

The driving forces behind the prices of major cryptocurrencies: Evidence from the past five years

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Abstract

Purpose: The primary objective of this study is to uncover the complex relationship between cryptocurrency prices and significant global events that transpired within the past five years. These events encompass a wide spectrum, including political and global health crises, the public disclosure of multinational enterprises' investments in cryptocurrencies, and the influence of macroeconomic indicators. Beyond the exclusive focus on Bitcoin, this study adopts a more comprehensive approach encompassing various cryptocurrencies.

Design/methodology/approach: This study examines the effects of the disclosure of cryptocurrency adoption plans by major corporations, the Russian-Ukraine war, Covid-19, Inflation rate, and Economic policy uncertainty within the U.S., U.K., and E.U on cryptocurrency prices (Bitcoin, Ethereum, and Binance coin) using a structural equation model over the past five years.

Findings: Our findings provided several compelling insights. Most notably, during the study period major corporations' adoption of cryptocurrencies positively influenced their price. Furthermore, a negative and significant association emerges between cryptocurrency prices and periods marked by economic policy uncertainty and inflation rates in the countries under investigation (U.S., U.K., and E.U). The results are robust under variations in sample composition and changes in sets of variables.

Originality/value: The study uncovered the complex relationship between cryptocurrency price fluctuations and significant global events that transpired within the past five years by taking the factors identified in previous literature as a whole and adding new variables that are not well studied, such as the effect of Russian-Ukraine War and multinational corporations revealing cryptocurrency adoption intention on the prices of cryptocurrencies. This study represents a pivotal contribution by bridging a crucial research void and providing theoretical insights into the legal considerations to be undertaken by policymakers, and informed investment practices by traders, and corporate leaders.

Keywords: Cryptocurrencies, SEM, Inflation rate, Uncertainty, Economic policy

Jel Codes: G4, G12, G15, G41, E52

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1. Introduction

Over the last five years, the global landscape has witnessed a series of transformative events that have left indelible marks on economies and societies worldwide. Events such as the COVID-19 pandemic, the Russian-Ukrainian conflict, and the implementation of stimulus measures and public spending initiatives have created ripples in consumer demand, fundamentally altering the way individuals and households engage in economic activities. Consumers find themselves grappling with rising inflation and uncertainty, prompting shifts in their buying decisions, and saving behaviours. Amid these tumultuous events, many governments have rolled out stimulus measures and public spending initiatives as a means of stabilizing economies and supporting citizens adversely affected by the pandemic's economic fallout (Astrov, Ghodsi, Grieveson, Holzner, Kochnev, Landesmann et al., 2022). These initiatives injected substantial liquidity into the markets and offered financial support to individuals and businesses. Such actions played a pivotal role in guiding consumer demand as households received additional income and incentives to spend, creating new dynamics in the consumer marketplace.

The transformative events of the past five years have not only impacted consumer demand but also have cascading effects throughout the financial market, which has spurred extensive research to uncover their association with cryptocurrency prices. Notably, scholars have delved into the impact of global geopolitical risks on Bitcoin returns (Aysan, Demir, Gozgor & Lau, 2019) and the association between Economic Policy Uncertainty (EPU) and Bitcoin (Mokni, 2021; Xia, Sang, He & Wang, 2022). Furthermore, the influence of COVID-19 on Bitcoin has been scrutinized by researchers such as Bouteska, Mefteh-Wali and Dang (2022) and Liu and Lee (2020), who also investigated the role of information dissemination. While these studies collectively contribute to our understanding of the relationship between these events and the cryptocurrency market, they have primarily scrutinized the factors influencing Bitcoin's returns. A recent comprehensive examination of cryptocurrency literature spanning over a decade, as conducted by Pattnaik, Hassan, Dsouza, Tiwari & Devji (2023), highlight the long-standing dominance of Bitcoin in research. Their research stresses the importance of investigating how a range of events can influence investors' attitudes and decision-making processes regarding cryptocurrency investments. A few studies, adopt a multi-cryptocurrency perspective in their research, exploring the impacts of factors like COVID-19, oil market shocks, Twitter sentiment, and alternative cryptocurrencies on the cryptocurrency market (Foroutan & Lahmiri, 2022; Sarkodie, Ahmed & Owusu, 2022; Yin, Nie & Han, 2021; Kraaijeveld & De Smedt, 2020; Fung, Jeong & Pereira, 2022; Ullah, Attah-Boakye, Adams & Zaefarian, 2022) these studies, as far as we are aware didn't consider these events collectively. Therefore, further research into the causes of cryptocurrency price changes is highly topical taking the variables identified in the previous literature as a whole and adding new variables not well studied such as the Russian-Ukraine war and Multinational Corporations revealing adoption intention.

The primary objective of this study is to uncover the complex relationship between cryptocurrency price fluctuations and significant global events that transpired within the past five years. These events encompass a wide spectrum, including political and global health crises, the public disclosure of multinational enterprises' investments in cryptocurrencies, and the influence of macroeconomic indicators. Beyond the exclusive focus on Bitcoin, this study adopts a more comprehensive approach encompassing various cryptocurrencies. It investigates how investors' decision-making processes regarding cryptocurrency investments are influenced by a blend of behavioural and macroeconomic factors, and how market signals influence the dynamics of cryptocurrency prices. We employed partial least squares structural equation Modelling to analyse the relationship between various variables, such as inflation rates (across the EU, UK, and USA), economic policy uncertainty (across the EU, UK, and USA), the adoption of cryptocurrencies by multinational enterprises, and the repercussions of global crises (including the Russian-Ukraine conflict and COVID-19 pandemic) on cryptocurrency returns. Our study specifically focuses on Bitcoin, Ethereum, and Binance coins, examining the period 2018 to 2022. In addition, we explore the moderating role of economic policy uncertainty in the relationship between inflation rates and cryptocurrency prices. By integrating macroeconomic and behavioural factors, this study will help readers gain a more comprehensive understanding of economic and social phenomena. This interdisciplinary approach is common in fields such as behavioural economics, where both macroeconomic and individual-level factors are considered to explain economic behaviour.

This study holds particular significance against the backdrop of major global health and geopolitical occurrences over the study period, which has had a profound impact on investor sentiment and decision-making. Owing to the complex interplay between these factors in shaping the cryptocurrency market, this comprehensive approach can offer valuable insights to investors, policymakers, and researchers in the increasingly interconnected world of digital assets. Therefore, further research into the causes of cryptocurrency price changes in this period is highly topical, taking the variables identified in previous literature as a whole and adding new variables that are not well studied, such as the Russian-Ukraine War and multinational corporations revealing adoption intention. In doing so, it guides strategic responses during transformative times. This study represents a pivotal contribution by bridging a crucial research void and providing theoretical insights into the considerations undertaken by policymakers, traders, and corporate leaders regarding legislation and informed investment practices. The remainder of this paper is organized as follows. The theoretical background is presented in Section 2. Section 3 presents the data and research methods. The conclusions, recommendations, and directions for future investigation are discussed in Section 4.

2. Theoretical Background and Hypotheses Development

2.1. Signaling and Cue Utilization Theory

Consumer behaviour theories, particularly signalling and cue utilization theories, provide a framework for understanding the dynamics that influence consumer decisions. This is particularly relevant in situations of information asymmetry, where the value of an asset is linked to the extent of the available market knowledge (Ullah et al., 2022). The crux of these theories emphasizes the key role played by organizational and producer credibility in shaping the efficacy of signals, be it in endorsing a product or guiding investment decisions (Helm & Mark, 2007; Reuer, Tong & Wu, 2012; Shen, Ma, Zhang, Huang & Fan, 2020). Cue utilization, a concept integral to product perception, involves consumers engaging in complex information processing. This complex cognitive process entails drawing inferences about products, assets, or stocks by synthesizing various accessible cues (Chung, Yu & Thorndike-Pysarchik, 2007; Kim & Choi, 2012; Olson & Jacoby, 1972; Wiggins, 2021). Notably, the complexity of items correlates with the complexity of the information processing they undergo, with more sophisticated products being subject to deeper scrutiny. In the expansive realm of human activities, the economic sector, including the cryptocurrency market, stands out as an interconnected and complex network (Drozd, Kwapien, Oświecimka, Stanisz & Watorek, 2020). The cue utilization theory emphasizes the idea that consumers evaluate a product's value based on a multitude of indicators rather than a singular factor, such as price (Bredahl, 2004). The reliability of a specific signal and the availability of additional signals are instrumental in shaping consumer choices and influencing the perceived value of goods (Helm & Mark, 2007). The signalling theory extends beyond individual consumers to encompass large corporations. According to this theory, the investment practices and tendencies of major firms can serve as indicators of a project's reliability, fostering a sense of psychological security among other investors. This, in turn, can positively impact buyers' willingness to invest, reduce perceived risks, and enhance their favourable attitudes toward assets (Shen et al., 2020). Given the inherent uncertainty and high volatility associated with the cryptocurrency market (García-Monleón, Danvila-del-Valle & Lara, 2021; Lewis, McPartland & Ranjan, 2019; Katsiampa, 2019), endorsement from credible individuals and companies is crucial for signalling reliability to investors and shaping their decisions in this precarious environment. Moreover, considering the relatively nascent stage of cryptocurrency market development, the support of multinational enterprises (MNEs) in cryptocurrency assets can attract attention and induce wider adoption. Prior research has identified instances of companies and individuals engaging in substantial volumes of cryptocurrency purchases and changes in prices. Ullah et al. (2022) have established a noteworthy correlation, indicating positive endorsements of cryptocurrencies by influential figures and celebrities contribute to the upward movement of cryptocurrency prices. Gandal, Hamrick, Moore and Oberman (2018) also highlighted that significant amounts of Bitcoin purchases made by companies exert a positive influence on the price. These empirical findings underline the impact of corporate participation in cryptocurrency acquisition, indicating positive endorsements from well-known figures can further amplify the market influence on cryptocurrency price. This reinforces the interconnected dynamics between corporate endorsements of cryptocurrencies and the price of cryptocurrencies. Therefore, we propose the following hypothesis:

Hypothesis 1: *There is a positive relationship between MNEs' disclosure of cryptocurrency adoption intentions and cryptocurrency price.*

2.2. Behavioural Factors

Researchers have identified behavioural biases and cognitive impairments in investors' decision-making that deviate from rational judgments (Zahera & Bansal, 2018). Here, we explore ambiguity aversion bias during global crises and its influence on cryptocurrency investors' decisions, and consequently, cryptocurrency prices.

2.2.1. Ambiguity Aversion During a Global Crisis

Ambiguity aversion reflects individuals and investors preferring certain and predictable outcomes, often choosing perceived safer investments over riskier ones with uncertain returns (Zeng, Li, Chen & Yang, 2018). This aversion is linked to reduced stock market participation, lower stock investments, and limited international stock ownership (Dimmock, Kouwenberg, Mitchell & Peijnenburg, 2016). Furthermore, ambiguity aversion is linked to the under-diversification of securities, and ambiguity-averse people are more likely to sell assets during a crisis (Dimmock et al., 2016). Previous research has highlighted the influence of investor psychology on financial risks and returns, including overconfidence and various biases. Factors such as holidays, seasonal changes, and investors' mental states can affect asset pricing and returns (Kliger & Qadan, 2019; Shaikh, 2021). Additionally, unexpected events such as wars, diseases, and geopolitical crises shape investors' perceptions and decisions (French, 2018; Manela & Moreira, 2016; Sakariyahu, Lawal, Oyekola, Dosumu & Adigun, 2023). Considering these influences, this study explores the connection between global health and war crises, investor decisions, and the potential repercussions on the cryptocurrency market and prices.

2.2.1.1. COVID-19 Crisis

Health, viewed as a form of human capital, significantly influences an individual's labour market value and is intertwined with economic growth. Pandemics (such as COVID-19) impact economies by reducing demand for goods and services and increasing operational expenses for businesses (Sidorenko, 2006). This connection between infectious disease crises and economic downturns, as seen in the 2008-2009 global financial crisis with the H1N1 virus (swine flu or influenza pandemic), indicates the need to consider economic susceptibility to disease outbreaks for accurate economic risk forecasting (Sands, El-Turabi, Saynisch & Dzau, 2016; Sperling & Biermann, 2009). Numerous studies have delved into the repercussions of global health crises on the financial system, (Himanshu, Mushir & Suryavanshi, 2021; Liu & Lee, 2020; Sarkodie et al., 2022; Shaikh, 2021) especially with a notable example of the COVID-19 pandemic. The pandemic has adversely affected future investments, economic activities, labour productivity, and risk control (Al-Thaqeb, Algharabali & Alabdulghafour, 2022). Empirical evidence highlights how the daily tally of COVID-19 infections and fatalities correlates with a negative return in the financial market, disrupting global investor sentiment (Shaikh, 2021). The pandemic has also influenced individual investors' portfolio allocation choices, with caution prevailing because of market ambiguity and uncertainty about profitability (Himanshu et al., 2021). This uncertainty leads to the hypothesis that investors might be hesitant to make new investments and risk-averse investors may opt to liquidate their holdings, increasing the supply of cryptocurrencies. As a result, we posit that the COVID-19 outbreak negatively impacted investors' risk-taking tendencies, potentially leading to decreased demand for cryptocurrencies.

Hypothesis 2: *COVID-19 had a negative effect on cryptocurrency prices.*

2.2.1.2. Russian-Ukraine War

Historically, war has been a key concern in economic research, examining its effects on the economy (Boiarko, Hrytsenko, Tverezovska, Saltykova & Kyrychenko, 2023; Brune, Hens, Rieger & Wang, 2015; Schneider & Troeger, 2006). In times of war, investor decisions become unpredictable, leading to diversified investment strategies aimed at minimizing losses (Gollier, 2011). Research indicates that the outbreak of war heightens market uncertainty and ambiguity, causing inconsistent investor reactions (Brune et al., 2015; Lopez & Mitchener, 2021). Initially, the uncertainty surrounding the possibility of war deters investors from certain investments such as stocks and cryptocurrencies, resulting in decreased market value (Brune et al., 2015). However, as conflict becomes certain and ambiguity decreases, this effect diminishes (Schneider & Troeger,

2006). However, uncertainty about the duration of the war may lead investors to stay out of the market or substantially reduce their holdings (Brune et al., 2015). This assertion is substantiated by few studies, in the context of the Russia–Ukraine war. Khalfaoui, Gozgor and Goodell (2023) point up the adverse effects of heightened war attention on all cryptocurrencies in the short term. The findings consistently unveil a trend wherein cryptocurrency investors respond to increased war attention by actively seeking liquidity. In such scenarios, the observed declines in cryptocurrency prices are attributed to intentional selloffs by significant holders of these digital assets. Additionally, Theiri, Nekhili and Sultan (2023) identified a significant but temporary impact on the liquidity of Bitcoin and Ethereum amid the Russia–Ukraine war. The study emphasizes a critical observation – liquidity levels witnessed a noticeable increase within the initial two days surrounding the event. This surge in liquidity suggests a noteworthy shift in market dynamics, possibly influenced by strategic responses from market participants amid geopolitical tensions. Considering this, this study posits the following hypothesis:

Hypothesis 3: *A negative association exists between the Russian-Ukraine War and cryptocurrency price change.*

2.3. Macroeconomic Factors

2.3.1. Inflation Rate

The primary goals of any country's economic system are to control inflation and ensure steady growth (Bernanke & Mishkin, 1997; Walsh, 2009). High inflation is identified as a significant economic risk for individual investors, impacting both a nation's long-term economic health and an individual's financial well-being (Demir, Frenkel, Grier, Grier, Ju & Kosacoff, 2008). As inflation accelerates, the overall price level rises, diminishing the appeal of new market opportunities and pricing signals for the average household (Coibion, Georgarakos, Gorodnichenko, Kenny & Weber, 2021; Labonte & Makinen, 2008). Research on the relationship between inflation rates and investor decisions reveals mixed associations (Braggion, von Meyerinck & Schaub, 2021). The hedging theory suggests that informed individuals may invest more during inflation to safeguard their investments, often turning to assets like gold, certain stocks, and haven assets (Baur & McDermott, 2012; Ely & Robinson, 1989; Ghosh, Levin, Macmillan & Wright, 2004). On the other hand, less informed individuals, as explained by the "money illusion, tend to sell more holdings during inflationary periods (Brunnermeier & Julliard, 2006; Howitt, 1989). In the cryptocurrency market, where complexity and infancy prevail, understanding the investment dynamics is challenging (Drozd et al., 2020). Several research studies have consistently identified a negative association between the inflation rates in different countries and the prices and returns of cryptocurrencies. Qudah and Aloulou, (2020) 's study supports this association, by revealing a noteworthy negative relationship between the price of bitcoin and the inflation rate in the Gulf Cooperation Council (GCC) countries. Additionally, Andrikopoulos, Hudson, Akbar and Saftoiu (2018) research indicates a relationship between cryptocurrency returns and Consumer Price Index (CPI) announcements, suggesting that the release of inflation-related data significantly influences these returns, especially in response to unexpected CPI figures. The present state of research reveals a nuanced stance on the efficacy of cryptocurrencies as robust inflation hedges, with a prevailing trend across multiple studies indicating their constrained effectiveness, particularly in the aftermath of short-term economic shocks in specific countries (Sakurai & Kurosaki, 2023; Wang, Sarker & Bouri, 2023). For instance, the examination of hedging properties in Matkovskyy and Jalan, (2020)'s study explains that while BTC/USD may lack efficacy in hedging realized inflation, BTC/JPY demonstrates effectiveness in the context of Japan. Contrastingly, Basher and Sadorsky, (2022) assert the diminishing relevance of Bitcoin as an inflation hedge, challenging its status as a reliable option. This observation is highlighted by the study's comparison with gold, revealing gold's more cyclical relationship with inflation and positioning it as a potentially viable alternative for risk-averse investors. In the comparative analysis by Smales, (2021) between cryptocurrencies and gold, a short-term positive correlation with inflation is uncovered. Their study brings to light a distinctive feature, highlighting that cryptocurrency, unlike gold, lacks a long-term inflation hedging capability. Additionally, the research pinpoints lower cryptocurrency returns on days coinciding with monthly CPI announcements, coupled with negative responses to unexpected CPI surprises. Building on this evidence, we propose the following hypothesis:

Hypothesis 4: *The inflation rate is negatively associated with cryptocurrency price change.*

2.3.2. Economic Policy Uncertainty

Policy uncertainty is characterized by an unpredictable pattern of monetary, fiscal, and regulatory policies that ultimately lead to market instability, which is a significant factor in economic dynamics (Al-Thaqeb & Algharabali, 2019). Economic policy uncertainty (EPU) refers to the lack of certainty surrounding economic policies, including decision-makers, actions, timing, and the impact on businesses due to changes in financial, monetary, and other legislation (Baker, Bloom & Davis, 2016). EPU has wide-ranging effects on investors, consumers, businesses, and industries and influences both consumption and production (Al-Thaqeb & Algharabali, 2019). During periods of uncertainty, households tend to delay unnecessary purchases while seeking secure investment avenues (Coibion et al., 2021). As uncertainty increases, investors make asset choices based on likely outcomes, with research indicating that uncertainty significantly shapes investment decisions, leading investors to seek safety in perceived reliable assets (Baur & McDermott, 2012). Numerous studies have investigated the relationship between EPU and major cryptocurrencies, notably Bitcoin and Ethereum, revealing a predominantly negative association (Bouri, Gupta, Tiwari & Roubaud, 2017; Cai, Zhu, Xue & Song, 2022; Demir, Gozgor, Lau & Vigne, 2018; Raza, Khan, Guesmi & Benkraiem, 2023). Bouri et al. (2017) research laid the groundwork by suggesting that Economic Policy Uncertainty leads to reduced Bitcoin returns, with noteworthy effects observed at both lower and higher quantiles. Subsequent work by Demir et al. (2018) reinforced this finding suggesting that EPU leads to decreased Bitcoin returns, with effects becoming positive and significant at higher quantile. Cai et al. (2022) insightful contributions further corroborate these assertions, as evidenced by daily and monthly time series tests. The results emphasize a discernible negative relationship, indicating that Bitcoin returns tend to decrease in tandem with rising economic policy uncertainty. In addition, Raza et al. (2023) extend the narrative by emphasizing the role of various cryptocurrencies including Bitcoin, Binance Coin, Ethereum, Cardano, Ripple, and Litecoin, acting as safe havens during periods of financial regulation policy uncertainty. Yen, Nie, Chang and Chang (2023) emphasize that economic policy uncertainty in cryptocurrency-supportive countries significantly influences overall market dynamics. Given these dynamics, we propose the following hypothesis.

***Hypothesis 5:** There is a negative association between Economic policy uncertainty and cryptocurrency price.*

2.4. Moderating Effect

This section builds on an earlier hypothesis that associates the inflation rate with a negative effect on cryptocurrency prices, reflecting reduced investor interest in cryptocurrency investments during inflation. It now explores an integrated concept that examines the dynamic interaction between inflation rate and policy uncertainty and their collective impact on cryptocurrency price changes. Several studies emphasize the importance of understanding policy uncertainty and macroeconomic variables together because of their significant economic impacts (Hartzmark, 2016; Tarkom & Ujah, 2023). Previous research indicates that increasing uncertainty prompts investors to make asset choices based on likely outcomes, leading them to seek safety in perceived reliable assets (Baur & McDermott, 2012). Akey and Lewellen (2017) suggested that investor risk tolerance may be influenced by sensitivity to policy uncertainty and political affiliation during periods of uncertainty. When economic policy uncertainty coincides with inflation periods, some investors driven by survival instincts may reassess portfolios and optimize resource use. In high-pressure periods, various studies indicate that perceived safe-haven status (López-Cabarcos, Pérez-Pico, Piñeiro-Chousa & Šević, 2021), decentralization, diversification benefits, and speculative interest (Mokni, 2021) can attract investors seeking refuge from inflation's negative effects, potentially causing upward price movements in the cryptocurrency market. Thus, we propose that policy uncertainty can moderate and sometimes negatively influence the relationship between the inflation rate and cryptocurrency price change.

***Hypothesis 6:** Economic policy uncertainty moderates the negative effect of the inflation rate on cryptocurrency price changes.*

3. Data and Methods

3.1. Data

The cryptocurrency market data used in this study were obtained from the Coinmarketcap database. The database contains information on daily prices (Open, High, Low, and Close), Volume, Market Cap, user-submitted price estimates, and cryptocurrency transaction records. We considered the daily “high” prices of Bitcoin, Ethereum, and

Binance coins for the period from August 30, 2018, to October 14, 2022. We selected these three cryptocurrencies because they embody distinct aspects of the expansive blockchain and cryptocurrency ecosystem (Davidson, De Filippi & Potts, 2018; Meyer & Hudon, 2019), rendering them pivotal subjects for a thorough examination. Bitcoin offers fundamental insights into decentralized currencies (Böhme, Christin, Edelman & Moore, 2015). Ethereum introduces the notions of smart contracts and decentralized applications, and Binance Coin illustrates the significance of utility tokens.

Regarding Economic Policy Uncertainty, we used the EPU index developed by Baker et al. (2016), which has been demonstrated to be a reliable indicator of actual economic policy uncertainty and is frequently applied to forecasting Bitcoin returns (Chen, Lau, Cheema & Koo, 2021; Demir et al., 2018; Yen & Cheng, 2021), stock returns (Phan, Sharma & Tran, 2018), exchange rate (Mueller, Tahbaz-Salehi & Vedolin, 2017), and nations trade fluctuation (Hu & Liu, 2021) among others. The EPU index historical data were retrieved from their website (information about the source is summarized in Table 1 below), which offers EPU indexes for the world and various countries. We used the European Union, United States of America, and United Kingdom Economic Policy indices to assess their effect on cryptocurrency price changes. The sample countries were selected because of their substantial contribution to the development of information and communication technology and the presence of numerous cryptocurrency trading firms in these regions. In addition, they have a greater standing in the world because of their membership in the G8, an assembly devoted to addressing global issues and promoting prosperity and economic development.

	Construct	Variables	Source	Variable Type	Effect
1	CRYP (Cryptocurrencies)	BTC(Bitcoin) ETH(Ethereum) BNB (Binance coin)	coinmarketcap.com	Numeric	
2	EVEN (Unexpected global events)	COVID-19 RU-UKR (Russian-Ukraine War)		Ordinal	Unexpected global crisis causes ambiguity(-Ve)
3	INF (Inflation rate)	INFEU (European Union 19 countries) INFUK (United Kingdom) INFUS (United States of America)	worldbank.org	Numeric	High inflation reduces spending, which lowers consumer demand for a cryptocurrency (-Ve)
4	UNCERT (Economic Policy uncertainty)	EUPU (European Union countries) GBPU (United Kingdom) USPU (United States of America)	www.policyuncertainty.com	Numeric	High uncertainty reduces spending, which lowers consumer demand for a cryptocurrency (-Ve)
5	ADO (Adoption of cryptocurrency by MNE)	Starbucks (SA) PayPal (PA) Visa (VA) MasterCard (MA) Tesla (TA) adoption	Google search	Ordinal	Encourages investors' investment (+Ve)

Table 1. Summary of variables and their effect

The EPU index for the USA is composed of three distinct elements: reports on lists of provisions in the federal tax code that are due to expiration in the next ten years, newspaper articles about the EPU, projections of future Consumer Price Index levels, and government spending from the Survey of Professional Forecasters. The European and United Kingdom policy-related economic uncertainty is based on newspaper articles about policy uncertainty from 10 European newspapers and two for the United Kingdom, which counted the number of times the terms were uncertain or uncertain, economic or economic, and one or more terms related to policy appeared in the articles (Baker et al., 2016).

The inflation rate data were obtained from www.worldbank.org prepared by Ha, Kose and Ohnsorge (2021), which provides a global database of inflation data by combining information from various sources. The database contains inflation series for six different inflation metrics: headline inflation, changes in the gross domestic product deflator, inflation of food and energy prices, inflation of core consumer prices, inflation of producer prices, and inflation of core consumer prices (Ha et al., 2021). We consider the monthly frequency and annual rate of change in the U.K., U.S.A., and EU inflation rates.

Additionally, we obtain the dates of any disclosures of MNEs welcoming cryptocurrency payments or purchasing cryptocurrencies during the study period using Google searches for terms such as (“cryptocurrencies,” and “crypto assets”), (“firms,” “Multinational Enterprises,” “Multinational Corporations”), And (“adoption,” “investment”, “payment acceptance”). We considered announcements made by Visa Inc., PayPal Holdings Inc., Mastercard Inc., Starbucks Corp., and Tesla Inc. to understand how investors utilize these cues and signals to establish judgments and cryptocurrency investment decisions.

Furthermore, we considered COVID-19 and the Russian-Ukrainian War to understand how global health issues and international conflicts have affected cryptocurrency prices. We obtained the timeline for the COVID-19 pandemic from <https://bfg.co.uk/2020/04/covid-19-timeline/> and created ordinal variables for the early, confinement, and relaxation periods. The timeline of the Russian-Ukrainian war was retrieved from <https://www.bbc.co.uk/news> and ordinal variables were created for the first, second, and third phases of the conflict.

3.2. Material and Methods

Partial least squares (PLS) structural equation modelling was used in this study. Structural equation modelling is a multivariate regression technique appropriate for confirmatory and exploratory research. Structural equation modelling (SEM) measures the structural relationship between independent constructs by combining the statistical techniques of “multiple regression analysis” and “factor analysis”. It uses latent variables to model the relations between independent and dependent variables. There are two viable analysis methods for modelling structural relationships: PLS-SEM and covariance-based SEM. Partial least squares (PLS) is a widely used model estimation technique. In Partial least-squares structural modelling, the model specifies both structural and measurement models (Hair, Hult, Ringle, Sarstedt, Danks & Ray, 2021). The measurement model indicates the relationship between each construct and its related indicators, whereas the structural model depicts the structural connections between constructs. Both are often visually represented by a path model that shows the variable correlations and hypotheses to be estimated in an analysis. The non-parametric bootstrap approach was used in the PLS-SEM. The bootstrapping method was used to estimate the significance of the path coefficients. The key benefit of this approach is that it assesses the precision of the parameters by dividing the available data into subsamples and examining the distribution of the estimated parameters for each subsample (Hair et al., 2021).

4. Data Analysis and Results

4.1. Model Estimation

4.1.1. Assessment of Reliability: “Cronbach’s Alpha” and “Composite Reliability”

Cronbach’s alpha was used to assess the internal correction or consistency of the measurement model between observed variables. The measurement of internal correction reflects the level of correlation between constructs and their corresponding scores. A minimum value of 0.7 for this index is accepted as a benchmark to show the accuracy of the measurement method. The Cronbach’s Alpha in this model reveals satisfactory values for ADO (0.815), CRYP (0.970), UNCER (0,687), and INF (0.977). These values suggest a reasonable degree of internal consistency within each construct (Hair et al., 2021). Additionally, the composite reliability, measured through both ρ_a and ρ_c , are indicators of the reliability of the scales. If the composite reliability value is greater than 0.8, the measurement model has a substantial level of internal consistency (Hair et al., 2021). As demonstrated in Table 2, the composite reliability scores for this study were satisfactory.

	Cronbach's alpha	Composite reliability (rho_a)	Composite reliability (rho_c)	The average variance extracted (AVE)
ADO	0,815	0,958	0,895	0,711
CRYP	0,970	0,970	0,981	0,944
EVEN	0,822	0,607	0,107	0,627
INF	0,977	1,071	0,984	0,953
UNCER	0,687	0,967	0,817	0,634

Table 2. Construct reliability and validity

4.1.2. Assessment of Validity: Average Variance Extracted and Fornell-Larcker Criterion Validity

Next, two criteria— Average Variance Extracted and Fornell-Larcker criterion validity were employed to determine whether the measurement met the acceptable validity standards. The Average Variance Extracted (AVE) indicates the average variance of each construct and its components. This confirms the validity of the association between relevant indicators. Following the literature by Fornell and Larcker (1981), a value of 0.5 must be considered to determine the AVE validity. Here, CRYP (AVE = 0.944) INF (AVE = 0.953), UNCER (AVE = 0.634), and ADO (AVE = 0.711), suggest greater consistency and accuracy in capturing the intended concepts. Divergent or discriminant validity (Fornell-Larcker test) indicates the singularity of a measurement tool. The test demonstrates divergent or discriminant validity if there is little or no association between it and instruments intended to measure other constructs. Any construct was considered valid if its square root (AVE) was higher than its internal correlation. The results of the divergent validity test (Fornell-Larcker test) are presented in Table 3. Notably, the diagonal elements represent the correlation of each construct with itself, revealing high self-correlation values for ADO (0.843), CRYP (0.972), UNCER (0.796), and INF (0.976). The off-diagonal elements showcase the correlations between different constructs. The AVE square root values (Fornell-Larcker) show a stronger association between the constructs. In other words, the research model also has discriminant validity.

	ADO	CRYP	EVEN	INF	UNCER
ADO	0,843				
CRYP	0,850	0,972			
EVEN	-0,544	-0,363	0,792		
INF	0,834	0,585	-0,770	0,976	
UNCER	-0,139	-0,186	0,527	-0,203	0,796

Table 3. Fornell-Larcker criterion

The Fornell-Larcker criterion was used to confirm discriminant reliability (Table 3). This demonstrates that each construct's AVE was higher than its highest squared correlation with any other.

4.2. Analysis of the Structural Model

A structural equation model (SEM) was developed to validate the relationships proposed in the hypotheses on the change in cryptocurrency prices. The proposed model of structural relationships (Figure 1) was estimated by bootstrapping (5000 samples) using Smart PLS 3 software, which accounts for moderating and linear effects. The criteria of R-squares and significant coefficients of p-values were employed in this study to examine associations between latent variables. The quality of the fit of a model was measured by its R² coefficients, which are related to its dependent latent variables. R² represents the influence of all related independent variable on the dependent variable. The adjusted R² (Table 4), which measures how well the latent variables explain the variability of the variable "Cryptocurrency price," has a value of 0,785, and the adjusted R² is 0,785 which is acceptable in line with the literature Kline (2023). It should be highlighted that the closer it is to one, the better the model fit.

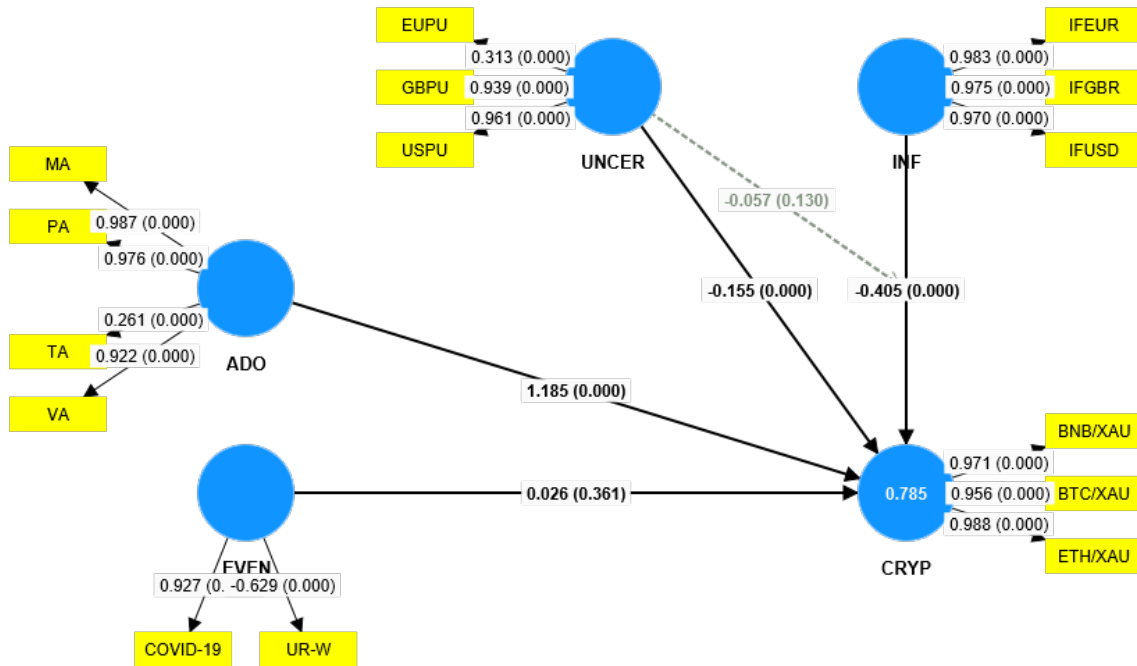


Figure 1. A structural relationships model between the variables and the price of cryptocurrency

	R-square	R-square adjusted
CRYP	0,785	0,785

Table 4. R-square

Dimension	Indicators	Path coefficients	P value	Test result
Adoption by MNEs [ADO] -> CRYP	PayPal [PA] Visa [VA] MasterCard [MA] Tesla [TA]	1,185	0,000	Pass
Disruptive events [EVEN] -> CRYP	COVID-19 Russian-Ukraine War [UR-W]	0,026	0,361	Reject
Economic policy uncertainty [UNCER] -> CRYP	European Union region [EUPU] United Kingdom [GBPU] United States of America [USPU]	-0,115	0,000	Pass
Inflation rate [INF] -> CRYP	European Union 19 countries [IFEU] United Kingdom [IFGBR] United States of America [IFUSD]	-0,429	0,000	Pass
Economic policy uncertainty x Inflation rate UNCER x INF -> CRYP		-0,057	0,130	Reject

Table 5. The effect of the model variable indicators on cryptocurrency price

The path coefficient (Table 5) shows the amount and direction of a causal link between two latent variables. The significance of the path coefficients is shown by the p-value. The path coefficients display the magnitude of each variable’s effect on the dependent variable. Path coefficients must be close to or less than 1. Results from 0.2 to 0.2 are considered poor. The results show that each hypothesis was validated at a confidence level greater than 95% ($P < 0.05$). Nevertheless, as evident from the table, the ADO variable exhibits a coefficient exceeding 1. Deegan, (1978) underlines the legitimacy of encountering regression coefficients greater than one. One explanation for this phenomenon is the presence of a predictor variable (ADO) and outcome variables (CRYP) measured on disparate scales. The dissimilarity in measurement scales can contribute to coefficients surpassing one.

4.3. Robustness Checks

Here a detailed examination of robustness checks was conducted to assess the stability and reliability of results obtained in the primary structural equation modelling analysis. These robustness checks involve variations in sample composition, focusing on different sets of companies and cryptocurrencies. The purpose is to evaluate the sensitivity of the findings to specific choices made in the modelling process. Furthermore, these robustness checks provide transparency and insights into the stability of SEM results under different specifications.

4.3.1. Robustness Check 1: Removing Pre-COVID Data

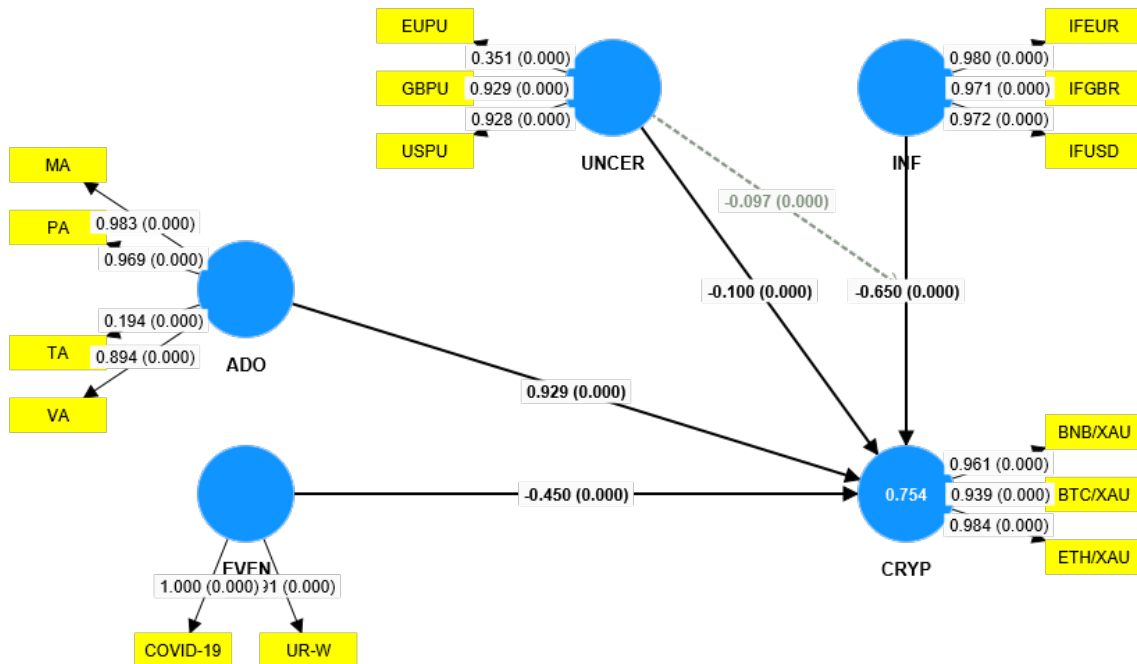


Figure 2. Robustness Check 1: Removing Pre-COVID Data

The first robustness check involved removing data collected before the COVID-19 period to examine the impact of the pandemic on the relationships within the model. The model, after removing pre-COVID data, still supports the main findings of the original model, with some adjustments in the strength of relationships.

Dimension	Indicators	Path coefficients	P value
Adoption by MNEs [ADO] -> CRYP	PayPal [PA] Visa [VA] MasterCard [MA] Tesla [TA]	0.929	0,000
Disruptive events [EVEN] -> CRYP	COVID-19 Russian-Ukraine War [UR-W]	-0,450	0,000
Economic policy uncertainty [UNCER] -> CRYP	European Union region [EUPU] United Kingdom [GBPU] United States of America [USPU]	-0,100	0,000
Inflation rate [INF] -> CRYP	European Union 19 countries [IFEU] United Kingdom [IFGBR] United States of America [IFUSD]	-0,650	0,000
Economic policy uncertainty x Inflation rate UNCER x INF -> CRYP		-0,097	0,000

Table 6. Robustness Check 1: Removing Pre-COVID Data

Adoption by MNEs [ADO] -> CRYP: The path coefficient has slightly decreased, but the relationship between the adoption by MNEs and CRYP remains statistically significant.

Disruptive events [EVEN] -> CRYP: The relationship between disruptive events (COVID-19 and Russian-Ukraine War) and CRYP has reversed in direction. Previously it was positive but not statistically significant; now it is negative and significant. This change might imply that the disruptive events had a different impact on CRYP when pre-COVID data was included.

Economic policy uncertainty [UNCER] -> CRYP: The negative relationship between economic policy uncertainty and CRYP remains, but the coefficient has decreased. However, the relationship remains statistically significant.

Inflation rate [INF] -> CRYP: The negative relationship between the inflation rate and CRYP has strengthened, and the coefficient has increased. The relationship remains statistically significant.

Economic policy uncertainty x Inflation rate [UNCER x INF] -> CRYP: The negative relationship of the interaction term's coefficient remains consistent, but the statistical significance has changed. Previously it was insignificant but now in this model, it is significant. This change might imply that the economic policy uncertainty had a different impact on the relationship between inflation rate and cryptocurrencies when pre-COVID data was included.

The overall patterns in the relationships have been maintained, and the key relationships are still statistically significant after removing pre-COVID data. The changes in path coefficients could suggest that the effects of certain factors on CRYP may have evolved or become more pronounced in the post-COVID period. In summary, the updated model, after removing pre-COVID data, still supports the main findings of the original model, with some adjustments in the strength of relationships. This robustness check enhances the credibility of the results by showing consistency in the findings despite variations in the dataset.

4.3.2. Robustness Check 2: Removing Specific Cryptocurrencies

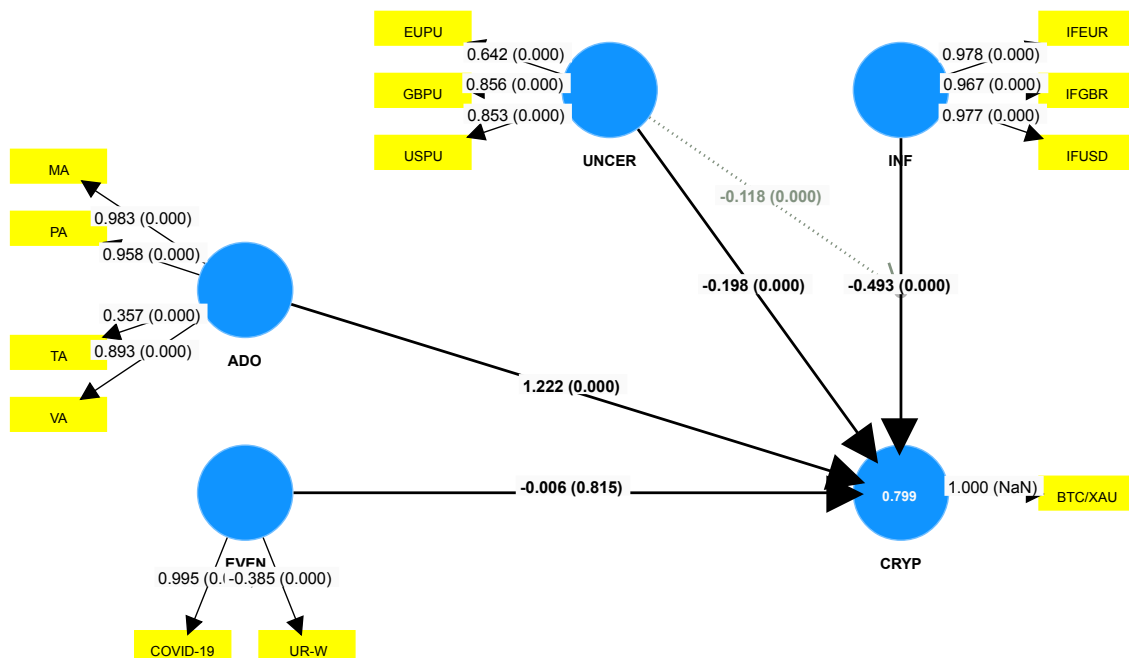


Figure 3. Robustness Check 2: Removing Specific Cryptocurrencies

The second robustness check involved conducting a robustness check by removing some cryptocurrencies (Ethereum and Binance) while keeping Bitcoin, and then re-evaluating the SEM model. Let's analyse the updated results:

Dimension	Indicators	Path coefficients	P value
Adoption by MNEs [ADO] -> CRYP	PayPal [PA] Visa [VA] MasterCard [MA] Tesla [TA]	1.222	0,000
Disruptive events [EVEN] -> CRYP	COVID-19 Russian-Ukraine War [UR-W]	-0,006	0,815
Economic policy uncertainty [UNCER] -> CRYP	European Union region [EUPU] United Kingdom [GBPU] United States of America [USPU]	-0,198	0,000
Inflation rate [INF] -> CRYP	European Union 19 countries [IFEU] United Kingdom [IFGBR] United States of America [IFUSD]	-0,493	0,000
Economic policy uncertainty x Inflation rate UNCER x INF -> CRYP		-0,118	0,000

Table 7. Robustness Check 2: Removing Specific Cryptocurrencies

Overall, the robustness check suggests that the model's core findings remain consistent after removing certain cryptocurrencies. The positive impact of MNEs, the negative impact of the inflation rate and policy uncertainty, and the relationship with disruptive events persist in the updated model. The previously insignificant relationship between the interaction of economic policy uncertainty and the inflation rate on cryptocurrency adoption became notable in the revised model. This shift suggests that the moderation of economic policy uncertainty on the relationship between the inflation rate and cryptocurrencies changed when considering only Bitcoin. This finding aligns with existing literature and supports our hypothesis, particularly in the case of Bitcoin, indicating that policy uncertainty moderates the relationship between the inflation rate and cryptocurrencies.

4.3.3. Robustness Check 3: Removing Companies that Adopted Cryptocurrencies

The third robustness check involved conducting a robustness check by removing some companies that adopted or invested in cryptocurrencies over the past five years, and then re-evaluating the SEM model.

Dimension	Indicators	Path coefficients	P value
Adoption by MNEs [ADO] -> CRYP	Visa [VA] Tesla [TA]	0.738	0,000
Disruptive events [EVEN] -> CRYP	COVID-19 Russian-Ukraine War [UR-W]	-0,353	0,000
Economic policy uncertainty [UNCER] -> CRYP	European Union region [EUPU] United Kingdom [GBPU] United States of America [USPU]	-0,286	0,000
Inflation rate [INF] -> CRYP	European Union 19 countries [IFEU] United Kingdom [IFGBR] United States of America [IFUSD]	-0,195	0,000
Economic policy uncertainty x Inflation rate UNCER x INF -> CRYP		-0,067	0,352

Table 8. Robustness Check 3: Removing Companies that adopted cryptocurrencies.

Overall, again in this model, the robustness check suggests that the model's core findings remain consistent after removing certain companies. The positive impact of MNEs, the negative impact of the inflation rate and policy uncertainty, and the relationship with disruptive events persist in the updated model. The above robustness checks enhance the credibility of the results by showing consistency in the findings despite variations in the modelling.

5. Discussion

A recent in-depth exploration of the cryptocurrency literature spanning more than a decade, as conducted by (Pattnaik et al., 2023), highlights Bitcoin's enduring prominence in research. Their proposed research direction emphasizes the need to examine how various events affect investors' attitudes and decision-making processes regarding cryptocurrency investments. In response, our analysis concentrates on global crises, macroeconomic indicators, and multinational enterprises (MNEs) interest in cryptocurrencies, all of which are linked to responsiveness to changes in cryptocurrency prices. We examine the role of MNEs in integrating cryptocurrencies, the impact of COVID-19, the Russia-Ukraine conflict, inflation rates, and Economic Policy Uncertainty to comprehend how investors react to these factors and subsequently influence cryptocurrency prices.

To test our first hypothesis, we examine the incorporation or investment in cryptocurrencies by multinational enterprises in our model. The results revealed a noteworthy positive association between MNEs' adoption of cryptocurrencies and cryptocurrency prices. The statistically significant link between Multinational Corporations embracing, accepting, and incorporating cryptocurrencies ("ADO") aligns with our expectations, suggesting that the consideration of cryptocurrencies by MNEs boosts investor confidence and trust. This encourages additional investments in cryptocurrencies and positively influences their prices. This finding is in line with Ullah et al. (2022) research, which also demonstrated a significant positive relationship between substantial/high-volume purchases from multinational companies and the prices of bitcoin-backed securities. This is also consistent with the literature, as highlighted by Shen et al. (2020), which indicates that the inclinations and investment practices of large firms may signal a project's reliability, foster psychological security among other investors, and motivate them to invest in similar initiatives and ventures.

To test Hypotheses 2 and 3, we investigated the crisis period marked by the COVID-19 pandemic and the Russian-Ukrainian War, serving as proxies for a global crisis, and assessed their impact on cryptocurrency prices. The results of testing our model indicate that "EVEN" is not significantly associated with cryptocurrency price. Although, in our original SEM analysis, it is observed an insignificant relationship based on the complete dataset, during a robustness check where we systematically removed data points before COVID-19 (see Figure 2), we found a notable change – the relationship became statistically significant. A potential explanation is that the initial disruptions caused by the effects of COVID-19 were assimilated or counterbalanced by subsequent market dynamics. Consequently, the influence on cryptocurrency prices might have been comparatively subdued throughout the entire five-year duration. While the original findings indicated no significant association, the results from the post-COVID-19 data analysis emphasize the potential influence of data subsets on the observed relationships. This aligns with our expectations, as per the report by The World Bank (2022), stating that the Russian-Ukrainian conflict disrupted the global economy, especially in energy and food markets, causing supply constraints and pushing prices to historic highs. Global economic activity has suffered throughout the year, significantly impacting global GDP growth due to energy price shocks, leading to a substantial surge in commodity prices, with a 50-60% increase in the initial stages of the war. This finding also corresponds with the existing literature, where several studies have shown that the outbreak of war introduces market uncertainty and ambiguity, causing investors to react inconsistently (Brune et al., 2015; Lopez & Mitchener, 2021).

Different studies have presented diverse findings on the influence of the COVID-19 pandemic on cryptocurrency prices. Various studies, including those conducted by Sarkodie, Ahmed and Owusu (2022); Liu and Lee (2020); Ullah et al. (2022), have focused on the relationship between COVID-19 lockdowns and the performance of various cryptocurrencies. The consensus from these studies suggests a significant positive association between the two, indicating that the cryptocurrency market experienced upward movements during the lockdown periods. However, nuanced findings emerged when considering the study conducted by Ullah et al. (2022), which identified a distinctive negative association. Specifically, Ullah et al. (2022) pointed out a significant negative correlation between the prices of bitcoin-backed securities and the period when COVID-19 lockdowns were eased. This reveals a dynamic shift in the relationship between cryptocurrency prices and pandemic-related restrictions, indicating that the positive influence observed during lockdowns may not be sustained if these restrictions are lifted. Amid lockdowns, changes in investor behaviour, influenced by individuals with more available time, probably led to increased interest in alternative investments, especially cryptocurrencies. The

digital characteristics of cryptocurrencies might enable them to navigate the disruptions faced by traditional markets during lockdowns, thereby ensuring uninterrupted trading.

Furthermore, during the COVID outbreak, a series of other events also occurred concurrently which may shape the trajectory of cryptocurrency prices. For instance, the onset of the COVID-19 pandemic initially led to a decline in Bitcoin's price. Upon the breaking of COVID-19 news, the price of Bitcoin dropped from \$8099.3 on November 20th, 2019, to \$7298.2 within two weeks on December 2nd, 2019, and continued to decrease until it reached \$6613.3 on December 17th, 2019. Additionally, when the lockdown began, Bitcoin's price fell to \$5030 on March 16th, 2020, from \$9134.8 on March 8th, 2020. Subsequently, for five months until July 26th, 2020, Bitcoin's price remained within a moderate range, fluctuating between \$5000 and \$10000. This observation suggests that various factors beyond the pandemic contributed to the fluctuations in cryptocurrency prices during the examined period. Therefore, the conclusion drawn from our findings, which encompasses various factors, is that although there was a brief period during COVID-19 when cryptocurrency prices increased, the overall impact of the pandemic on cryptocurrency prices appears insignificant or negative.

If we look at the institutional adoption for example, within 10 days after PayPal announced its acceptance of Bitcoin in October 2020, the price of Bitcoin surged from 10620.5\$ to 11298.4\$. Similarly, Mastercard's announcement in November 2020 led to another significant jump in Bitcoin's price, from 13759.4\$ to 15303.6\$ within 10 days. The trend continued, with Bitcoin's value reaching a peak of 46395.7\$ in February 2021 following Tesla's announcement of Bitcoin acceptance. Subsequently, Mastercard's decision to embrace Bitcoin in February 2021 further bolstered its value, with prices escalating from 44836\$ to 47990.7\$ within a few days. Notably, these developments occurred amidst a period of lockdown, coinciding with a general uptrend in Bitcoin prices. Nevertheless, it's noteworthy that the peak of Bitcoin's price was during a period characterized by the absence of COVID-19 and marked a phase of normalization. About one month and 15 days after Starbucks initiated accepting Bitcoin payments in September 2021, the price of Bitcoin surged, reaching a range between \$60,000 and \$67,000 from October to November 2021.

To examine our fourth hypothesis, we analysed the inflation rates of European Union countries, the United Kingdom, and the United States regarding the prices of cryptocurrencies (specifically Bitcoin, Ethereum, and Binance Coin). Our findings reveal a negative correlation between these variables, which is consistent with existing literature. The high cost of goods in the market during periods of high inflation constrains spending, thus negatively impacting cryptocurrency prices during the study period. Although various studies, such as Conlon, Corbet and McGee (2021), have identified a positive connection between cryptocurrencies and forward inflation rates, it is noteworthy that their focus was on a brief period around the onset of the COVID-19 pandemic. Over the past five years, governments and regulatory bodies have responded to the combined challenges of COVID-19 and inflationary pressures by implementing diverse measures aimed at stabilizing traditional financial systems. These measures include stimulus initiatives, public interventions, monetary policy adjustments, currency controls, and regulatory interventions. It is crucial to recognize that such governmental actions have the potential to influence the cryptocurrency market and may be perceived negatively by investors.

Our fifth hypothesis delves into the impact of economic policy uncertainty on cryptocurrency prices. Throughout our study duration, we identified a statistically significant and negative association between Economic Policy Uncertainty ("UNCER") and the prices of cryptocurrencies under scrutiny. This finding aligns with previous research, including those of Bouri et al. (2017); Cai et al. (2022); Demir et al. (2018); and Raza et al. (2023). The study of Yen and Cheng (2021) indicates a negative association between changes in China's (EPU) and the future price of Bitcoin and Litecoin. Bouri et al. (2017) research also suggests that Economic Policy Uncertainty leads to reduced Bitcoin returns. This supports the notion that investor responses hinge on the efficacy of policies and guidelines established by each country regarding cryptocurrencies and align with investors' objectives for protection or gain. Furthermore, Yen et al. (2023) emphasizes that economic policy uncertainty in cryptocurrency-supportive countries significantly influences overall market dynamics. Their findings highlight that fluctuations in economic policy uncertainty within cryptocurrency-supportive nations play a pivotal role in shaping the overall landscape of the market. This observation aligns with our study's specific focus and the significant relationship of EPU of the countries and regions under investigation (European Union,

the United Kingdom, and the United States of America) which are characterized by potentially robust and influential economic policies.

Our sixth hypotheses focus on the moderating influence of economic policy uncertainty on the impact of the inflation rate on cryptocurrency prices. As indicated in our fourth hypothesis, the study period revealed an adverse effect of the inflation rate on cryptocurrency prices. The results from the moderating effect (hypothesis six) didn't confirm the moderation of policy uncertainty on the impact of the inflation rate on cryptocurrency prices. Although, in our original SEM analysis, it is observed an insignificant relationship based on the complete dataset, during a robustness check where we systematically removed data points before COVID-19 (see Figure 2), we found a notable change – the relationship became statistically significant. While the original findings indicated no significant association, the results from the post-COVID-19 present the potential influence of data subsets on the observed relationships. The conventional relationship has likely grown more pronounced due to shifts in the economic landscape and unpredictable policy responses post-COVID. The pandemic's unique challenges may have introduced pandemic-induced policy uncertainty, influencing investor perceptions and behaviour. In this context, the moderating effect becomes more pronounced as market participants navigate uncertain policy trajectories, impacting the susceptibility of cryptocurrencies to inflation rates. In contrast, the pre-COVID period, marked by relatively stable economic conditions and clear governmental frameworks, lacks a similar moderating effect. Because policy responses were more predictable during this time, the typical relationship between inflation rates and cryptocurrency might be less susceptible to external risks. This may serve as a support to the literature that during periods of heightened economic policy uncertainty, the negative impact of the inflation rate on cryptocurrency values intensifies. Investors, especially those with high savings, are drawn to perceived safe-haven status, decentralization, diversification benefits, and speculative interest, as suggested by various studies (López-Cabarcos et al., 2021; Mokni, 2021). Furthermore, savvy investors attuned to economic policy nuances may adopt more impulsive and tactical approaches when investing in cryptocurrencies during inflationary periods. Additionally, investors who closely monitor economic policies, such as tax policies and interest rates, can establish a clear course of action, mitigate economic challenges, and efficiently allocate funds.

6. Conclusions

The findings from our comprehensive study, influenced by Pattnaik et al. (2023) an examination of cryptocurrency literature, highlight the enduring dominance of Bitcoin in research focus. In response to the call to investigate events influencing investors' attitudes, our analysis explores global crises, macroeconomic indicators, and multinational enterprises' (MNEs) interest in various cryptocurrencies. The positive association between MNEs' adoption and cryptocurrency prices suggests that corporate decisions have the potential to positively influence market dynamics. As businesses consider adopting or integrating cryptocurrencies, they may stimulate investor confidence, thereby fostering increased market demand.

The impact of crises, specifically the COVID-19 pandemic and the Russian-Ukrainian war, on cryptocurrency prices, as investigated in our second and third hypotheses, reveals a negative association, although not significant in our original SEM analysis based on the complete dataset, during a robustness check where we systematically removed data points before COVID-19 (see Figure 2), we found a notable change – the relationship became statistically significant in line with expectations and supported by the literature. Our study contributes to the broader understanding of the complex relationship between external factors, investor sentiment, and the evolving role of cryptocurrencies during crises. Examining the influence of the COVID-19 pandemic on cryptocurrency prices, we find diverse findings in the literature. This points to the need for a nuanced understanding of the dynamic relationship between pandemic-related restrictions and cryptocurrency prices. Furthermore, it indicates that during times of crisis, the market responds to external events, necessitating the reassessment of cryptocurrency portfolios and strategic planning.

Analysing the inflation rates of European Union countries, the United Kingdom, and the United States on cryptocurrency prices, our fourth hypothesis reveals a negative correlation, aligning with the literature. This emphasizes the impact of high inflation on limiting spending, and consequently, negatively affects cryptocurrency prices. Our investigation of the impact of economic policy uncertainty on cryptocurrency prices,

as per our fifth hypothesis, indicates a negative correlation during periods of uncertainty. This aligns with existing research and emphasizes the role of policies and guidelines established by countries in shaping investor perceptions and driving cryptocurrency prices. This indicates the importance of clear and transparent government policies. Policymakers may consider providing guidelines for cryptocurrency regulations to create a positive environment for investors, potentially leading to an increase in cryptocurrency prices. The sixth hypotheses explore the correlation between policy uncertainty, inflation rate, and the moderating role of economic policy uncertainty on cryptocurrency prices and reveal insightful connections. The moderating effect of economic policy uncertainty suggests a complex interplay between economic uncertainties and inflation on cryptocurrency values. This insight also provides strategic guidance for investors seeking to allocate funds during times of economic uncertainty, thus emphasizing the potential role of cryptocurrencies in diversified investment portfolios.

As the cryptocurrency market continues to evolve, information about external influences, economic factors, and market dynamics is crucial for making strategic decisions and optimizing returns. This study's contributions provide a foundation for further research and analysis, ensuring that stakeholders remain well-equipped to navigate the dynamic world of cryptocurrencies. The positive relationship between MNEs' adoption of cryptocurrencies and cryptocurrency prices indicates the potential impact of corporate decisions on the market dynamics. The nuanced findings on crises and the pandemic highlight the need for a comprehensive understanding of external influences on cryptocurrency prices. Additionally, the negative correlation between inflation rates and cryptocurrency prices emphasizes the impact of economic factors on market dynamics. Finally, the moderating effect of economic policy uncertainty provides insight into the relationship between policy uncertainty, inflation, and cryptocurrency values.

The first limitation of our study is that the factors outlined are specific to the sampling period, cryptocurrencies, and countries (for the inflation rate and economic policy uncertainty), which creates particularity in terms of cryptocurrency price change. Another possible limitation is the intrinsic independence of the variables used in our analyses. For instance, a global crisis may lead to inflation and uncertainty in economic policies. Broadly speaking, the causes and effects may be reversed. Independent variables may exist beforehand or concurrently with changes in cryptocurrency prices. The limitations of this study's findings should be addressed in future research. Future research could consider additional cryptocurrencies, stablecoins, macroeconomic indicators, financial market volatility, and policy uncertainty in various countries. Further research, considering the factors in this study, aimed at various cryptocurrencies, and perhaps different methodologies, would, in our opinion, improve the findings.

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Declaration of Conflicting Interests

The authors declared no potential conflicts of interest with respect to the research, authorship, and/or publication of this article.

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