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Is Bitcoin an Alternative Investment Asset? An econometric investigation of China and the USA

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ABSTRACT

This paper evaluated Bitcoin financial and economic behaviour by using the econometric model on Bitcoin rate of returns compared to the alternatives assets like precious metals, stock market, and exchange rate risk. The study employed the various Quantile Regression models to observe the hedging ability of Bitcoin under bearish and bullish scenarios. The daily data of China and the USA have been collected, from July 18, 2010, to August 31, 2021. The result indicates that under different market phenomena, Bitcoin holds hedge and safe-haven asset properties against precious metals such as gold, silver, and platinum. Bitcoin can be used as an alternative to money during the currency devaluation against the US Dollar since it holds a hedge and safe-haven properties against S&P 500 Index and SSEC Index. The study elaborates the several implications for investors portfolios. Finally, the study draws the attention of policymakers towards the legalisation of Bitcoin as a currency alternative considering its efficient performance under different economic conditions, supported by detailed theoretical and empirical analyses.

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INTRODUCTION

In 2008, Crypto currencies launched as the newest asset class in the global financial market based on the "peer-to-peer" network. Digital currency is an inventive liquid asset that raises interest among investors and executive authorities, along with the warmed-up discussion among academic researchers. Gans and Halaburda (2015) highlighted that the primary functions of these digital currencies are transactions, stores of value, and units of account. Furthermore, it can be described as a digital secured by cryptography that is almost impossible to imitate. It is also free from the limitations of national borders, central banks, and other autonomous financial authorities. Among many crypto currencies, Bitcoin appears to be the principal applicant for replacing central bank money and acts as a beneficial alternative in the form of liquidity. Klein et al. (2018) asserted that with the emergence of crypto currencies, traditional assets like precious metals, equity returns, and exchange rates lost some of their value and were perceived more likely as a risky assets. Diversification and alternative assets have always been the fundamental motive for investors to achieve high returns. Thus, digital currency opens a new investment avenue for stakeholders and investors.

Bitcoin consistently received attention in economic studies and secured its position in investor portfolios (Corbet et al., 2018; Guesmi et al., 2019; Symitsi & Chalvatzis, 2019). According to Mokni et al. (2021), Bitcoin has now reserved more than 80% of digital currency total market value globally according to its highest market capitalisation and valuable properties. Some authors investigated the safe-haven and hedging properties of Bitcoin and stock indexes (Bouri, Molnár, et al., 2017; Shahzad et al., 2020, 2019), exchange rates currencies (Urquhart & Zhang, 2019), and assets (Bouri, Jalkh, et al., 2017; Klein et al., 2018). Several authors have observed the role of Bitcoin in the stock market as a hedging instrument or as a safe-haven asset and its connection with other stock markets such as S&P 500 index, PSX index, SSE index, and FTSE 100 index. It has been considered an asset for its efficient performance (Jakub, 2015). Bouri, Jalkh, et al. (2017) said Bitcoin could not be assumed as a hedging instrument and observed Bitcoin as a risky asset. On the other side, Dyhrberg (2016) asserts that Bitcoin possesses similar hedging properties to gold and the US dollar. Moreover, Dyhrberg et al. (2018) suggest that trading Bitcoin will be more fruitful when its liquidity and volatility are lower than stocks. Thus, various studies like Al-Yahyaee et al. (2018), Bouri, Jalkh, et al. (2017), Urquhart and Zhang (2019), Shahzad et al. (2019), and Chan et al. (2019) also consider Bitcoin as a hedging instrument.

Gold is one of the most ductile, dense, electrical conductors and beautiful of all metals (O'Connor et al., 2015). These unique properties make it the most representative safe-haven or hedging asset against alternative assets worldwide.

The vital role of gold as an investment asset can't be neglected during the stress period, and several studies have verified its safe-haven ability against equities (Areal et al., 2015; D. G. Baur & Lucey, 2010). Compared to the high standing of gold, Bitcoin has great potential in the sense of acceptance, history and low volatility. Bitcoin and gold have several similar properties; in fact, Bitcoin is also called "digital gold" (Arsov, 2017; Mckay & Peters, 2018; Smith, 2016). Firstly both Bitcoin and gold are not concerned with political considerations and are classified as assets, particularly in the USA, where Bitcoin is considered a commodity by the Commodity Futures Trading Commission (Shahzad et al., 2019). Secondly, no national organisation has the authority to control and make transactions using them, which makes both of them independent of inflation, (D. G. Baur & Dimpfl, 2017). Third, Bitcoin and gold are generated in a process known as "mining." Fourth, asymmetric upturn behavior to positive and negative shocks in gold (D. G. Baur & Lucey, 2010) and Bitcoin (Bouri, Jalkh, et al., 2017). According to Bouoiyour et al. (2019), Bitcoin and gold are complementary instead of competing.

Bitcoin can be considered more speculative investment than a traditional currency, in case accepted as a medium of exchange. Hence, the fiat money (US dollar or the Euro) that is controlled by central government, causes a distracting effect on central banks and exchange-rate policy (D. Baur et al., 2017). Goodhart (1998) highlighted the only difference between Bitcoin and standardised currency that the later is approved by state administration while Bitcoin is not. To compare Bitcoin with traditional assets like stocks and bonds, Bitcoin price returns are more volatile and susceptible to items that do not meet the state capitalisation (Balcilar et al., 2017). The executive authority has a different perspective on Bitcoin and changed its strategy worldwide; for instance, in March 2014, the Japanese administration proclaimed Bitcoin is not a currency and banned Bitcoin from marketing. Later on, in 2017, Japan's Financial Service Agency (FSA) declared Bitcoin as a legal payment method in Japan (Feng et al., 2018).

This research analyses whether Bitcoin holds a safe-haven behavior and hedging properties against stock markets, precious metals, and exchange rate risk in China and the United States of America. This research examines the Bitcoin characteristics over various financial and economic variables such as equity markets, currency rates, gold, silver, and platinum. By applying Quantile Regression utilised by Iqbal (2017). We estimate that Bitcoin either serves as a hedging asset or acts as a safe-haven asset during the stress period. This analysis will discover the relationship between crypto currency and portfolio assets in different financial states. This study has beneficial contributions in the domain of the digital currency market as the higher number of individuals and investors

have stake in the crypto currency. Bitcoin has become the fastest-growing digital market, and demand is increasing swiftly. This study examined the stability and instability of the Bitcoin risk market and what factors oblige portfolio investors to fund in the digital currencies. Furthermore, we work on the current time series data sets and formulate models of bitcoin against the metals market, stock indexes, and foreign exchange rates.

LITERATURE REVIEW

The literature relevant to the financial modeling of Bitcoin with the other economic variables is analysed. Jacobs (2011) highlighted the legal concerns of Bitcoin because bitcoin is a digital currency that a central authority or bank cannot control. The study also discusses the regulation problem of crypto currency since Bitcoin attracts the attention of the economic organisation and portfolio investors in both the United States and the European Union. In 2009, the director of electronic money of the European Union did not provide any precision about Bitcoin, because it possibly became free from regulation (Jacobs, 2011). If the legal reservations are addressed, the use of Bitcoin for transaction purposes will rise.

Yermack (2015) noticed that bitcoin is more volatile than other assets. The study also observed no correlation between Bitcoin daily exchange rate and the US dollar exchange rate versus the British pound, Swiss franc, Euro, yen, and gold, making Bitcoin purposeless in managing risk and difficult to hedge. Furthermore, Bitcoin does not have any association with banks for transaction purposes nor an alternative to credit card, so Bitcoin behaves as a speculative investment instead of a currency.

Recently, Bitcoin has appeared as the most well-known crypto currency and has become an asset in financial portfolios. Chen and Vivek (2014) examined the advantages of Bitcoin as an investment asset and Bitcoin function as a currency and suggested that as a digital currency, Bitcoin is not convenient. Still, it can be a considerable asset in an investor's portfolio. Bitcoin is a deflationary currency because its price changes continuously, and it lacks any support from the executive authority.

Dyhrberg (2016) used the asymmetric GARCH model to investigate Bitcoin's hedging potential in examining gold. The data set covers the daily observations, from July 19, 2010 to May 22, 2015, of the exchange rates of Euro-dollar, US dollar, and Financial Time Series Exchange Index (FTSE) contains 1796 observations. The results proposed that Bitcoin may be employed as a hedge against stocks in Financial Time Series Exchange Index (FTSE). Besides this, Bitcoin also hedged against the US dollar. As a result, Bitcoin possesses similar

capabilities to gold and is considered as hedging asset during the risk in the financial market.

Using the Bayesian Structural Time Series Approach, Poyser (2017) pointed out the link between Bitcoin's market price and central and extreme economic variables. He explores that Bitcoin price is weakly related to investor point of view as compared togold and Yuan to the US Dollar exchange rate. The study further suggest that bitcoin is strongly associated with the stock market index and the US Dollar to Euro currency exchange rate. Consequently, He found that Bitcoin has miscellaneous properties since it sometimes seems speculative safe-haven.

Katsiampa (2017), the author examines the various GARCH model to study the volatility behaviour of Bitcoin prices. The sample period has 2267 observations of the daily closing price of Bitcoin, from July 18, 2010 to October 1, 2016. The appropriate or best model concerning goodness-of-fit is the AR-CGARCH model, which shows that the Bitcoin price market is thoroughly speculative, and also suggests the importance of the significance of the short-run and long-run components of the conditional variance.

In the research, Erdas and Caglar (2018) considered that Bitcoin is associated with traditional assets and will be accepted as a medium of exchange. In his study, the authors investigate the causal relations among Bitcoin, gold, Brent oil, US dollar, and S&P 500 and BIST 100 Indexes for a weekly data set from November 2013 to July 2018 by implementing the Hatemi-j (2012) test. They concluded causal link is only present between the bitcoin price and S&P 500 Index. Eventually, this result will influence the investor decision about S&P 500 Index when Bitcoin prices are about to change. Moreover, no causal relationship exists between bitcoin prices and the other variables.

Urquhart and Zhang (2019) stated that Bitcoin had grabbed the media's attention alongside investors. In this paper, the authors examine if Bitcoin can play a role as a hedge or a safe-haven asset versus several currencies. They studied the relationship between bitcoin and money at the hourly interval because Bitcoin exhibits significant daily volatility. Also, bitcoin could be an intra day hedge for the Swiss Franc, Euro, and British Pound, applying an ADCC model diversifies Australian, Canadian Dollars, and Japanese Yen. To test the safe-haven properties of Bitcoin, they implement the non-temporal. In a study by Hansen (2000), evidence was found that Bitcoin is a safe-haven during the intense period for the CAD, CHF, and GBP. Hence they said Bitcoin could not act as an intra day hedge, safe-haven, and diversifier for several currencies.

Zargar and Kumar (2019), by using high-frequency data of Bitcoin, examine the long-run memory properties of the conditional and unconditional volatilities

of Bitcoin along with the long-run memory properties of the conditional and unconditional "realised" volatilities of Bitcoin by applying the local Whittle (LW) estimator, the exact local Whittle (ELW) estimator, and the ARMA–FIAPARCH model. The results indicate that the long-run memory coefficient is favorable and significant for both cases, and all over time scales, the Bitcoin market is highly persistent. This investigation benefits investors and can help them forecast the expected future volatilities in the Bitcoin market and make better trading policies.

Prateek and Tript (2020) investigate the diversification abilities of Bitcoin for international portfolios dealing against six popular assets such as fiat currencies from mainly USD, GBP, EUR, JPY, and CNY. The sample period takes effect with when Bitcoin launched until 2018 under study; the writers employed a modified conditional value-at-risk and standard deviation as risk measures in portfolio optimisations across three asset allocations. On account of investment in Bitcoin, the JPY, CNY, and USD express more significant improvement in risk-return and a higher proportion of ideal investment in Bitcoin. They also observe risk-adjusted portfolios with and without Bitcoin to see the degree of diversification in the context of Bitcoin as currency.

López-Cabarcos et al. (2021) analyse the existing knowledge on Bitcoin behavior and the results of investor thoughts, S&P returns, and VIX returns on Bitcoin volatility, using GARCH and EGARCH models. VIX Index is a volatility index that measures market volatility based on the S&P 500 Index. S&P 500 Index is a market that contains 500 companies from different sectors. The data was collected from January 4, 2016, until September 30, 2019, resulting in 943 trading days. The GARCH (1, 1) model suggests testing the individual influence of the S&P 500 return, VIX Index, and investor sentiments over Bitcoin. For asymmetric effect, applied EGARCH (1, 1) model to see the volatility behavior of Bitcoin. The result recommended that Bitcoin volatility fluctuated in a speculative period in stable market conditions, S&P 500 returns, VIX returns, and sentiment affects Bitcoin volatility.

D. G. Baur and Dimpfl (2021) reveal that the volatility of Bitcoin is very high and tenfold higher than the volatility of vital exchange rates of the US dollar versus the Euro and Yen. This extreme volatility harms Bitcoin's role in portfolios. This data is based on March 2009 and go till August 30, 2020. Since their investigation figured out that Bitcoin does not have that much use as a risk-diversifier and cannot be used as a medium of exchange. They also conclude that Bitcoin possesses a store of value properties, and to function as a currency, Bitcoin should be secured or approved by the government.

The above literature contributes to the field of digital asset in which the authors investigated Bitcoin's properties like hedge, safe-haven, mean of exchange,

and store of value and also explored the hedging potential of Bitcoin against precious metals, equity markets, and currency rate risk that protect the investor's portfolio from danger in the financial market and give new insight to investors by investment in digital currency.

METHODOLOGY

The Quantiles are cut points in any distribution that defines the distribution value above or below limits, providing information regarding the shape of the distribution. 90% is the upper quantile, 50% is the median or middle quantile, and 25% is the lower quantile.Quantile Regression analysis helps us to examine the relationship between dependent variables (outcome variable) and independent variables; this statistical method has been most broadly used to see the conditional mean effect.

Model of Quantile Regression for Precious Metals and Stocks Market Index

We embraced the framework of quantile regression that has been introduced by Iqbal (2017), under several bearish and bullish conditions of the Bitcoin market. For this purpose, Following models are designed.

The model of quantile regression for the bitcoin market against precious metals/stocks of China and the United States is as follows;

$$Q_\tau(y) = \beta_0(\tau) + \beta_1(\tau) r_{metals/stockls} + \beta_2(\tau) r_{metals/stock} D_{(metals/stock\ q10]} + \beta_1(\tau) r_{metals/stock} D_{(metals/stock\ q05]} + \beta_1(\tau) r_{metals/stock} D_{(metals/stock\ q01]} + e_t \quad (1)$$

Where r = returns of the variables

Return = log (p_t / p $_{t-1}$) *100

P_t and P $_{t-1}$ are the price and lagged price of Bitcoin and precious metals/stock, respectively.

Q_t(Y) = Conditional Distribution of Bitcoin against metals/stock markets at particular quantiles. Also D[r(metals q10)], D[r(metals q05)] and D[r(metals q01)] are Dummy variables of percentage change of metals/stock markets at 10%, 5% and 1% quantiles, i.e., ($r_{(metals/stock)}$< 10% =1), ($r_{(metals/stock)}$< 05% =1) and ($r_{(metals/stock)}$< 01% =1) respectively. Since β_1 (t) represents the Bitcoin market's hedge coefficients against metals/stock market. The coefficients $\Sigma\beta_2$ (10%), $\Sigma\beta_3$ (5%) and $\Sigma\beta_4$ (1%) considers as a sum of safe-haven coefficients of Bitcoin market against metals/stock market at 10%, 5% and 1% quantiles.

Model of Quantile Regression for Exchange Rate Risk

The following model is used to find the hedging or safe-haven behavior of Bitcoin against the currency rate of China.

$$Q_\tau(y) = \beta_0(\tau) + \beta_1(\tau) r_{ex-rate} + \beta_2(\tau) r_{ex-rate} D_{[r\ ex-rate\ q99]} + \beta_3(\tau) r_{ex-rate} D_{[r\ ex-rate\ q95]} + \beta_4(\tau) r_{ex-rate} D_{[r\ ex-rate\ q90]} + e_t \quad (2)$$

Where, r = returns of the variables,

Return = log (p_t / p $_{t-1}$) *100

P_t = price of Bitcoin and exchange rates.

P_{t-1}= lagged price of Bitcoin and exchange rates

Q_t(Y) = Conditional Distribution of Bitcoin against metals markets at particular quantiles.

D[r(metals q99)] = Dummy Variables of percentage change of exchange-rate indexes at 99% quantile, i.e., $r_{(exchange\ rate)}$> 99% =1.

D[r(metals q95)] = Dummy Variables of percentage change of exchange-rate indexes at 95% quantile, i.e., $r_{(exchange\ rate)}$> 95% =1.

D[r(metals q90)] = Dummy Variables of percentage change of exchange-rate indexes at 90% quantile, i.e., $r_{(exchange\ rate)}$ > 90% =1.

β_1 (t) = Hedge coefficients of the Bitcoin market against exchange-rate indexes.

$\Sigma\beta_2$ (99%) = sum of safe-haven coefficients of the Bitcoin market against exchange-rate indexes at 99% quantile.

$\Sigma\beta_3$ (95%) = sum of safe-haven coefficients of the Bitcoin market against exchange-rate indexes at 95% quantile.

$\Sigma\beta_4$ (90%)= sum of safe-haven coefficients of the Bitcoin market against exchange-rate indexes at 90% quantile.

EMPIRICAL ANALYSIS

This section focused on explaining and interpreting the econometric model of Bitcoin with the three precious metals, equity markets, and exchange rates of China and the United States.

Estimation Results

In the subsequent section, we will discuss the summary statistics, the time series plot, and empirical results through the Quantile Regression model.

Data Description and Summary Statistics

To achieve objectives of this study, we assembled a time series of data from China and the USA. The prices of Bitcoin and precious metals like (gold, silver, and platinum) have been considered in the US Dollar. The other financial and economic variables, such as stock market indexes and local-currency exchange rates, have been obtained from investing.com, DataStream, and International Financial Statistics. The time frame is taken according to the availability of the data; thus, the study contains 2902 daily observations of stock indexes, exchange rates, Bitcoin, and precious metals, from July 18, 2010, to August 31, 2021. The daily prices of Bitcoin, gold, silver, and platinum in China are calculated by multiplying the respective currency rates. The assets'returns are calculated by taking the natural logarithmic difference. Inspect S&P-500 Index from the USA equity market, and Shanghai SEC Index considers the China stock market.

Table 1 presents the descriptive statistics of the returns of all the variables for the extended sample period with 2902 daily observations, excluding weekends. The descriptive analysis shows that Bitcoin is nowhere near gold, silver, platinum, stocks, and exchange rates. The average daily return is 0.452 % in China, and the United States of America yields an average return of Bitcoin price is 0.450 %. The standard deviation that measures the market volatility and a pivotal factor to measure the risk associated with the investor investment show that Bitcoin and other financial assets of both countries have similar behavior.The only similarities observed are that the returns of all the assets, like Bitcoin, stocks, exchange rates, and precious metals, have non-normal distribution. The abnormality witnessed in financial data is the possibility of extreme returns, technically termed kurtosis with heavy tails (leptokurtic), indicating a severe degree of risk. As the financial assets of returns data exhibit an asymmetrical distribution, the skewness is used as an alternative risk measurement tool. The stock prices of China and the United States of America with negative skewness generate frequent small gains and few extreme or significant losses in the considered time frame.

Estimation Results for the United States of America

Table 2 represents the Quantile regression model of Bitcoin counter to the metal market, i.e., gold in the United States. To access the Bitcoin hedging ability in the USA, the results provide a significant hedge coefficient and positive relationship between Bitcoin and gold;accordingly, Bitcoin can always hedge against the gold metal market. The safe-haven coefficient associated with extreme market status holds for the bearish or normal period of the Bitcoin market. At the same time Bitcoin reserves as a safe asset in a bullish state against 5% and 1% gold

Table 1.
Descriptive statistics of returns of Bitcoin, precious metals, stock indexes and exchange rates risk in the USA and China

Countries		Mean	STD	MIN.	MAX.	SKEWNESS	KURTOSIS
CHINA	BITCOIN	0.452	7.462	-85.004	147.418	2.418	71.745
	GOLD	0.016	1.014	-8.814	4.150	-0.557	7.627
	SILVER	0.012	2.294	-19.546	11.567	-0.515	9.264
	PLATINUM	-0.012	1.467	-13.434	10.356	-0.535	10.665
	SSEC	0.012	1.286	-8.873	5.604	-0.960	10.179
	EXCHANGE RATE	0.002	0.198	-1.818	1.349	-0.432	11.973
USA	BITCOIN	0.450	7.460	-84.880	147.410	2.430	71.780
	GOLD	0.015	0.964	-8.876	4.693	-0.646	8.762
	SILVER	0.011	2.260	-19.546	11.567	-0.541	9.734
	PLATINUM	-0.014	1.409	-13.614	9.931	-0.510	11.037
	S &P 500	0.050	1.061	-12.765	8.968	-0.921	21.395

Author Estimation
Note: The first column shows the means of log returns. The second column shows the standard deviation. The third and fourth columns show log returns' minimum and maximum observation. The sixth column represents the skewness coefficient, and the last column represents the kurtosis coefficients of log returns.

market. During the financial stress in the metal market, investment in Bitcoin is quite beneficial for investors portfolio because it can act as a hedge and safe-haven asset (Kyriazis, 2020) Bitcoin is a good hedging asset in portfolios with gold. Moreover, gold is a beneficial and more stable safe-haven investment than Bitcoin.

Table 3 discloses the estimation output through the Quantile regression of Bitcoin and precious metals like silver in the USA. For identification of the hedging potential of Bitcoin on the highly bearish and bullish state, the hedge coefficient is insignificant but negative and positive at 10% quantile. So, we notice that Bitcoin can hedge silver at an average of 25% and 75% quantiles of the Bitcoin market. The safe-haven coefficient has an insignificant effect on all conditions of silver return in the financial system; compared to the USA's silver market, the safe-haven ability of Bitcoin does not prevail. Hence, we analyse that Bitcoin is only a hedging asset in the investor portfolio against the financial troubles in the silver market of the United States of America.

Table 4 displays the Quantile regression estimates of Bitcoin with precious metal (platinum) in the United States. The results depict that the higher quantile hedge coefficient is insignificant but positive, and Bitcoin can hedge only at

Table 2.

Estimation analysis of quantile regression of Bitcoin against gold for the United States of America

QUANTILE REGRESSION															
BITCOIN RETURN	BEARISH PERIOD						BULLISH PERIOD			NORMAL PERIOD					
	10th			25th			50th			75th			90th		
	Coeff.	Std. Error	t-stat p-value	Coeff.	Std. Error	t-stat p-value	Coeff.	Std. Error	t-stat p-value	Coeff.	Std. Error	t-stat p-value	Coeff.	Std. Error	t-stat p-value
$\beta 1$ (hedge)	3.480	0.096	36.253** 0.000	0.528	0.195	2.708** 0.007	0.339	0.162	2.089** 0.037	0.349	0.190	1.838*** 0.066	0.374	0.177	2.115** 0.035
$\beta 2$ (10%)	1.638	1.539	1.064 0.287	0.327	0.393	0.832 0.406	0.019	0.200	0.095 0.925	-0.402	0.493	-0.815 0.415	-0.227	1.378	-0.165 0.869
$\beta 3$ (05%)	-2.898	1.824	-1.588 0.112	-0.829	0.531	-1.561 0.119	-0.048	0.269	-0.178 0.858	0.913	0.630	1.449 0.147	2.122	1.245	1.704*** 0.089
$\beta 4$ (01%)	-3.296	0.561	-5.873** 0.000	-0.300	0.241	-1.245 0.213	-0.321	0.184	-1.740*** 0.082	-0.475	0.313	-1.514 0.130	-1.146	1.064	-1.077 0.282
$\Sigma\ \beta 2$ (10%)	5.118	1.560	3.280** 0.001	0.854	0.450	1.897** 0.029	0.358	0.266	1.344*** 0.089	-0.053	0.543	-0.097 0.539	0.146	1.417	0.103 0.459
$\Sigma\ \beta 3$ (05%)	2.220	0.836	2.657** 0.004	0.025	0.340	0.073 0.471	0.310	0.220	1.408*** 0.080	0.861	0.426	2.019** 0.022	2.269	1.181	1.921** 0.027
$\Sigma\ \beta 4$ (01%)	-1.076	0.521	-2.064 0.980	-0.275	0.211	-1.304 0.904	-0.011	0.108	-0.102 0.541	0.386	0.251	1.539*** 0.062	1.123	0.457	2.459** 0.007

Author Estimation

Note: The table display the estimated regression coefficients of hedge (β_1) and safe-haven coefficients (β_2) at 10%, (β_3) at 05%, and (β_4) at 01% along with the t-statistic, p-value and standard errors. We clarify 10^{th} and 25^{th} quantiles as bearish period, 50^{th} quantiles as a normal period and 75^{th} and 90^{th} quantiles as bullish period of markets of numerous assets. The table shows sum of β_1 and β_2 for the 10% quantile, the sum of β_1, β_2 and β_3 for 5% quantile and the sum of β_1, β_2, β_3 and β_4 for the 1% quantile of Bitcoin return and these estimated coefficients reflects unfavorable condition of Bitcoin market. *, ** and *** represents significance at 1%, 5% and 10% respectively.

Table 3.

Estimation analysis of quantile regression of Bitcoin against silver for the United States of America

QUANTILE REGRESSION															
	BEARISH PERIOD						BULLISH PERIOD						NORMAL PERIOD		
BITCOIN RETURN	10th			25th			50th			75th			90th		
	Coeff.	Std.Error	t-stat p-value	Coeff.	Std.Error	t-stat p-value	Coeff.	Std.Error	t-stat p-value	Coeff.	Std.Error	t-stat p-value	Coeff.	Std.Error	t-stat p-value
$\beta 1$ (hedge)	0.182	0.207	0.879 0.380	0.283	0.072	3.909** 0.000	-0.155	0.070	-2.2 0.026	-0.070	0.038	-1.851*** 0.064	-0.077	0.110	-0.702 0.483
$\beta 2$ (10%)	-0.085	0.580	-0.146 0.884	-0.101	0.182	-0.556 0.578	0.000	0.101	0.000 1.000	0.098	0.261	0.376 0.707	0.584	0.873	0.668 0.504
$\beta 3$ (05%)	-0.309	0.714	-0.432 0.666	-0.033	0.215	-0.154 0.878	0.058	0.122	0.476 0.634	-0.055	0.288	-0.190 0.850	0.269	1.088	0.247 0.805
$\beta 4$ (01%)	0.177	0.240	0.739 0.460	-0.090	0.115	-0.778 0.437	0.155	0.078	1.984** 0.047	0.106	0.125	0.845 0.398	-0.404	0.502	-0.804 0.421
$\Sigma\ \beta 2$ (10%)	0.098	0.639	0.153 0.439	0.182	0.200	0.910 0.181	-0.155	0.124	-1.248 0.894	0.028	0.268	0.104 0.459	0.507	0.911	0.556 0.289
$\Sigma\ \beta 3$ (05%)	-0.211	0.333	-0.634 0.737	0.149	0.144	1.035 0.150	-0.097	0.090	-1.075 0.859	-0.027	0.151	-0.176 0.570	0.775	0.644	1.205 0.114
$\Sigma\ \beta 4$ (01%)	-0.034	0.212	-0.159 0.563	0.059	0.075	0.789 0.215	0.058	0.041	1.430 0.076	0.079	0.068	1.155 0.124	0.372	0.306	1.214 0.113

Author Estimation

Note:The table display the estimated regression coefficients of hedge (β_1)and safe-haven coefficients (β_2)at 10%, (β_3)at 05%, and (β_4)at 01% along with the t-statistic, p-value and standard errors. Weclarify 10^{th} and 25^{th} quantiles as bearish period, 50th quantiles as a normal period and75^{th} and 90^{th} quantiles as bullish period of markets of numerous assets. The tableshows sum of $\beta_1$and $\beta_2$forthe 10% quantile, the sum of β_1,$\beta_2$and $\beta_3$for 5% quantile and the sum of β_1,β_2,$\beta_3$and $\beta_4$for the 1% quantile of Bitcoin return and these estimatedcoefficients reflect the unfavourable condition of Bitcoin market. *,** and *** represents significance at 1%, 5% and 10% respectively.

Table 4.

Estimation analysis of quantile regression of Bitcoin against platinum for the United States of America

QUANTILE REGRESSION														
BITCOIN RETURN	BEARISH PERIOD						BULLISH PERIOD			NORMAL PERIOD				
	10th			25th			50th			75th			90th	
	Coeff.	Std.Error	t-stat p-value	Coeff.	Std.Error	t-stat p-value	Coeff.	Std.Error	t-stat p-value	Coeff.	Std.Error	t-stat p-value	Coeff.	Std.Error	t-stat p-value
$\beta 1$ (hedge)	3.641	0.070	51.717** 0.000	0.728	0.125	5.802** 0.000	0.561	0.265	2.119** 0.034	0.106	0.493	0.215 0.830	0.003	0.508	0.006 0.995
$\beta 2$ (10%)	-0.488	0.861	-0.567 0.571	0.072	0.252	0.285 0.776	0.000	0.126	0.000 1.000	-0.030	0.303	-0.099 0.921	-0.701	0.648	-1.082 0.279
$\beta 3$ (05%)	-0.188	1.037	-0.181 0.856	-0.364	0.368	-0.988 0.323	0.148	0.172	0.861 0.390	-0.098	0.379	-0.259 0.796	-0.265	0.781	-0.339 0.734
$\beta 4$ (01%)	-3.005	0.264	-11.393** 0.000	-0.488	0.184	-2.647** 0.008	-0.561	0.274	-2.044** 0.041	0.080	0.508	0.158 0.875	0.744	0.517	1.439 0.150
$\Sigma\ \beta 2$ (10%)	3.152	0.882	3.573** 0.000	0.800	0.290	2.759** 0.003	0.561	0.296	1.894** 0.029	0.076	0.596	0.127 0.449	-0.698	0.873	-0.800 0.788
$\Sigma\ \beta 3$ (05%)	2.964	0.388	7.633** 0.000	0.436	0.268	1.628*** 0.052	0.709	0.288	2.462** 0.007	-0.022	0.524	-0.042 0.517	-0.963	0.530	-1.818 0.965
$\Sigma\ \beta 4$ (01%)	-0.041	0.232	-0.177 0.570	-0.052	0.163	-0.317 0.624	0.148	0.076	1.946** 0.026	0.058	0.141	0.410 0.341	-0.219	0.097	-2.251 0.988

Author Estimation

Note:The table display the estimated regression coefficients of hedge (β_1) and safe-haven coefficients (β_2)at 10%, (β_3)at 05%, and (β_4)at 01% along with the t-statistic, p-value and standard errors. Weclarify 10^{th} and 25^{th} quantiles as bearish period, 50th quantiles as a normal period and75^{th} and 90^{th} quantiles as bullish period of markets of numerous assets. The table shows sum of $\beta_1$and β_2 for the 10% quantile, the sum of β_1,β_2 and β_3 for 5% quantile and the sum of β_1, β_2, $\beta_3$and β_4 for the 1% quantile of Bitcoin return and these estimated coefficients reflects unfavorable condition of Bitcoin market. *, **and *** represents significance at 1%, 5% and 10%, respectively.

Table 5.

Estimation analysis of quantile regression of Bitcoin against S&P 500 Index for the USA.

QUANTILE REGRESSION														
BITCOIN RETURN	BEARISH PERIOD						BULLISH PERIOD			NORMAL PERIOD				
	10th			25th			50th			75th			90th	
	Coeff.	Std.Error	t-stat p-value	Coeff.	Std.Error	t-stat p-value	Coeff.	Std.Error	t-stat p-value	Coeff.	Std.Error	t-stat p-value	Coeff.	Std.Error	t-stat p-value
$\beta 1$ (hedge)	4.480	0.102	43.965** 0.000	1.599	0.218	7.349** 0.000	0.304	0.479	0.635 0.526	0.402	0.172	2.334** 0.020	0.525	0.396	1.326 0.185
$\beta 2$ (10%)	-1.338	1.386	-0.966 0.334	-0.711	0.348	-2.042** 0.041	0.000	0.218	0.000 1.000	1.143	0.435	2.629** 0.009	1.991	1.294	1.539 0.124
$\beta 3$ (05%)	0.953	1.953	0.488 0.626	-0.711	0.348	1.651*** 0.099	0.134	0.256	0.522 0.602	-0.759	0.449	-1.692** 0.091	-0.330	2.684	-0.123 0.902
$\beta 4$ (01%)	-3.669	0.826	-4.442** 0.000	-1.209	0.270	-4.477** 0.000	-0.304	0.489	-0.623 0.534	-0.580	0.293	-1.983** 0.048	-1.394	0.821	-1.697*** 0.090
£$\beta 2$ (10%)	3.142	1.413	2.224** 0.013	0.888	0.413	2.148** 0.016	0.304	0.534	0.569 0.285	1.546	0.481	3.215** 0.001	2.515	1.437	1.751** 0.040
£$\beta 3$ (05%)	4.095	1.336	3.065** 0.001	1.543	0.304	5.079** 0.000	0.438	0.495	0.885 0.188	0.786	0.327	2.40** 0.008	2.185	1.943	1.125 0.130
£$\beta 4$ (01%)	0.426	0.873	0.487 0.313	0.333	0.114	2.933** 0.002	0.134	0.080	1.665** 0.048	0.206	0.137	1.509*** 0.066	0.791	1.571	0.504 0.307

Author Estimation

Note:The table display the estimated regression coefficients of hedge (β_1) and safe-haven coefficients (β_2) at 10%, (β_3) at 05%, and (β_4) at 01% along with the t-statistic, p-value and standard errors. Weclarify 10^{th} and 25^{th} quantiles as bearish period, 50th quantiles as a normal period and75^{th} and 90^{th} quantiles as bullish period of markets of numerous assets. The table shows sum of $\beta_1$and $\beta_2$forthe 10% quantile, the sum of β_1, β_2 and β_3 for 5% quantile and the sum of β_1, β_2, β_3 and $\beta_4$for the 1% quantile of Bitcoin return and these estimated coefficients reflects unfavorable condition of Bitcoin market. *, **and *** represents significance at 1%, 5% and 10%, respectively.

the bearish quantiles, meaning that the Bitcoin market rises once the platinum market brings down in the USA finance. Moreover, at 5% or above quantiles, the average sum of a safe-haven coefficient is quite significant at bearish or normal Bitcoin market, or 1% market status. Bitcoin can be a safe-haven during a normal period only. Consequently, Bitcoin's safe-haven ability holds when the platinum market is distressed. Thus, our analysis examines that Bitcoin provides a better investment opportunity to investors against the platinum metal market in the USA.

Table 5 presents the result obtained from the Quantile regression of Bitcoin against the S&P 500 Index. In this estimation, the hedging behavior is observed around the lower and 75% quantiles of the Bitcoin market, represent that investing in the Bitcoin market is quite advantageous for shareholders in the USA when stock return is coming down. In favour of safe-haven characteristics, Bitcoin exhibits a significant effect at the bull and bear market except for the 50% quantile, corresponding to high market, i.e. 10% quantile of equity Index, not only the high state but also at 5% and 1% condition, Bitcoin also retain its safe-haven behaviors for bullish or standard financial environment. In a nutshell, Bitcoin has a significant role in investor's portfolios and equity markets in the United States and reduces risk during financial distress. Thus, this estimation aligns with (Bouri, Jalkh, et al., 2017; Chan et al., 2019; Conrad et al., 2018; Erdas & Caglar, 2018).

Estimation Results for China

Table 6 gives estimation results from the Quantile regression approach of Bitcoin in contrast to China's precious gold metal market. To examine Bitcoin's hedging potential, we observe a significant but positive coefficient, i.e. Bitcoin can hedge only at the average market. Bitcoin does not display the hedging function in China in the rising and declining market. The safe-haven coefficients of Bitcoin parallel to the 10% and 5% quantiles have negligible effect;even so at 1% quantile, Bitcoin is favorable for safe-haven behaviour from bear to the bull market in China. Therefore, estimated results denote that Bitcoin is preferable assets along with gold financial market of China. In line with the Bouri, Jalkh, et al. (2017), Bitcoin is a safe-haven.

Table 7 reveals the Quantile regression approach between China's Bitcoin and silver markets. The results indicate that the hedge coefficient is positive but significant from neutral to the rising market of Bitcoin, so we figure out that Bitcoin hedging ability exists in China's growing market. The overall effect of safe-haven coefficients is significant but still positive at lower quantiles of Bitcoin, so we conclude that Bitcoin can be asafe-haven asset at 10% or below quantiles

Table 6.

Estimation analysis of quantile regression of Bitcoin against gold for China.

QUANTILE REGRESSION															
BITCOIN RETURN	BEARISH PERIOD						BULLISH PERIOD			NORMAL PERIOD					
	10th			25th			50th			75th			90th		
	Coeff.	Std.Error	t-stat p-value	Coeff.	Std.Error	t-stat p-value	Coeff.	Std.Error	t-stat p-value	Coeff.	Std.Error	t-stat p-value	Coeff.	Std.Error	t-stat p-value
$\beta 1$ (hedge)	-0.232	0.329	-0.705 0.481	0.061	0.130	0.467 0.641	0.127	0.072	1.760*** 0.078	0.255	0.166	1.539 0.124	0.404	0.475	0.850 0.395
$\beta 2$ (10%)	1.407	1.407	1.000 0.318	0.020	0.311	0.065 0.949	-0.098	0.177	-0.552 0.581	-0.450	0.505	-0.891 0.373	-0.727	0.964	-0.754 0.451
$\beta 3$ (05%)	-1.456	1.526	-0.954 0.340	0.131	0.300	0.438 0.662	0.034	0.187	0.182 0.856	0.439	0.659	0.666 0.506	-0.222	1.723	-0.129 0.897
$\beta 4$ (01%)	3.701	0.729	5.074** 0.000	0.261	0.247	1.058 0.290	0.300	0.191	1.568 0.117	0.149	0.498	0.300 0.764	1.116	1.526	0.732 0.464
$\Sigma\ \beta 2$ (10%)	1.175	1.361	0.863 0.194	0.081	0.274	0.294 0.384	0.029	0.158	0.184 0.427	-0.194	0.468	-0.416 0.661	-0.323	0.837	-0.386 0.650
$\Sigma\ \beta 3$ (05%)	-0.281	0.727	-0.386 0.650	0.212	0.147	1.447*** 0.074	0.063	0.109	0.576 0.282	0.244	0.476	0.513 0.304	-0.545	1.526	-0.357 0.640
$\Sigma\ \beta 4$ (01%)	3.420	0.096	35.509** 0.000	0.473	0.203	2.325** 0.010	0.363	0.160	2.272** 0.012	0.394	0.156	2.522** 0.006	0.571	0.138	4.125 0.000

Author Estimation

Note:The table display the estimated regression coefficients of hedge (β_1) and safe-haven coefficients (β_2) at 10%, (β_3) at 05%, and (β_4) at 01% along with the t-statistic, p-value and standard errors. We clarify 10^{th} and 25^{th} quantiles as bearish period, 50th quantiles as a normal period and75^{th} and 90^{th} quantiles as bullish period of markets of numerous assets. The table shows sum of $\beta_1$and β_2 for the 10% quantile, the sum of β_1, β_2 and $\beta_3$for 5% quantile and the sum of β_1, β_2, β_3 and β_4 for the 1% quantile of Bitcoin return and these estimated coefficients reflects unfavorable condition of Bitcoin market. *, **and *** represents significance at 1%, 5% and 10%, respectively.

Table 7.

Estimation analysis of quantile regression of Bitcoin against silver for China.

QUANTILE REGRESSION														
BITCOIN RETURN	BEARISH PERIOD						BULLISH PERIOD						NORMAL PERIOD		
	10th			25th			50th			75th			90th		
	Coeff.	Std.Error	t-stat p-value	Coeff.	Std.Error	t-stat p-value	Coeff.	Std.Error	t-stat p-value	Coeff.	Std.Error	t-stat p-value	Coeff.	Std.Error	t-stat p-value
$\beta 1$ (hedge)	0.110	0.286	0.384 0.701	0.178	0.130	1.372 0.170	0.159	0.069	2.309** 0.021	0.180	0.132	1.369 0.171	0.728	0.308	2.361** 0.018
$\beta 2$ (10%)	-0.340	0.681	-0.499 0.618	0.328	0.316	1.038 0.299	0.079	0.193	0.411 0.681	0.176	0.500	0.351 0.726	-0.648	0.680	-0.953 0.341
$\beta 3$ (05%)	1.018	0.625	1.629 0.104	-0.166	0.492	-0.338 0.736	-0.187	0.195	-0.958 0.338	-0.403	0.544	-0.741 0.459	-1.808	0.672	-2.691** 0.000
$\beta 4$ (01%)	-0.368	0.557	-0.661 0.509	0.269	0.445	0.605 0.545	0.197	0.736	0.267 0.789	-0.110	0.296	-0.372 0.710	1.684	0.455	3.697** 0.000
$\Sigma\ \beta 2$ (10%)	-0.230	0.588	-0.392 0.652	0.507	0.281	1.803** 0.036	0.238	0.175	1.355*** 0.088	0.356	0.475	0.750 0.227	0.080	0.583	0.137 0.445
$\Sigma\ \beta 3$ (05%)	0.787	0.337	2.338** 0.010	0.341	0.411	0.830 0.203	0.051	0.094	0.537 0.296	-0.047	0.286	-0.165 0.566	-1.728	0.407	-4.247 1.000
$\Sigma\ \beta 4$ (01%)	0.419	0.472	0.889 0.187	0.610	0.175	3.480** 0.000	0.247	0.731	0.338 0.368	-0.158	0.091	-1.740 0.959	-0.044	0.243	-0.182 0.572

Author Estimation

Note:The table display the estimated regression coefficients of hedge (β_1) and safe-haven coefficients (β_2) at 10%, (β_3) at 05%, and (β_4) at 01% along with the t-statistic, p-value and standard errors. We clarify 10^{th} and 25^{th} quantiles as bearish period, 50th quantiles as a normal period and 75^{th} and 90^{th} quantiles as bullish period of markets of numerous assets. The table shows sum of β_1 and β_2 forthe 10% quantile, the sum of β_1, β_2 and β_3 for 5% quantile and the sum of β_1, β_2, β_3 and $\beta_4$for the 1% quantile of Bitcoin return and these estimated coefficients reflects unfavorable condition of Bitcoin market. *, **and *** represents significance at 1%, 5% and 10%, respectively.

Table 8.

Estimation analysis of quantile regression of Bitcoin against platinum for China

QUANTILE REGRESSION															
BITCOIN RETURN	BEARISH PERIOD						BULLISH PERIOD				NORMAL PERIOD				
	10th			25th			50th			75th			90th		
	Coeff.	Std.Error	t-stat p-value	Coeff.	Std.Error	t-stat p-value	Coeff.	Std.Error	t-stat p-value	Coeff.	Std.Error	t-stat p-value	Coeff.	Std.Error	t-stat p-value
$\beta 1$ (hedge)	0.133	0.189	0.703 0.482	0.140	0.084	1.657*** 0.098	0.130	0.048	2.713** 0.007	0.142	0.099	1.438 0.151	-0.112	0.126	-0.888 0.375
$\beta 2$ (10%)	0.981	0.690	1.420 0.156	-0.185	0.173	-1.065 0.287	-0.034	0.114	-0.299 0.765	0.198	0.253	0.782 0.434	0.920	0.426	2.158** 0.031
$\beta 3$ (05%)	-0.574	0.647	-0.887 0.375	0.560	0.225	2.490** 0.013	0.030	0.135	0.219 0.827	-0.159	0.328	-0.483 0.629	-0.162	0.394	-0.411 0.681
$\beta 4$ (01%)	-0.574	0.647	13.720** 0.000	0.179	0.204	0.876 0.381	0.261	0.336	0.777 0.437	0.032	0.411	0.078 0.938	-0.547	0.431	-1.270 0.204
$\Sigma\ \beta 2$ (10%)	1.113	0.642	1.735** 0.041	-0.045	0.145	-0.309 0.621	0.096	0.101	0.958 0.169	0.339	0.227	1.493*** 0.068	0.808	0.388	2.084** 0.019
$\Sigma\ \beta 3$ (05%)	0.540	0.210	2.565** 0.005	0.515	0.182	2.836** 0.002	0.126	0.095	1.327*** 0.092	0.181	0.245	0.739 0.230	0.647	0.200	3.228** 0.001
$\Sigma\ \beta 4$ (01%)	3.425	0.061	55.718** 0.000	0.694	0.096	7.214** 0.000	0.387	0.324	1.196 0.116	0.213	0.334	0.637 0.262	0.099	0.401	0.247 0.402

Author Estimation

Note:The table display the estimated regression coefficients of hedge (β_1) and safe-haven coefficients (β_2) at 10%, (β_3) at 05%, and (β_4) at 01% along with the t-statistic, p-value and standard errors. We clarify 10^{th} and 25^{th} quantiles as bearish period, 50th quantiles as a normal period and75^{th} and 90^{th} quantiles as bullish period of markets of numerous assets. The table shows sum of β_1 and β_2 forthe 10% quantile, the sum of β_1,β_2 and $\beta_3$for 5% quantile and the sum of β_1, β_2, β_3 and β_4 for the 1% quantile of Bitcoin return and these estimated coefficients reflects unfavorable condition of Bitcoin market. *, **and *** represents significance at 1%, 5% and 10%, respectively.

Table 9.

Estimation analysis of quantile regression of Bitcoin against SSEC Index for China

QUANTILE REGRESSION															
BITCOIN RETURN	BEARISH PERIOD						BULLISH PERIOD			NORMAL PERIOD					
	10th			25th			50th			75th			90th		
	Coeff.	Std.Error	t-stat p-value	Coeff.	Std.Error	t-stat p-value	Coeff.	Std.Error	t-stat p-value	Coeff.	Std.Error	t-stat p-value	Coeff.	Std.Error	t-stat p-value
$\beta 1$ (hedge)	0.444	0.231	1.924*** 0.055	0.039	0.087	0.450 0.653	0.003	0.057	0.046 0.963	-0.075	0.146	-0.513 0.608	-0.127	0.328	-0.388 0.698
$\beta 2$ (10%)	0.209	0.834	0.251 0.802	-0.116	0.278	-0.417 0.677	-0.005	0.161	-0.033 0.974	-0.263	0.661	-0.398 0.691	-2.489	0.752	-3.309** 0.001
$\beta 3$ (05%)	0.606	1.140	0.532 0.595	0.217	0.492	0.441 0.659	0.044	0.180	0.246 0.806	0.096	0.687	0.140 0.889	1.207	1.051	1.148 0.251
$\beta 4$ (01%)	-0.858	0.950	-0.903 0.367	-0.081	0.442	-0.184 0.854	0.086	0.141	0.612 0.541	0.371	0.298	1.246 0.213	1.619	0.840	1.926*** 0.054
$\Sigma \beta 2$ (10%)	0.653	0.771	0.847 0.199	-0.077	0.258	-0.298 0.617	-0.003	0.145	-0.018 0.507	-0.338	0.641	-0.528 0.701	-2.616	0.655	-3.995 1.000
$\Sigma \beta 3$ (05%)	1.259	0.883	1.426*** 0.077	0.140	0.426	0.329 0.371	0.042	0.112	0.371 0.355	-0.242	0.260	-0.930 0.824	-1.409	0.837	-1.683 0.954
$\Sigma \beta 4$ (01%)	0.402	0.380	1.056 0.146	0.059	0.123	0.478 0.316	0.128	0.088	1.453** 0.073	0.129	0.150	0.863 0.194	0.210	0.098	2.132** 0.017

Author Estimation

Note:The table display the estimated regression coefficients of hedge (β_1) and safe-haven coefficients (β_2) at 10%, (β_3) at 05%, and (β_4) at 01% along with the t-statistic, p-value and standard errors. We clarify 10^{th} and 25^{th} quantiles as bearish period, 50th quantiles as a normal period and 75^{th} and 90^{th} quantiles as bullish period of markets of numerous assets. The table shows sum of β_1 and β_2 forthe 10% quantile, the sum of β_1, β_2 and β_3 for 5% quantile and the sum of β_1, β_2, β_3 and β_4 for the 1% quantile of Bitcoin return and theseestimated coefficientss reflects unfavorable condition of Bitcoin market. *, **and *** represents significance at 1%, 5% and 10%, respectively.

Table 10.

Estimation analysis of quantile regression of Bitcoin against exchange rate risk for China.

QUANTILE REGRESSION													
	BEARISH PERIOD					BULLISH PERIOD			NORMAL PERIOD				
BITCOIN RETURN	25th					50th			75th			90th	
	Std.Error	t-stat p-value	Coeff.	Std.Error	t-stat p-value	Coeff.	Std.Error	t-stat p-value	Coeff.	Std.Error	t-stat p-value	Coeff.	Std.Error	t-stat p-value
$\beta 1$ (hedge)	1.965	0.367 0.714	1.126	0.769	1.463 0.144	1.000	0.370	2.700** 0.007	0.034	1.191	0.029 0.977	-1.274	2.974	-0.428 0.668
$\beta 2$ (99%)	3.223	-0.688 0.492	0.495	1.724	0.287 0.774	-0.725	0.845	-0.858 0.391	-0.146	1.789	-0.082 0.935	4.120	1.746	2.360** 0.018
$\beta 3$ (95%)	4.741	-0.275 0.784	-1.352	1.861	-0.727 0.468	0.097	1.134	0.085 0.932	0.941	2.171	0.433 0.665	4.766	2.954	1.614 0.107
$\beta 4$ (90%)	4.737	1.071 0.284	2.188	1.449	1.510 0.131	1.506	1.014	1.485 0.138	1.428	2.117	0.674 0.500	-4.037	4.463	-0.904 0.366
$\Sigma\ \beta 2$ (99%)	3.934	-0.380 0.648	1.620	1.906	0.850 0.198	0.275	0.926	0.297 0.383	-0.112	2.160	-0.052 0.521	2.846	3.536	0.805 0.210
$\Sigma\ \beta 3$ (95%)	4.710	-0.594 0.724	0.268	1.628	0.165 0.435	0.372	1.123	0.331 0.370	0.828	2.344	0.353 0.362	7.612	4.424	1.721** 0.043
$\Sigma\ \beta 4$ (90%)	1.102	2.064** 0.020	2.456	0.837	2.935(**) 0.002	1.878	0.512	3.668** 0.000	2.256	1.097	2.057** 0.020	3.575	1.110	3.222** 0.001

Author Estimation

Note:The table displays the estimated regression coefficients of the hedge (β_1)and safe-haven coefficients (β_2) at 10%, (β_3) at 05%, and (β_4) at 01%, along with the t-statistic, p-value and standard errors. We clarify the $10^{th}$and 25^{th}quantiles as a bearish period, the 50th quantiles as a normal period and the $75^{th}$and 90^{th}quantiles as the bullish period of markets of numerous assets. The table shows the sum of $\beta_1$and $\beta_2$forthe 10% quantile, the sum of β_1, β_2 and $\beta_3$for the 5% quantile and the sum of β_1, β_2, $\beta_3$and β_4 for the 1% quantile of Bitcoin return and these estimated coefficients reflects the unfavourable condition of Bitcoin market.*, ** and *** represents significance at 1%, 5%, and 10%, respectively.

of silver metal market. Henceforth, during the financial stress in silver market, Bitcoin may appear as good investment for portfolio investors in China.

Table 8 represents the Quantile regression analysis of China's Bitcoin and platinum metal market. The significance of hedge coefficients at 25% and 50% quantiles shows thatBitcoin can act as a hedge asset against the financial platinum market. We have seen that in China, Bitcoin only hedge at the standard market of all the precious metals. However, the total sum of safe-haven coefficient at the extreme platinum market issignificant from lower to higher quantiles of Bitcoin. At 1% quantiles or declining condition in the platinum market makes Bitcoin a safe-haven asset in the portfolio;only for bearish periodsare the coefficients also positive and significant, i.e. Bitcoin holds a safe-haven property in China.

Table 9 shows the estimation output of Bitcoin andthe Shanghai stock exchange of China (SSEC). To identify the hedging characteristics of Bitcoin by employing the Quantile regression model, we found a significant coefficient at 10% quantile. Ina bullish environment, Bitcoin does not provide a significant hedging coefficient which means Bitcoin hedge only at the falling market. To determine the safe-haven behavior, Bitcoin exhibits significant coefficients at 1% and 5% conditions; this represents the safe-haven property while the stock market gains some and losses values, respectively. Otherwise, at the 10% equity market, Bitcoin does not hold a safe-haven behavior. Dirican and Canoz (2017) expose the relationship of Bitcoin's price with the developed equity market of the USA and China, and concludes that Bitcoin has the potential to affect the investor's sentiment for long-term investment but did not discover any relationship with FTSE Index, and BIST100 Index.

Table 10 represents the Quantile regression estimation of Bitcoin and Chinese Yuan.For the hedging capabilities, the result indicates the significant & positive relationship between Bitcoin and Yuan at 50% quantile, i.e., normal market. Moreover, when currency risk reaches 90% quantile, Bitcoin possesses a safe-haven behavior and positive relation with the Chinese Yuan for all the quantiles. At 99% risk, Bitcoin cannot be a safe-haven asset for investors at all phases of the currency rate. While at 95 % exchange rate risk, Bitcoin detects as a safe-haven instrument at 90% quantile. So, Bitcoin can be a hedge and safe-haven for both currency Euro and the Chinese Yuan. These empirical results are consistent with the findings of Niels Graveland (2018) estimation.

CONCLUSION

The current study examines an association of cryptocurrency or virtual currency particularly Bitcoin, with traditional assets like precious metals, stock indexes,

and exchange rates risk in the financial market of China and the United States. Bitcoin is a virtual token with the highest market capitalisation among all the other cryptocurrencies. In this study, we focused on how Bitcoin acts as a hedge or safe-haven against the uncertain condition of equity markets, exchange rates, and precious metals. Because several studies keep an eye on the gold market, we added silver and platinum markets along with the gold market.

This study contributes to the literature in several ways by defining the pros and cons of cryptocurrency. It gives investors, legislators, and decision-makers an idea about investing in virtual property. It suggests the legal Bitcoin trading which should be regulated by government organisations. The future of Bitcoin can not be predicted, but banks and many financial authorities should consider Bitcoin as an alternative currency for transaction purposes. Cryptocurrency, particularly Bitcoin, has an optimistic future and may become a financial asset. There are several assets in the portfolio, but adding Bitcoin can insured the investors from probable collapse during the risk and diversify their portfolio.

LIMITATIONS OF THE STUDY

The study has a few limitations that can be covered in future studies. In this study, we don't analyse the association of Bitcoin with economic and financial variables exclusively. Still, this study help researcher to investigate the behavior of Bitcoin with other variables such as inflation rates, bonds, and oil prices.

CONFLICT OF INTEREST STATEMENT

The authors declare no conflict of interests.

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