we do not reject the null hypothesis.

3.7.6. Coefficients and statistical significance

BTC (-1): The lagged value of BTC (one period ago) has a coefficient of −0.038019. This coefficient is not statistically significant (*P*-value = 0.1350). Therefore, the lagged BTC does not significantly impact the different BTC.

C: The constant term has a coefficient of 1449.238, but it is not statistically significant (*P*-value = 0.1394). Therefore, a constant term in the differenced BTC equation is not significant.

3.7.7. The goodness of Fit

R^2: The coefficient of determination (R^2) for the differenced BTC equation is 0.019158, indicating that approximately

1.92% of the variation in the differenced BTC can be explained by the lagged BTC and the constant term. Adjusted R^2: The adjusted R^2 is 0.010703, which considers the degrees of freedom and penalizes including irrelevant variables. F-statistic: The F-statistic is 2.265778, and its associated *P*-value is 0.134978, which suggests that the overall model is not statistical.

3.7.8. Significant

Other information: Mean dependent var: The average value of the differenced BTC in the sample is 82.18729. S.D. Dependent var: The standard deviation of the differenced BTC is 3836.238. Sum squared resid: The sum of squared residuals is 1.69E+09, which measures the model's overall fit.

3.7.9. Suggest no autocorrelation

Prob (F-statistic): The probability associated with the F-statistic is 0.134978, indicating that the overall model is not statistically significant.

Note: Based on the results, there is insufficient evidence to reject the null hypothesis that BTC has a unit root, suggesting that BTC is non-stationary.

Bitcoin (-1): The lagged value of Bitcoin (one period ago) has a coefficient of 0.917958. This suggests that a one-unit increase in Bitcoin yesterday is associated with an approximately 0.917958 unit increase in BTC today. GC: The coefficient for the variable GC is 1.484124, but it is not statistically significant (*P*-value = 0.7447). Therefore, the inclusion of GC in the model is relatively minor in Bitcoin. The coefficient for the variable insurance companies' performance. It is 110.0404 and statistically significant (*P*-value = 0.0005). This suggests that a one-unit increase in insurance companies' performance is associated with a 110.0404 unit increase in Bitcoin-insurance companies' performance. (-1): The lagged value of IXIS (one period ago) has a coefficient of −96.63934, and it is statistically significant (*P*-value = 0.0019). This implies a one-unit increase in insurance companies' performance. Yesterday is associated with a decrease of approximately 96.63934 units in Bitcoin today. The coefficient for the variable telecommunications stock index price. It is 0.213805 but not statistically significant (*P*-value = 0.7117). The coefficient for the variable telecommunications stock index price. The model has little impact on Bitcoin. C: The constant term has a coefficient of −8104.335, but it is not statistically significant (*P*-value = 0.3722). Therefore, the intercept is not significantly different from zero.

ADF test statistic −1.505250 0.5276 Test critical values: 1% level −3.486551 5% level −2.886074 10% level −2.579931

*MacKinnon (1996) one-sided *P*-values. ADF test equation method: Least squares. Variable Coefficient standard error t-statistic prob.

BTC (-1) −0.038019 0.025258 −1.505250 0.1350 C 1449.238 973.7503 1.488306 0.1394

R^2 0.019158 Mean dependent var 82.18729 Adjusted R^2 0.010703 S.D. dependent var 3836.238 F-statistic 2.265778 Durbin-Watson stat 1.803764 Prob(F-statistic) 0.134978

BTC (-1): The variable BTC with a lag of one period has a coefficient of −0.038019. This suggests that a one-unit increase in BTC in the previous period is associated with a decrease of approximately 0.038019 units in the current period. The standard error for this coefficient is 0.025258, the t-statistic is −1.505250, and the corresponding p-value is 0.1350.

C: The constant term in the model has a coefficient of 1449.238. This represents the intercept or baseline value of the dependent variable (BTC) when all other variables in the model are zero. The standard error for this coefficient is 973.7503, the t-statistic is 1.488306, and the corresponding p-value is 0.1394.

The results are from unrestricted cointegration rank tests (trace and max-eigenvalue) performed to determine the presence of cointegration among the variables. Here is an interpretation of the critical components of the results: Unrestricted Cointegration Rank Test (Trace):

Hypothesized No. of CE(s): The number of common trends assumed in the null hypothesis. The tests are conducted for different assumed numbers of common trends. Eigenvalue: The eigenvalues associated with the assumed number of common trends.

Statistic: The test statistic for the trace test. Critical Value: The critical values correspond to the assumed number of common trends at the specified significance level.

Prob.**: p-value calculated based on the MacKinnon-Haug-Michelis (1999) method. The trace test compares the sum of the eigenvalues to the critical values to determine the number of cointegrating equations (common trends). The null hypothesis is that there are no cointegrating equations.

3.7.10. Based on the trace test results

No cointegration: The test statistic for the case of no cointegration (0 common trends) is 36.81853, which is lower than the critical value at the 0.05 level (47.85613). Therefore, we do not reject the null hypothesis of no cointegration at the 0.05 level.

3.7.11. Unrestricted cointegration rank test (Max-eigenvalue)

- Hypothesized No. of CE(s): The number of common trends assumed in the null hypothesis.
- Eigenvalue: The eigenvalues associated with the assumed number of common trends. Statistic: The test statistic for the max-eigenvalue test.
- Critical value: The critical values corresponding to the assumed number of common trends at the specified significance level.
- Prob.**: *P*-value calculated based on the MacKinnon-Haug-Michelis (1999) method.

The max-eigenvalue test examines the largest eigenvalue to determine the number of cointegrating equations. The null hypothesis is that no more than a certain number of cointegrating equations exist.

3.7.12. Based on the max-eigenvalue test results

No cointegration: The test statistic for the case of no cointegration (0 common trends) is 19.27991, which is lower than the critical value at the 0.05 level (27.58434). Therefore, we do not reject the null hypothesis of no cointegration at the 0.05 level. The trace and max-eigenvalue tests indicate no cointegration at the 0.05 level. This suggests that there is no long-term relationship among the variables being tested (Please see Table 4).

The Granger causality test is used to examine the causal relationship between variables. In this case, the test is conducted between BTC, GC, IXIS, and IXUT variables. Here is an interpretation of the critical components of the results:

Null Hypothesis: Indicates the null hypothesis being tested for Granger causality. Obs: The number of observations used in the test. F-Statistic: The F-statistic calculated for the Granger causality test. Prob: The p-value associated with the F-statistic.

3.7.13. Interpretation of the results

1. GC does not Granger cause BTC:
   - F-Statistic: 0.30848
   - Prob: 0.7352. *P*-value (0.7352) is higher than the significance level (e.g., 0.05), indicating no evidence to reject the null hypothesis. This suggests that GC does not Granger cause BTC.
2. BTC does not Granger Cause GC:
   - F-Statistic: 0.25926
   - Prob: 0.7721. Similarly, *P*-value (0.7721) is higher than the significance level, indicating no evidence to reject the null hypothesis. Therefore, BTC does not Granger cause GC.
3. IXIS does not Granger Cause BTC:
   - F-Statistic: 0.86716
   - Prob: 0.4229 *P*-value (0.4229) is higher than the significance level, indicating that there is no evidence to reject the null hypothesis. Therefore, IXIS does not Granger cause BTC.
4. BTC does not Granger Cause IXIS:
   - F-Statistic: 0.85998
   - Prob: 0.4259 *P*-value (0.4259) is higher than the significance level, suggesting that there is no evidence to reject the null hypothesis. Hence, BTC does not Granger cause IXIS.

The remaining results follow a similar pattern for the Granger causality tests between telecommunications stock index price and BTC, insurance companies' performance and gold price, telecommunications stock index price and gold price, telecommunications stock index price and insurance companies' performance, and insurance companies' performance and telecommunications stock index price. In each case, p-value is higher than the significance level, indicating a lack of evidence to reject the null hypothesis.

In summary, based on these Granger causality test results, no significant evidence suggests a causal relationship between the variables tested in either direction (Fig. 1).

The following tables offer the estimations of the influences of the models for three relations. To test the link between Bitcoin measured by the insurance companies' performance (IXIS) and telecommunications stock index price (IXUT), whereas gold price (GC), correlation, and multiple regression analyses were conducted. Table 1, which shows summary model results, indicates our model with the two forecasters. The model is a linear regression model with BTC (Bitcoin) as the dependent variable and three predictors: IXIS (Insurance companies' performance), IXUT (Telecommunications stock index price), and GC (Gold price). The model's R^2 value is 0.588, indicating that the three predictors can explain 58.8% of the variance in BTC. The adjusted R^2 value is 0.563,

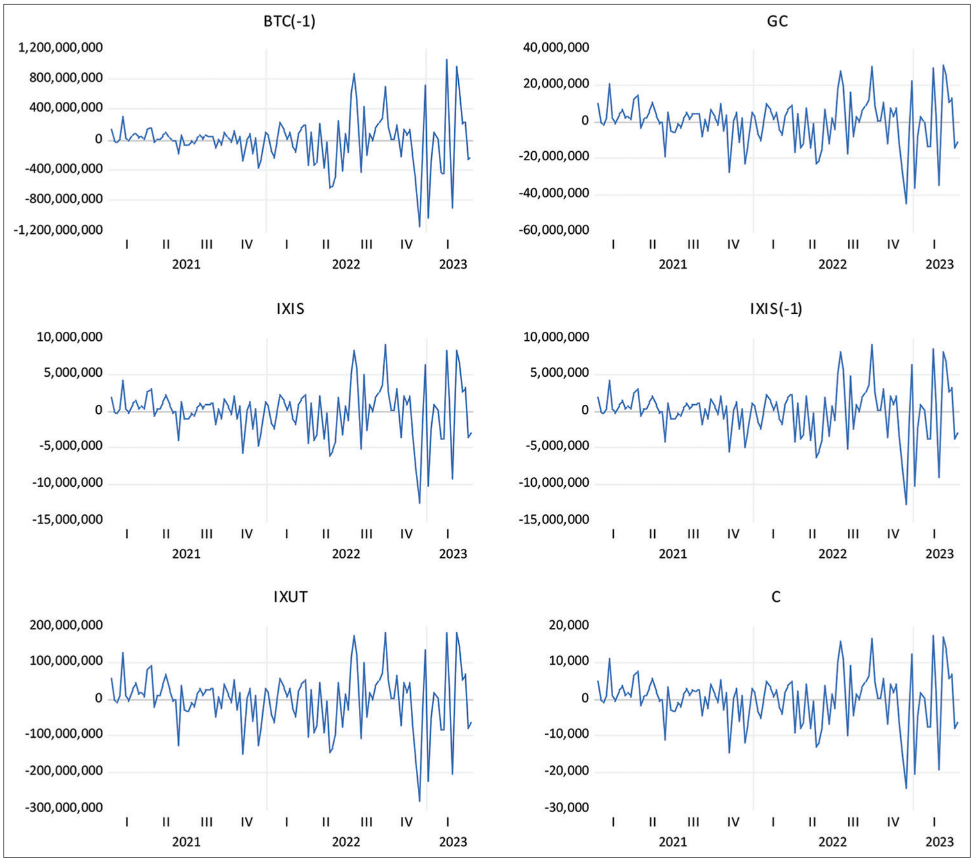
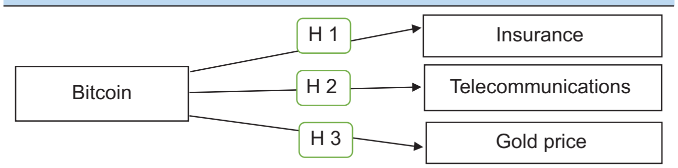


Fig. 1. Gradients of the objective function.

Table 1: Model of the study



tiModel description:
Where:
BTC=Bitcoin
IXIS=Insurance companies' performance.
IXUT=Telecommunications stock index price.
GC=Gold price.
μ=The error term.

which considers the number of predictors in the model. The standard error of the estimate is 3896.04060, which represents the average distance that the actual BTC values deviate from the predicted values.

Multiple regression analysis was conducted to examine the relationship between Bitcoin (BTC) as the dependent variable and three predictors: Insurance companies' performance (IXIS), telecommunications stock index price (IXUT), and gold price (GC). The summary model results are presented in Table 2.

The R^2 value of 0.93 indicates that approximately 93% of the variance in BTC can be explained by the three predictors included in the model. This suggests that the predictors collectively account for a significant portion of the variability in Bitcoin prices.

To further elaborate on the results, it would be helpful to provide more specific information from Table 1, such as the coefficients associated with each predictor variable and their corresponding p-values or confidence intervals. In addition, discussing the statistical significance of the coefficients and their interpretation of the research question would provide a more comprehensive understanding of the model's findings. The significance and interpretation of the coefficients can be further expanded to provide a deeper understanding of the relationships. For instance, the positive coefficient associated with the gold price (GC) suggests a positive correlation between the price of gold and the price of Bitcoin. One possible explanation for this relationship is that gold and Bitcoin are considered alternative investment assets or stores of value. As investors seek to hedge against inflation or economic uncertainties, they may allocate funds to gold and Bitcoin, simultaneously driving up their prices.

Similarly, the positive coefficient for the telecommunications stock index price (IXUT) implies a positive association between the performance of the telecommunications sector and the price of Bitcoin. This relationship could be attributed to the increasing adoption and integration of cryptocurrencies within the telecommunications industry. As the telecommunications sector advances technologically and embraces cryptocurrencies, it may contribute to the growth and acceptance of Bitcoin, thereby positively impacting its price.

Table 2: Stationarity statistics at first difference

Dependent variable: BTC Method: ARDL Dependent lags: (4 max. lags): GC IXIS IXUT				
Variables	**Coefficient**	**Standard error**	**t-statistic**	**Prob.***
BTC(-1)	0.917958	0.039009	23.53190	0.0000
GC	1.484124	4.545807	0.326482	0.7447
IXIS	110.0404	30.44721	3.614136	0.0005
IXIS(-1)	−96.63934	30.37787	−3.181241	0.0019
IXUT	0.213805	0.576962	0.370570	0.7117

*Prob (F-statistic)=0.000000
R^2=0.934858
Adjusted R^2=0.931950

On the other hand, the negative coefficient associated with the insurance companies' performance (IXIS) indicates an inverse relationship between the performance of insurance companies and the price of Bitcoin. One possible explanation is that as the performance of insurance companies improves, investors may perceive them as more stable and secure investment options compared to the relatively volatile and speculative nature of Bitcoin. Consequently, increased confidence in traditional financial institutions, such as insurance companies, may lead to decreased demand for Bitcoin and a subsequent decrease in its price.

It is important to note that the constant term, representing the value of the dependent variable when all predictor variables are equal to zero, predicts a negative value for Bitcoin. However, since the constant term is not statistically significant, its impact on the overall Bitcoin price prediction may not be substantial. Therefore, the focus should primarily be on the coefficients of the predictor variables, as they provide more meaningful insights into the relationships being examined.

By delving into the underlying mechanisms and offering plausible explanations for the observed relationships, a more thorough understanding of the dynamics between the variables can be achieved, thereby strengthening the overall analysis.

Table 3: ADF test statistic

Null hypothesis: BTC has a unit root Exogenous: Constant				
			t-Statistic	**Prob.***
Augmented Dickey–Fuller test statistic			−1.505250	0.5276
Test critical values:	1% level		−3.486551	
	5% level		−2.886074	
	10% level		−2.579931	

*MacKinnon (1996) one-sided *P*-values

Augmented Dickey–Fuller Test Equation Method: Least Squares				
Variable	**Coefficient**	**Std. Error**	**t-Statistic**	**Prob.**
BTC(-1)	−0.038019	0.025258	−1.505250	0.1350
C	1449.238	973.7503	1.488306	0.1394
R^2	0.019158	Mean dependent var		82.18729
Adjusted R^2	0.010703	S.D. dependent var		3836.238
F-statistic	2.265778	Durbin-Watson stat		1.803764
Prob (F-statistic)	0.134978			

The results are from an ADF test performed on the variable BTC to test for the presence of a unit root. Here is an interpretation of the key components of the results:
Null Hypothesis: The null hypothesis being tested is that BTC has a unit root, indicating that it is non-stationary

Table 4: Long-term relationship among variables

Unrestricted Cointegration Rank Test (Trace)				
Hypothesized No. of CE (s)	Eigenvalue	Trace Statistic	0.05 Critical Value	Prob.** Critical Value
None	0.153128	36.81853	47.85613	0.3561
At most 1	0.077052	17.53862	29.79707	0.6002
At most 2	0.060441	8.237412	15.49471	0.4404
At most 3	0.008630	1.005381	3.841465	0.3160

Trace test indicates no cointegration at the 0.05 level
*Denotes rejection of the hypothesis at the 0.05 level
**MacKinnon-Haug-Michelis (1999) *P*-values

Unrestricted Cointegration Rank Test (Max-eigenvalue)				
Hypothesized No. of CE (s)	Eigenvalue	Max-Eigen Statistic	0.05* Critical Value	Prob.** Critical Value
None	0.153128	19.27991	27.58434	0.3932
At most 1	0.077052	9.301208	21.13162	0.8074
At most 2	0.060441	7.232031	14.26460	0.4621
At most 3	0.008630	1.005381	3.841465	0.3160

Max-eigenvalue test indicates no cointegration at the 0.05 level
*Denotes rejection of the hypothesis at the 0.05 level
**MacKinnon-Haug-Michelis (1999) *P*-values

Table 5: Results of pairwise Granger causality test

Sample: March 1, 2021–September 4, 2023

Lags: 2

Null hypothesis	Obs	F-Statistic	Prob.
GC does not Granger cause BTC	117	0.30848	0.7352
BTC does not Granger cause GC		0.25926	0.7721
IXIS does not Granger cause BTC	117	0.86716	0.4229
BTC does not Granger cause IXIS		0.85998	0.4259
IXUT does not Granger cause BTC	117	0.27543	0.7598
BTC does not Granger Cause IXUT		0.80404	0.4501
IXIS does not Granger cause GC	117	0.02168	0.9786
GC does not Granger cause IXIS		0.93098	0.3972
IXUT does not Granger cause GC	117	0.70114	0.4982
GC does not Granger cause IXUT		3.33503	0.0392
IXUT does not Granger cause IXIS	117	2.11883	0.1250
IXIS does not Granger cause IXUT		0.27989	0.7564

4. CONCLUSION AND RECOMMENDATION

4.1. Conclusion

Bitcoin (-1) coefficient: The lagged value of Bitcoin has a coefficient of 0.917958, which is statistically significant at a high t-statistic value of 23.53190. This suggests that a one-unit increase in Bitcoin in the previous period is associated with an approximate 0.917958 unit increase in Bitcoin in the current period. This indicates a positive autocorrelation effect and suggests the presence of momentum in Bitcoin prices.

4.1.1. Gold prices coefficient

The coefficient for the variable gold prices is 1.484124, but it is not statistically significant with a t-statistic of 0.326482 and a relatively high *P*-value of 0.7447. Therefore, the inclusion of gold prices in the model has little Bitcoin.

4.1.2. Insurance companies' performance coefficient

The coefficient for the variable insurance companies' performance is 110.0404, and it is statistically significant with a t-statistic of 3.614136 and a low *P*-value of 0.0005. This suggests that a one-unit increase in insurance companies' performance is associated with a significant 110.0404 unit increase in Bitcoin. This indicates a positive relationship between insurance companies' performance (a specific independent variable) and Bitcoin.

Insurance companies performance (-1) coefficient: The lagged value of insurance companies' performance has a coefficient of -96.63934, and it is statistically significant with a t-statistic of and p-value of 0.0019. This implies that a one-unit increase in insurance companies' performance in the previous period is associated with a decrease of approximately 96.63934 units in BTC in the current period. This suggests a negative relationship between the lagged value of insurance companies' performance and Bitcoin.

4.1.2. Telecommunications stock index price coefficient

The coefficient for the variable telecommunications stock index price is 0.213805, but it is not statistically significant with a t-statistic of 0.370570 and *P*-value of 0.7117. Therefore, the inclusion of the telecommunications stock index price in the model does not significantly impact Bitcoin.

4.2. Recommendations

Given the significant coefficient of Bitcoin (-1), it is essential to consider the lagged value of BTC as a predictor in the model for analyzing Bitcoin prices.

Since the coefficient for GC is not statistically significant, further investigation may be required to determine if there is a causal relationship or impact of Gold price on Bitcoin prices. Alternative models or additional variables could be explored to capture potential relationships.

The significant coefficients of Insurance companies' performance (-1) suggest that these variables play a meaningful role in explaining Bitcoin prices. It may be beneficial to investigate further the underlying factors and dynamics driving the relationship between insurance companies' performance and Bitcoin.

Considering the non-significant coefficient of the telecommunications stock index price, it may be advisable to reassess the inclusion of this variable in the model or explore alternative variables that could better capture the relevant information related to Bitcoin prices.

The high R^2 value of 0.934858 indicates that the model explains a substantial portion of the variation in Bitcoin prices. However, further robustness checks, model diagnostics, and sensitivity analyses should be conducted to ensure the reliability and accuracy of the findings.

These recommendations can guide further analysis, model refinement, and enhance the understanding of the relationships between the variables in the paper's context.

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Date	**IXUT**	**IXIS**	**GC**	**BTC**
4/9/2023	11,701.90	399.18	2,002.20	30,453.80
4/2/2023	11,563.70	396.79	2,011.90	27,941.20
3/26/2023	11,532.60	398.16	1,969.00	28,456.10
3/19/2023	11,134.70	383.93	1,983.80	27,475.60
3/12/2023	10,981.20	384.43	1,973.50	26,914.10
3/5/2023	11,585.00	375.79	1,867.20	20,467.50
2/26/2023	12,487.30	391.23	1,854.60	22,347.10
2/19/2023	12,344.60	390.39	1,817.10	23,166.10
2/12/2023	12,558.50	409.19	1,840.40	24,631.40
2/5/2023	12,376.60	393.52	1,862.80	21,859.80
1/29/2023	12,329.30	404.43	1,862.90	23,323.80
1/22/2023	12,128.50	401.53	1,929.40	23,027.90
1/15/2023	11,933.70	395.02	1,928.20	22,775.70
1/8/2023	12,191.70	401	1,921.70	20,958.20
1/1/2023	12,047.70	391.95	1,869.70	16,943.60
12/25/2022	11,641.90	371.45	1,826.20	16,537.40
12/18/2022	11,876.90	370.83	1,804.20	16,837.20
12/11/2022	11,636.20	369.1	1,800.20	16,777.10
12/4/2022	11,805.50	381.88	1,810.70	17,127.20
11/27/2022	12,199.60	397.47	1,809.60	16,884.50
11/20/2022	12,022.90	392.52	1,768.80	16,456.50
11/13/2022	11,728.20	384.4	1,754.40	16,699.20
11/6/2022	11,835.40	377.59	1,769.40	16,795.20
10/30/2022	11,419.70	363.5	1,676.60	21,301.60
10/23/2022	11,482.70	374.68	1,644.80	20,809.80
10/16/2022	10,689.60	347.71	1,656.30	19,204.80
10/9/2022	10,439.00	334.89	1,648.90	19,068.70
10/2/2022	10,269.90	338.48	1,709.30	19,415.00
9/25/2022	10,002.00	333.05	1,672.00	19,311.90
9/18/2022	9,986.00	342.17	1,650.00	18,925.20
9/11/2022	10,472.20	369.83	1,677.90	20,113.50
9/4/2022	10,725.40	387.47	1,723.60	21,650.40
8/28/2022	10,311.10	382.19	1,717.70	19,831.40
8/21/2022	10,581.70	392.86	1,740.60	20,033.90
8/14/2022	10,867.50	411.36	1,753.00	21,138.90
8/7/2022	10,960.60	414.75	1,805.20	24,442.50
7/31/2022	10,176.10	402.04	1,780.50	22,944.20
7/24/2022	10,036.70	394.73	1,771.50	23,634.20
7/17/2022	10,022.40	403.27	1,731.40	22,460.40
7/10/2022	9,885.60	396.26	1,707.50	21,209.90
7/3/2022	10,300.00	393.14	1,746.70	21,587.50
6/26/2022	10,399.00	393.23	1,805.90	19,243.20
6/19/2022	10,341.30	396.01	1,830.30	21,489.90
6/12/2022	9,773.50	379.79	1,840.60	18,986.50
6/5/2022	10,174.20	395.6	1,875.50	28,403.40
5/29/2022	10,596.30	411.53	1,850.20	29,864.30
5/22/2022	10,809.00	417.06	1,857.30	29,027.10
5/15/2022	10,225.30	393.43	1,844.70	29,434.60
5/8/2022	10,428.60	406.93	1,811.30	30,080.40
5/1/2022	10,612.70	402.14	1,886.20	35,468.00
4/24/2022	10,462.00	396.55	1,915.10	37,650.00
4/17/2022	11,162.00	431.11	1,934.30	39,418.00
4/10/2022	11,376.80	447.35	1,974.90	40,382.00
4/3/2022	11,450.40	454.5	1,945.60	42,767.00
3/27/2022	11,596.10	459.47	1,923.70	45,811.00
3/20/2022	11,506.10	450.78	1,956.90	44,548.00
3/13/2022	11,188.00	456.92	1,931.70	42,233.00
3/6/2022	10,650.00	441.21	1,987.60	38,814.30
2/27/2022	10,793.80	450.01	1,968.90	39,395.80
2/20/2022	11,204.80	460.89	1,889.20	39,115.50

Top of Form				
Date	**IXUT**	**IXIS**	**GC**	**BTC**
2/13/2022	11,175.10	459.47	1,899.80	40,090.30
2/6/2022	11,189.50	460.86	1,842.10	42,205.20
1/30/2022	11,382.10	464.39	1,807.80	41,412.10
1/23/2022	11,035.30	455.18	1,786.60	38,170.80
1/16/2022	10,922.50	450.46	1,833.50	35,075.20
1/9/2022	11,437.80	480.21	1,818.30	43,097.00
1/2/2022	11,463.00	478.36	1,799.30	41,672.00
12/26/2021	11,416.40	496.8	1,829.70	47,738.00
12/19/2021	11,298.30	496.22	1,811.70	50,406.40
12/12/2021	11,161.10	487.76	1,804.90	46,856.20
12/5/2021	11,333.30	477.08	1,784.80	49,314.50
11/28/2021	10,983.50	481.07	1,783.90	49,195.20
11/21/2021	11,225.70	478.85	1,786.90	54,765.90
11/14/2021	11,437.90	481.6	1,852.90	59,717.60
11/7/2021	11,567.50	500.87	1,869.70	64,398.60
10/31/2021	11,694.50	505.17	1,818.00	61,483.90
10/24/2021	11,398.20	490.14	1,784.90	61,840.10
10/17/2021	11,608.00	504.93	1,796.30	61,312.50
10/10/2021	11,413.50	501.41	1,768.30	60,861.10
10/3/2021	11,309.30	505.05	1,757.40	54,942.50
9/26/2021	10,930.20	519.52	1,758.40	47,666.90
9/19/2021	10,876.60	523.32	1,750.90	42,686.80
9/12/2021	10,816.20	527.15	1,750.50	48,306.70
9/5/2021	10,930.30	540.62	1,791.00	45,161.90
8/29/2021	11,060.80	558.6	1,832.60	49,918.40
8/22/2021	11,120.80	552.89	1,817.20	48,897.10
8/15/2021	11,002.40	549.06	1,781.80	48,875.80
8/8/2021	11,044.20	545.57	1,776.00	47,081.50
8/1/2021	10,971.50	543	1,761.10	44,614.20
7/25/2021	10,689.50	543.03	1,814.50	41,553.70
7/18/2021	10,812.90	542.15	1,802.90	33,824.80
7/11/2021	10,772.30	531.67	1,815.90	31,518.60
7/4/2021	10,780.90	538.55	1,811.50	33,510.60
6/27/2021	10,966.90	538.93	1,784.10	34,742.80
6/20/2021	11,052.80	531.2	1,777.80	32,243.40
6/13/2021	10,610.00	518.24	1,769.00	35,513.40
6/6/2021	11,259.10	526.03	1,879.60	35,467.50
5/30/2021	11,306.90	522.61	1,892.00	35,520.00
5/23/2021	11,350.30	521.35	1,905.30	34,584.60
5/16/2021	11,273.50	509.01	1,877.60	37,448.30
5/9/2021	11,330.20	523.45	1,839.10	46,708.80
5/2/2021	11,478.60	521.27	1,832.40	58,840.10
4/25/2021	11,209.80	504.51	1,768.60	57,807.10
4/18/2021	10,944.50	501.46	1,777.80	50,088.90
4/11/2021	10,993.90	504.41	1,780.20	60,041.90
4/4/2021	10,916.40	492.39	1,744.80	59,748.40
3/28/2021	10,807.90	489.68	1,728.40	57,059.90
3/21/2021	10,766.80	489.91	1,733.60	55,862.90
3/14/2021	10,730.00	486.46	1,742.90	58,093.40
3/7/2021	10,857.50	493.06	1,721.20	61,195.30
2/28/2021	10,520.10	475.8	1,700.30	48,855.60
2/21/2021	10,357.00	465.96	1,730.10	46,136.70
2/14/2021	10,564.20	473.52	1,777.40	55,923.70
2/7/2021	10,559.50	484.23	1,823.20	47,168.70
1/31/2021	10,301.30	478.83	1,813.00	39,256.60
1/24/2021	9,642.30	460.24	1,850.30	34,283.10
1/17/2021	10,102.90	470.14	1,857.90	32,088.90
1/10/2021	10,286.70	465.96	1,831.70	36,019.50
1/3/2021	10,273.70	475.87	1,837.30	40,151.90