Impact of Cryptocurrency Market on the Performance of Stock Market- An Empirical Study

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5 April 2023

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Abstract

This paper intends to measure the effect of cryptocurrency market on the performance of stock market. It considers US S&P500 daily index as the dependent variable while daily price and volume of Bitcoin as independent variables and daily US volatility index and oil prices as controlled variables from 2017 to 2021. Applying simple regression model, this study observes significantly negative impact of cryptocurrency market on the performance of stock market while it notices an insignificant but positive impact on the same. Both US VIX and oil prices also negatively affect the performance. The recommendations of this study may benefit concerned parties to utilize the growing popularity of cryptocurrencies in favor of stock market performance and economic growth.

Keywords: Bitcoin, Performance, Portfolio diversification, Regression model, Stock market

Introduction

Cryptocurrency is one of the most important fintech innovations that helps performing transactions and plays vital role as a popular medium of exchange across the globe (Bohme *et al.,* 2020). It has become a matter of serious concern for the general public, venture capitalists, media, financial and governmental organizations occupying a specific place in the global finance markets due to its rapid expansion (Glaser et al., 2014). Specifically, in 2018, the market capitalization of the cryptocurrency market became $139 billion with a whooping more than 250,000 transactions per day (Blockchain, 2018). Ever since Bitcoin was first proposed by Nakamoto (2008), a few remarkable studies have been conducted on Bitcoin, focusing on market efficiency (Bariviera, 2017), transaction costs (Kim, 2017), price volatility (Katsiampa, 2017), speculation (Cheah & Fry, 2015), blockchain (Chowdhury, 2019) and price clustering (Urquhart, 2017).

The cryptocurrency market has witnessed a tremendous expansion due to introduction of different kinds of cryptocurrencies in recent years. Some studies have examined the impact of cryptocurrency on the speculation (Blau, 2018), regime shifting models (Mensi, Al-Yahyaeeb & Kang, 2018), market returns and volatility (Omane-Adjepong et al., 2019), return-volume

relationship (Bouri et al., 2018), herding behavior in cryptocurrency markets and portfolio diversification across cryptocurrencies (Liu, 2018).

Despite many studies of cryptocurrencies in the above-mentioned areas, the scope is still limited. More specifically, the impact of cryptocurrency market on the performance of stock market is still an untouched field. Cryptocurrency market provides several attractive opportunities for investors that are likely to affect the stock market performance. The existent studies assume that the stock market is driven by three main factors: fundamental, macroeconomic and institutional factors (Svaleryd & Vlachos, 2002; Jeffus, 2004; Niroomand et al., 2014). However, this study introduces a new factor namely cryptocurrency that can affect stock market performance. As bitcoin is legal in the United States of America, the impact is supposed to be better understood on the US stock market. Therefore, this study intends to measure the impact of cryptocurrency on the US stock market.

This study will be important for policymakers, academics and investors. It is assumed that cryptocurrency market may have positive or negative impact on the performance of stock market. If the impact of the cryptocurrency market is positive, the virtual money markets may be considered as a complement for the stock market. It indicates that virtual money markets are positively affecting the stock market performance of the stock market and the investors tend to diversify their portfolio as such markets boost investors to speculate and invest. While, negative impact on the markets indicates that the investors prefer to place their wealth in alternative markets.

The study is organized as follows. Section 2 reviews the previous studies. Section 3 focuses on the conceptual framework. Section 4 outlines the data and methodology. Section 5 discusses the empirical results and section 6 concludes the paper.

Literature Review

The importance of having an efficient stock market has been highlighted in most of the literature. An efficient stock market ensures liquidity, reduce transaction and savings mobilization costs, improve corporate governance and enhance international image (Yartey & Adjasi, 2007; Bernard & Austin, 2011). There has been done a good number of research during the last three decades on the determinants of stock market (Bayar, 2016; chowdhury et al., 2019).

The determinants to influence the performance of the stock market can be divided into three main types: fundamental, macroeconomic and institutional factors. Fundamental factors are related to earning bases (Foster, 1973) and valuation manifold (Edmans et al., 2012). The latter two components are supposed to affect the stock market performance as depicted by (Iliev, 2010). Second, concerning the macroeconomic factors, the literature proposes different drivers: economic development, interest rate, inflation rate, trade openness and financial intermediary development (Foster, 1973; Iliev, 2010; Edmans et al., 2012; Niroomand et al., 2014; Gorodnichenko & Weber, 2016; Bordo & Wheelock, 2007). Afterward, the institutional factors studies were introduced as one of the main determinants of this market. Several drivers were introduced to affect this factor such as corporate governance, financial market liberalization, stock market integration and government type (Chowdhury et al., 2018; Svaleryd & Vlachos, 2002; chowdhury et al., 2020).

The elements of the stock market in the developing markets have its main unique characteristics. In fact, the emerging markets are branded by higher uncertainty and therefor higher expected returns, relative to the developed economies (Chowdhury and Chowdhury, 2014).Evidently, investing in the stock market of these less advanced capital markets has its main limitations. These markets are prone to adverse financial shocks, important transaction costs and also less transparency in the banking Sector (Chowdhury, 2010).

The initiation of "Fintech Revolution" has brought about phenomenal change in the international financial system. The purpose of financial technology (fintech) is to use technology in the design and delivery of financial services that makes them more accessible to the general public (Gomber et al., 2018; Chowdhury, 2021). The commencement of cryptocurrencies in the international financial system facilitates to overcome the major limitations of the traditional banking system and speculations in the stock market (chowdhury et al., 2021).

It helps the investors to enjoy low transaction costs, improved security, ease of use, decentralized and real-time settlement. Since use of cryptocurrency in the US market is legal, it is expected to have a significant impact on the economic and financial system in the performance of US stock market (Sayed & Abbas, 2018). The literature advocates that, it is highly important to know the impact of the cryptocurrency market as one of the determinants of stock market return in the US stock market (Chowdhury, 2012).

Development of Hypotheses

After reviewing the above literature, this study develops the following hypotheses:

H_1. There is no impact of cryptocurrency market on the stock market.

H_2. The positive attitude of government toward cryptocurrency does not bring any good results for the stock market

Conceptual Framework

Inclusion of cryptocurrency in the portfolio

Traditional financial market started its journey with the transactions of stocks and bonds. Subsequently complex instruments like options, forwards and futures were added. During the last decade, the principal objective of individual investors and portfolio fund managers was to invent in new financial instruments that maximize their return with tolerable risk. The introduction of cryptocurrency in 2008 was a magnificent inclusion in today's international financial system. Currently, there are more than 5000 cryptocurrencies in the financial market. The technology behind this currency is the blockchain (Coinmarketcap, 2020; Chowdhury, 2018).

As the cryptocurrencies are highly secured, decentralized, transparent and there is no border restrictions, the popularity is increasing very fast across the world (Abboushi, 2017). Portfolio fund managers use cryptocurrencies as an efficient investment tool to hedge against risk and speculate profitable situations (Chowdhury and Abedin,, 2020; Corbet et al., 2018 and Trimborn et al., 2019). The benefits of cryptocurrencies create avenue for the portfolio managers to diversify the risks with better returns (Chowdhury, 2020).

Markowitz (1952) envisioned to abolish the idiosyncratic risk, which is the risk inherent in a particular financial asset due to its unique characteristics. Therefore, inclusion of cryptocurrencies to the portfolio will enhance the overall portfolio performance, especially in the US economy (Chowdhury, 2015).

Interlink between cryptocurrencies and the stock market performance

Buyers and sellers enjoy benefits when a financial market stays competitive. This allows traders to differentiate their choices (Cantillon & Yin, 2011). A competitive market adversely affects the companies with low productivity and less comparative advantage in the market while it helps to reduce transaction costs, stock delivery time and stimulate innovations in financial instruments (Foucault & Parlour, 2004). Similarly, the same is true for the relationship between the cryptocurrency market and the stock market. The countries which show negative attitude toward

the cryptocurrencies, the stock markets of those countries are supposed to be adversely affected whereas a positive attitude may offer different opportunities for the investors as it has no border restrictions, low transaction costs and transparency (Abboushi, 2017; chowdhury et al., 2017).

Willingness of government and regulatory authority to welcome innovations, new technologies, products and strategies may enhance the stock market performance (Chowdhury et al., 2023).

Data and Methodology

To measure the impact of cryptocurrency market on the stock market, this study has used daily price and volume of Bitcoin, US S&P 500 index, VIX index and oil price from January 1, 2017 to 30 September 2021. The data have been collected from the investing.com.

Table 1 shows a superficial idea about the nature of variables. It is observed that the return on cryptocurrency (0.039) is much riskier than that of stock market return (0.012). while the return on cryptocurrency market (0.0026) is way better that of stock market (0.0006). As the values of skewness and kurtosis are concern, the distributions are skewed and peaked in nature (Chowdhury, 2017).

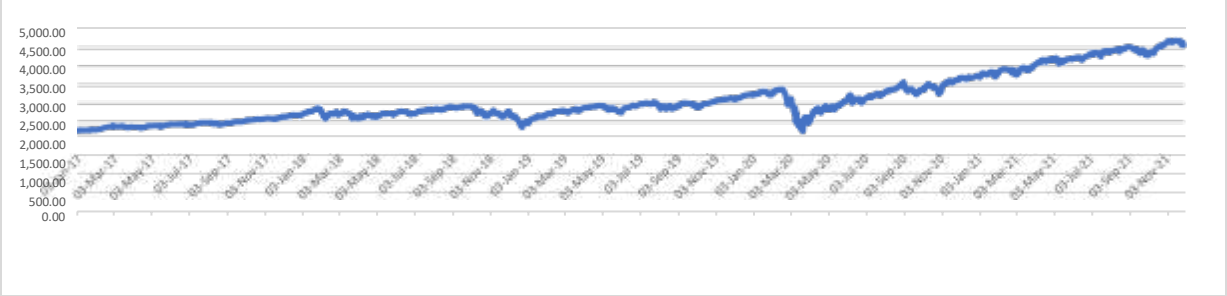

Figure 1. S&P 500 Index

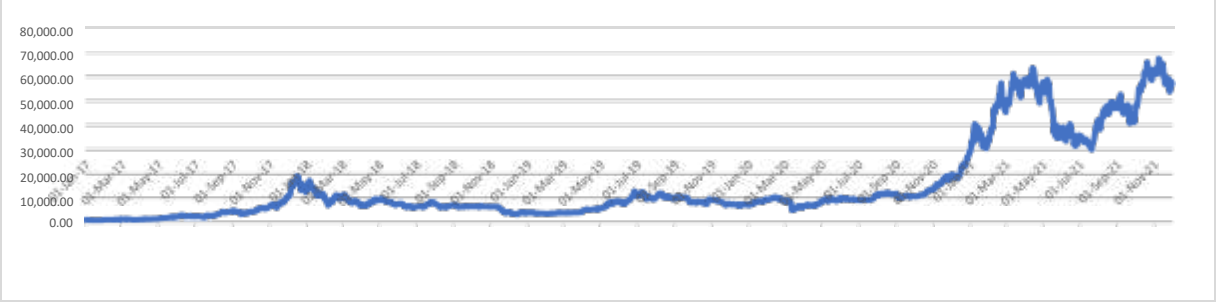

Figure 2. Cryptocurrency Price

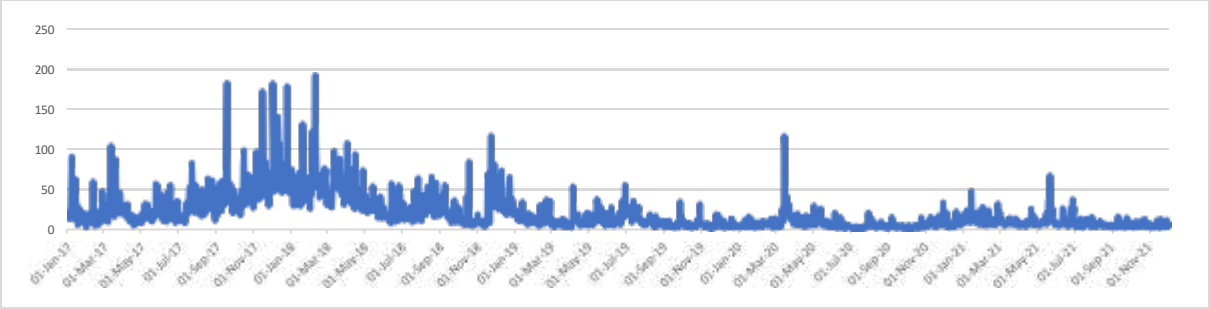

Figure 3. Cryptocurrency volume (000)

Figure 4. Crude Oil Price

Figure 5. US VIX

The data nature of all the five variables has been presented in figure 1 to figure 5 for a rough understanding.

Table 1. Descriptive statistics

	S&P500	*VIX*	*Oil_Price*	*Cryp_Price*	*Cryp_Vol*
Mean	0.00065	0.00449	-0.00223	0.002555	-1.12333
Std. Dev	0.012141	0.092951	0.099488	0.038757	14.61348
Kurtosis	20.64284	24.34755	743.7836	9.737788	300.1684
Skewness	-0.75057	3.008851	-25.1128	-0.49798	9.024969
Count	1237	1237	1237	1237	1237

This study has applied very general statistical tool namely regression model to know the impact as mentioned above using the following function:

Stock Performance$_{it}$ = ∫(Cryptocurrency returns$_{it}$, Cryptocurrency volume$_{it}$, Volatility index$_{it}$, Oil price$_{it}$)

The above function is expressed in the following specification:

$$y_{it} = \propto + X_1\beta_1 + X_2\beta_2 + X_3\beta_3 + X_4\beta_4$$

Where, y_{it} is the dependent variable that measures the stock market performance. X_1 to X_4 are the cryptocurrency return, volume, volatility index and oil price respectively while β_1 to β_4 are the coefficients of each independent variable.

Empirical Results

The relationship among the dependent and independent variables is shown in table 2. It is noticed that the stock returns are negatively correlated to all the independent variables except the cryptocurrency volume. This result is similar to the findings of Segal et al., (2015) and Sami et al., (2020).

Table 2. Correlation Coefficient

	S&P500	*VIX*	*Oil_Price*	*Cryp_Price*	*Cryp_Vol*
S&P500	1				
VIX	-0.02284	1			
Oil_Price	-0.07211	-0.02317	1		
Cryp_Price	-0.02849	0.030146	0.022656	1	
Cryp_Vol	0.001014	-0.10433	0.004138	0.021631	1

Table 3 indicates a unit change in cryptocurrency price has a significantly negative impact on the stock market performance while the change in volume has positive but insignificant impact on the same. The volatility index and oil price have significantly negative impact on the stock market performance. These results resemble the research outcomes of Farrell & Klemperer (2007); Cantillon & Yin (2011); Arouri & Rault (2012); and Sami & Eldomiaty (2019). The reason for negative impact of cryto market on the stock performance is that, with the constant appreciation of the digital currencies, investing in companies that have directly or indirectly invested in cryptocurrency could be highly profitable. It is understandable that investors are avoiding the flat

money which is vulnerable to inflation, monetary and fiscal policy. As a result, Investors are interested for Bitcoin and other Cryptocurrency as safe haven. (Chowdhury et al., 2022).

Table 3. Regression results

	Coefficients
Intercept	0.000664849** (1.917264)
Cryp_Price	-0.00818426** (-0.91907)
Cryp_Vol	0.00 (0.02)
VIX	-0.003107029*** (-0.83243)
Oil_Price	-0.008794858*** (-2.53652)

The increase in the demand for Cryptocurrencies has made companies with cryptocurrency exposure to be highly demanded. As the cryptocurrencies continue to increase, the companies will experience an influx of big purchases of their stocks as in the case of emerging stocks. If cryptocurrencies are accepted worldwide, the appreciation of cryptocurrencies will result in the stock prices thus result in better performance (Chowdhury, 2011)

. The negative correlation between cryptocurrency and stock market performance indicate that investors may decide either to invest in the cryptocurrency or the stocks. Investment in these two different sectors has dual aspects. In the one hand, stocks are an ownership interest in a company, so a stock's performance over the long term depends on the underlying company's success (Chowdhury and Begum, 2012). If investors do not like a stock, they can sell it and push down the price, though at the end of the day the company has to go out of business for the stock to be worthless. Investment in stocks comes with high volatility and many stocks can rise 100 percent or even more in a year and may fall as well. Stock market is secured as it is established on legal ground and functions are monitored by securities and exchange commission (Chowdhury, 2013).

On the other hand, cryptocurrencies are not backed by assets. The prices fluctuate on sentiments. If traders want not to own a cryptocurrency, the price may plunge to zero as it is not backed by anything (. The nature of volatility is horrible in this sector as the prices hover around 50 percent up and down in a year. Countries may prefer to ban cryptocurrencies entirely, as China did in 2021 and many countries recently. Moreover, as cryptocurrency is relatively a new concept, it is not yet firmly established as an asset class (Chowdhury, 2014).

Cantillon & Yin (2011) found cryptocurrency as a main determinant of performance of stock market while Sami & Abdullah (2020) observed a sound financial possibility if government accepts cryptocurrency and vice-versa. If a country wants to legalize cryptocurrency in their financial system, it should develop necessary rules and legislations. Policymakers require to discover different opportunities to enrich the economic welfare by improving the existing financial system and stock market mechanism (Chowdhury, 2016).

Therefore, after reviewing the pros and cons of both stock market and the cryptocurrencies, a portfolio manager can decide to invest either in a particular sector or both considering different aspects precisely risk and return.

Concluding remark

This study has taken initiative to measure the impact of cryptocurrency market on the stock market performance taking US S&P500 as dependent and cryptocurrency price and volume as independent variable while volatility index and oil prices as controlled variables. The result reveals a negative impact of cryptocurrency market price on the stock performance while cryptocurrency volume has positive impact on the same. Cryptocurrencies are the disruptive economic inventions that can significantly transform the current economic structure. It will also change the way banks and financial institutions operate. Bitcoin is the highly traded cryptocurrency that allows digital transactions between two parties without the need for any middleman. Each transaction is electronically recorded in blocks that act like ledgers and when a block is filled another new block is created. All blocks are connected to each other using hashtags and a linear chronological sequence of these blocks forms a blockchain. Thus, every transaction is digitally recorded to keep security at a top-notch level. Currently, all the traditional monetary transactions are enabled and monitored by respective central banks. Now, with the evolution of cryptocurrency, the scenario has changed. The power that was bestowed to the governments is now shifting to the public. This revolutionary change in transaction handling has the power to change the economic structure. This new market which has been introduced with the appearance of cryptocurrencies like Bitcoin will create many disruptions as the traditional transaction methods will be converted to absolutely paperless and auto-monitored with either some or no transaction cost. The negative impact of the cryptocurrencies on the performance of stock market indicates that they are substitute. During recession of stock market, investors may channelize their investment to the cryptocurrency market.

Different research findings reveal that a positive attitude of government toward cryptocurrency may ensure economic growth.

Guideline for future research

Future research may be conducted to measure the impact of cryptocurrency market on the performance of regional stock markets like European Union, South Asia, Middle East, Latin America and even country specific etc.

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