

# Impact of Select Cryptocurrencies on the Performance of Select Global Stock Markets: An Empirical Study

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## Abstract

Over the past few years, cryptocurrencies have experienced rapid growth and have become an important component of the global financial system. Digital assets like Bitcoin, Ether, Tether, XRP, and BNB have become highly popular that investors and researchers have started studying their correlation with the traditional stock markets. This research examines the effect of selected cryptocurrencies on the major global stock market indices in India, the United States, Europe, South Korea, Japan, and Canada in the years 2021-2025 using secondary data. Various statistical tools were used such as Augmented Dickey-Fuller (ADF) test, Jarque-Bera test, correlation analysis, volatility analysis, Compound Annual Growth Rate (CAGR), t-test and regression analysis were used to analyze the relationship between cryptocurrency and stock market return. The results show that the original price series of both cryptocurrencies and stock market indices were non-stationary, however, after transforming them into a return series, the data became stationary and suitable for further analysis. The results show that the returns of cryptocurrencies are far more volatile and less normally distributed than the returns of stock markets, and this reflects the riskier and more speculative nature of their returns. While strong relationships were found within the cryptocurrency market, and within stock markets individually, the relationship between cryptocurrency returns and stock market returns was found to be weak. Regression analysis further shows that the influence of cryptocurrencies on the stock market returns is very limited in most regions. Overall, the findings show that cryptocurrencies have a relatively stronger impact on global stock markets in developed economies such as the United States, Europe and Canada whereas the impact is comparatively weaker in developing countries such as India, South Korea and Japan.

**Keywords:** Cryptocurrencies, Global Stock Markets, Stationarity, Correlation, Regression

## Introduction

The world of finance has been completely transformed because of the emergence of cryptocurrencies. This has resulted in the emergence of a whole new investment class. While the journey of cryptocurrencies began with the birth of Bitcoin in 2009, Ethereum raised the world of cryptocurrencies to the next level. This was accomplished through the introduction of smart contracts and DeFi. Unlike other securities that are traded on stock exchanges like NYSE, NSE India, Tokyo Stock Exchange and many others, cryptocurrencies are decentralized and do not have a controlling authority. This has been the major reason why the world has taken a note of the emergence of cryptocurrencies, and have

been wondering about its interlinkages with the traditional stock exchanges. Stock exchanges of developed economies such as America, Europe, India, South Korea, Japan, and Canada correlation is high. Hence, in the present scenario wherein there has been a lot of fascination around crypto investments, it is necessary to understand whether there are any implications or implications of the fluctuations in crypto assets on stock exchanges. Traditional stock exchanges are typically dominated by economic growth rates, inflation rates and interest rates. On the contrary, the price of cryptocurrencies are largely dependent on the technological upgradation and market sentiments. This has been the key reason why the current study has been conducted to understand the interlinkages between selected cryptocurrencies and stock exchanges across the world for 2021 - 2025.

### Review of Literature

Farroukh et al. (2025), estimated the impact of Bitcoin and Ethereum on the global financial stability using the VaR, CoVaR, copula approach, and the regression analysis. Using the data on the frequency of daily and monthly events, the authors examined the systemic risk and spillovers between the different financial markets. The results showed significant financial market spillovers in the stock market, commodities, and macroeconomic variables during the period of financial stress. The effects were more pronounced, at higher frequency, and at employment-related variables. The overall results implied the systemic risks of the existence of the cryptocurrency and the need for an intervention from the regulator.

Alidaee et al. (2025), compared the portfolio optimization strategies for the cryptocurrency and stock markets. In the research, the authors have tested the DMPS, ODP, BUODP and naive diversification portfolio optimization techniques. Classical techniques were faster and more efficient than the quantum based techniques. A portfolio of stocks and cryptocurrencies was found to have the best results. Classical techniques were indicated for portfolio optimization.

Nawaz et al. (2025) examined the long and short run cointegration analysis of cryptocurrency and South Asian stock markets using cointegration and VAR/VECM methods. The results have depicted long-run relationship between cryptocurrency and South Asian stock markets using a weekly data. Cryptocurrencies responded more quickly to changes and were volatile in comparison to the stock markets. Short-run relationship between cryptocurrency and South Asian stock markets using Granger causality tests showed spillover effects.

Adelopo & Luo (2025), reviewed the impact of the features of crypto currency on volatility and nature of co-movement with stocks. In the paper, the authors used frequency per day for the top cryptocurrencies and world indices. They performed cointegration, causality and logistic regression analyses. Their results showed that only the stablecoins had the characteristic of a safe-haven asset and hedging. Suly limits and consensus mechanisms accounted for a lot of the explanatory power of the nature of co-movement. In conclusion, the authors found the relationship between cryptocurrencies and stocks depended highly on the features.

Umoro et al. (2024), examined the relationship between the returns of Bitcoin, stock market and exchange rate in oil importing countries. By applying the Markov-Switching Regression model, the relationship of exchange rate with the Bitcoin's returns was analyzed with the help of weekly data. The results came out that the returns of Bitcoin vary depending on the economic state. Both stock and Bitcoin's return was significant in determining the exchange rate. Bitcoin's incorporation with macroeconomic variables was also emphasized in this study.

Pala (2024), examined the short and long-run impact of cryptocurrency on the stock markets of USA, UK, and Germany. Using the monthly data the ARDL bounds test was used to check the dynamic relationships. There were no significant short-run relationships between the countries. However, long-run relationships were discovered for Bitcoin in the USA and Germany.

Menda (2024) examined the impact of the adoption of cryptocurrencies on stock market capitalization in 154 countries. The study utilized a cross country data set and applied an Ordinary Least Squares (OLS) regression model in controlling for GDP per capita. The results showed that there is a significant positive relationship between cryptocurrency adoption and stock market capitalization. This means that countries with a higher level of cryptocurrency adoption have larger and more developed stock markets. The study concludes that it is more likely that cryptocurrencies will complement the traditional financial markets rather than replacing them.

**Research Gap:** Although cryptocurrencies have highlighted and gained a great deal of attention, the empirical works about the effect of cryptocurrencies on global stock markets are limited. Most of the studies are done on individual cryptocurrencies or specific markets and are often done over short periods of time, giving only part of the picture. This

limited view of the world limits the understanding of the larger and changing relationship between digital assets and the traditional financial system. Moreover, the increasing integration and volatility of cryptocurrencies makes it necessary to provide a detailed analysis across several assets and major global indices. Therefore, the purpose of this study is to address this gap by exploring dynamic linkages between cryptocurrencies and global stock markets based on a broader and more recent data set.

### **Objectives of The Study:**

1. To study the Descriptive Statistics on the returns of select cryptocurrencies and select indices of the global Stock Markets.
2. To investigate the relationship between select cryptocurrencies and select global stock markets returns.
3. To measure the impact of the fluctuation of cryptocurrency returns on stocks market returns worldwide.

### **Research Methodology:**

**(i) Period of the Study:** The period covered by the study is five years from 2021 to 2025, providing an opportunity to analyse recent trends and market dynamics.

**(ii) Cryptocurrency and Stock Market Choice:** The study takes major cryptocurrencies such as Bitcoin, Ethereum, Tether, BNB, XRP into account based on market capitalization. Select worldwide stock market indexes such as United States - NYSE & NASDAQ, Japan - Tokyo Stock Exchange (TSE), South Korea - KOSPI & KOSDAQ, European Markets - Frankfurt (DAX), Euronext, India - NSE & BSE, Canada - Toronto Stock Exchange (TSX) are selected for analysis.

**(iii) Model Framework:** An analytical research design is taken. The relationship between cryptocurrencies and global stock markets is studied with the help of appropriate statistical and econometric models.

### **(iv) Variables:**

**Independent Variables (IV):** Based on prices of select cryptocurrencies

**Dependent Variables (DV):** Choose global stock market indices

**(v) Softwares Used:** Excel, Python

### **(vi) Statistical Tools:**

**Stationarity Test:** A stationarity test is a test to determine whether a time series data has a constant mean, variance and autocorrelation over time. It is used to check whether the data is stable or not for time series analysis.

**Normality Test:** A normality test is a test to determine if a data set follows a normal (bell-shaped) distribution as it is important for the application of many statistical tests. According to the Central Limit Theorem, the data is normal for larger sampled size with a sample size of 1300.

**Descriptive Statistics:** Descriptive statistics are statistics that summarize and describe the main features of data in a data set such as mean, median, standard deviation, skewness, and kurtosis.

**t-test:** A t-test is used for the determination of whether there is a statistically significant difference between the means of two groups or variables.

### **(vii) Hypothesis:**

H0: Crypto currencies and Stock prices are non-stationary.

H1: Crypto currencies and Stock prices are in a stationary state.

H0: Crypto currencies and Stock prices are not normally distributed.

H1: Crypto currencies and Stock prices have a normal distribution.

H0: Select cryptocurrencies do not have a significant impact on select global stock market indices.

H1: Select cryptocurrencies have significant effect on select global stock market indices.

## Data Analysis and Interpretation

### Descriptive Statistics:

#### 1.INDIA

	BITCOIN RETURN S	ETHEREU M RETURNS	TETHER RETURN S	XRP RETURN S	BNB RETURN S	NSE RETURN S	BSE RETURN S
Count	1218	1218	1218	1218	1218	1218	1218
Mean	0.001785	0.002617	0.000172	0.003788	0.004099	0.000551	0.000514
StandardDeviation	0.037811	0.050952	0.002737	0.064892	0.053488	0.008907	0.008933
Min.	-0.23374	-0.30276	-0.01133	-0.32631	-0.33179	-0.05929	-0.05741
(Q1)25%	-0.01611	-0.02245	-0.00124	-0.0234	-0.01634	-0.00407	-0.00413
(Q2)50%	0.000616	0.000985	0.000117	0	0.001868	0.000488	0.000473
(Q3)75%	0.018899	0.026116	0.001454	0.024663	0.020969	0.00568	0.005542
Max.	0.213457	0.424211	0.014264	0.731556	0.696334	0.047423	0.050012

The table gives an overview of all the 1,218 observations for all assets. Cryptocurrencies are perceived to have greater returns than the others: BNB at 0.004099, XRP at 0.003788 and Ethereum at 0.002617 is higher than NSE at 0.000551 and BSE at 0.000514. The volatility of the assets is also on a higher side for cryptocurrencies: XRP at 0.064892 and BNB at 0.053488 are higher than NSE and BSE at 0.008907 and 0.008933, respectively. The difference between minimum and maximum values is also more for cryptocurrencies than the stock markets, which implies higher return potential and risk involved.

#### 2.USA

	BITCOIN RETURNS	ETHEREUM RETURNS	TETHER RETURNS	XRP RETURNS	BNB RETURNS	NYSE RETURNS	NASDAQ RETURNS
Count	1254	1254	1254	1254	1254	1254	1254
Mean	0.001488	0.002032	-1E-06	0.003491	0.003717	0.000384	0.000584
Standard Deviation	0.036992	0.048779	0.000462	0.063492	0.051938	0.009389	0.014285
Min.	-0.22681	-0.27655	-0.00392	-0.32715	-0.33264	-0.0612	-0.05968
(Q1)25%	-0.01741	-0.02378	-0.00019	-0.02346	-0.01653	-0.00459	-0.0064
(Q2)50%	0.000358	0.000537	-7E-06	0.000079	0.001492	0.000585	0.001061
(Q3)75%	0.019758	0.025678	0.000171	0.024896	0.020873	0.005641	0.008665
Max.	0.211097	0.280254	0.003061	0.730843	0.697647	0.070397	0.121632

As can be seen, 1,254 data points are aggregated in the table. When looking at the crypto assets, currencies like BNB and XRP have higher average return values, at 0.003717 and 0.003491, respectively, where stock indexes like the NYSE, at around 0.000384, and NASDAQ, at around 0.000584, have average return values. When looking at the volatility, the values of crypto assets are higher at 0.063492 for XRP and 0.051938 for BNB which means that there is more wiggle room. When looking at the range of the smallest and largest values, there is a greater range in crypto assets, such as XRP, ranging from -0.32715 to 0.730843, they have greater movement than the stock markets.

#### 3.EUROPE

	BITCOIN RETURN S	ETHEREU M RETURNS	TETHER RETURN S	XRP RETURN S	BNB RETURN S	DAX RETURN S	EURONEX T RETURNS
Count	1273	1273	1273	1273	1273	1273	1273
Mean	0.001499	0.002011	0.000044	0.003558	0.00369	0.000509	0.000388

Standard Deviation	0.036502	0.047884	0.004887	0.065174	0.05153	0.010453	0.009529
Min.	-0.21901	-0.26925	-0.02776	-0.32432	-0.32981	-0.04953	-0.05087
(Q1)25%	-0.01614	-0.02277	-0.00266	-0.02349	-0.01652	-0.00467	-0.00435
(Q2)50%	0.00022	0.001677	0.000139	0	0.001684	0.000884	0.000831
(Q3)75%	0.018362	0.024195	0.00274	0.023973	0.020416	0.006539	0.005793
Max.	0.210732	0.271921	0.019728	0.877389	0.693903	0.079213	0.05753

The above table is the representation of all the variables for 1273 observations. Cryptocurrencies, such as BNB (~0.00369), XRP (0.003558), have a higher average return than stock indices DAX (0.000509), Euronext (0.000388). Similarly, there is greater volatility for cryptocurrencies: XRP (0.065174) and BNB (0.05153) have a larger standard deviation than DAX (0.010453) and Euronext (0.009529), which are more stable. For example the range of XRP is from -0.32432 to 0.877389, indicating the higher volatility of cryptocurrencies in comparison to the stock market.

#### 4. SOUTH KOREA

	BITCOIN RETURNS	ETHEREUM RETURNS	TETHER RETURNS	XRP RETURNS	BNB RETURNS	KOSPI RETURNS	KOSDAQ RETURNS
Count	1221	1221	1221	1221	1221	1221	1221
Mean	0.001717	0.002221	0.000245	0.003718	0.003925	0.000362	0.000062
Standard Deviation	0.03617	0.047575	0.005742	0.062368	0.050472	0.011654	0.014568
Min.	-0.2193	-0.26952	-0.02604	-0.25478	-0.22527	-0.08768	-0.11298
(Q1)25%	-0.01692	-0.0215	-0.0034	-0.0228	-0.01642	-0.00638	-0.00811
(Q2)50%	0.000589	0.001407	0.00056	-0.0007	0.001598	0.000607	0.000807
(Q3)75%	0.019194	0.024296	0.004061	0.02425	0.022053	0.00742	0.008594
Max.	0.210697	0.280482	0.019638	0.720096	0.695813	0.065989	0.073397

All variables contain 1,221 data points in the table. Cryptocurrencies such as BNB (mean=0.003925) and XRP (mean=0.003718) have greater average return than the stock indices such as KOSPI (0.000362) and KOSDAQ (0.000062). Volatility in cryptocurrencies such as XRP (standard deviation=0.062368) and BNB (standard deviation=0.050472) is higher than in the stock indices such as KOSPI (standard deviation=0.011654) and KOSDAQ (standard deviation=0.014568). The range of values in cryptocurrencies such as XRP from -0.25478 to 0.720096 is higher.

#### 5. JAPAN

	BITCOIN RETURNS	ETHEREUM RETURNS	TETHER RETURNS	XRP RETURNS	BNB RETURNS	TSE RETURNS
Count	1222	1222	1222	1222	1222	1222
Mean	0.001899	0.002443	0.000359	0.00392	0.004151	0.000592
Standard Deviation	0.038051	0.049678	0.006235	0.063732	0.052492	0.01342
Min.	-0.22798	-0.27764	-0.03701	-0.32469	-0.33024	-0.12396
(Q1)25%	-0.01679	-0.02288	-0.00288	-0.02326	-0.01736	-0.00661
(Q2)50%	0.000614	0.001343	0.00054	-9.2E-05	0.00203	0.000927
(Q3)75%	0.019911	0.025935	0.003844	0.024945	0.022284	0.007864
Max.	0.209275	0.255373	0.027146	0.727329	0.694236	0.102263

As shown in the table, all variables have 1,222 observations. Cryptocurrency such as BNB with a mean value of 0.004151 and XRP with a mean value of 0.00392 have higher returns compared to TSE, which is a stock index, with a mean of 0.000592. The volatility of cryptocurrencies is more than the index of the stock market. For example, XRP and BNB have greater standard deviations of 0.063732 and 0.052492 than that of TSE which is 0.01342, and it is less volatile than cryptocurrencies. The values for XRP is between [?]0.32469 and 0.727329 compared to TSE.

**6.CANADA**

	BITCOIN RETURNS	ETHEREUM RETURNS	TETHER RETURNS	XRP RETURNS	BNB RETURNS	TSX RETURNS
Count	1253	1253	1253	1253	1253	1253
Mean	0.001515	0.00205	0.000064	0.003507	0.003738	0.000506
Standard Deviation	0.036175	0.047999	0.004175	0.062778	0.051191	0.008048
Min.	-0.22025	-0.27041	-0.01892	-0.32387	-0.3294	-0.04694
(Q1)25%	-0.01676	-0.02259	-0.00243	-0.02294	-0.01618	-0.00392
(Q2)50%	0.000207	0.001084	0.000071	0	0.00145	0.000985
(Q3)75%	0.018836	0.025588	0.002488	0.024629	0.020905	0.005264
Max.	0.208825	0.275131	0.014093	0.721462	0.689459	0.05421

The total number of observations for all variables is 1,253 as seen in the table. Cryptocurrencies, such as BNB with a mean return of 0.003738 and XRP with mean return of 0.003507, have a higher return than the stock index TSX, which has a mean return of 0.000506. The volatility of the assets is also showing a higher value for the cryptocurrencies, with XRP at 0.062778, and BNB at 0.051191, the stock index TSX is showing a lower value at 0.008048. The range from the minimum to the maximum also shows an higher values for the cryptocurrencies, with XRP having a value of -0.32387 to 0.721462.

**t-test:**

H<sub>0</sub>: There is no significant difference between Crypto currencies and returns in stocks.

H<sub>1</sub>: There is a significant difference between Crypto currencies and Stock return.

**INDIA**

t-statistic: 3.11
P-value: 0.0019
Reject H <sub>0</sub> : Significant difference between crypto and stock returns

From the result of the t-test, it can be seen that the value of t statistic is 3.1086, and the p-value is 0.00189 which is much lower than the required 0.05 for the test to be taken as significant. This rejects the null hypothesis, H<sub>0</sub>, which implies that the difference between the returns of cryptocurrency market and stock market returns are statistically significant i.e. the mean returns of crypto assets are significantly different from mean returns of NSE and BSE, thus confirming the hypothesis that the two markets behave differently.

**USA**

t-statistic: 2.65
P-value: 0.008
Reject H <sub>0</sub> : Significant difference between crypto and stock returns

From the results obtained in the t-test, we can see t-statistic is 2.6518 & p-value is 0.0080. This is lower than 0.05. Therefore, we reject the null hypothesis (H<sub>0</sub>) and it means that there is a significant difference between the returns of cryptocurrencies and the stock market. This implies that the average returns of crypto asset is significantly different from the NYSE and NASDAQ stock market.

## EUROPE

t-statistic: 2.810
P-value: 0.005
Reject H0: Significant difference between crypto and stock returns

From the t-test results, it can be seen, the t-statistic = 2.8103 and p-value = 0.00496. As the p-value is less than the significance level(0.05), we can reject the null hypothesis(H0). This implies that there is a statistical significance between the cryptocurrency returns to the return of European stock market (DAX and Euronext). This means that the average returns of crypto assets are almost not the same as the average returns of the traditional stock exchanges in Europe.

## SOUTH KOREA

t-statistic: 3.4038
P-value: 0.0007
Reject H0: Significant difference between crypto and stock returns

From the above results of the t-test, the T-statistic is 3.404 with a p-value of 0.00067. This is way below the 5% level of significance. Thus, the null hypothesis is rejected and we conclude that there is a statistically significant difference between the average returns of the cryptocurrency markets and the Korean stock market returns. This suggests that the average return of the crypto market is not the same as the average return of the stock market.

## JAPAN

t-statistic: 2.774
P-value: 0.0056
Reject H0: Significant difference between crypto and stock returns

The results of the t-test show that the value of the t-statistic is 2.774 and the p-value is 0.00554 which is less than the significance level of 5%. This means that we reject the null hypothesis and we conclude that there is a statistically significant difference between the mean crypto asset returns and those of the TSE stocks. This means that, on average, crypto assets are generating different amounts of returns compared to the stock market.

## CANADA

t-statistic: 2.718
P-value: 0.0069
Reject H0: Significant difference between crypto and stock returns

The t-test shows that the difference is statistically significant since  $t = 2.72$  and  $p \sim 0.0066$ . This just means that at a level of significance of, say, 5%, we have managed to reject the null hypothesis that the difference in crypto and stock is zero, and that we can say that the difference in the average returns of crypto and the stock market is indeed significant.

## FINDINGS:

Cryptocurrency and stock price series are non-stationary and returns are stationary.

**Volatility** - By far, cryptocurrencies are highly volatile as compared to stock markets. XRP and BNB are the most volatile, and tether is stable currency.

**Correlation:** Strong correlation in Crypto markets and weak correlation in Stock markets.

Regression results show that cryptocurrencies have a limited and regional effect on stock markets, with a stronger impact in US stock markets than in India and Europe.

## Suggestions:

**High Volatility:** - As it has high volatility, it should be invested cautiously in cryptocurrencies.

As the exchange rate is volatile, it is suitable for diversification in the portfolio.

For example, the following are some of the recommendations: - Regulators should always keep an eye on the crypto markets to prevent financial instability.

Future studies should apply advanced models and include macroeconomic variables.

## Conclusion:

The study shows that cryptocurrencies have higher returns but also higher volatility and risk than traditional stock markets. The results of regression analysis indicate that the impact that cryptocurrencies have on traditional stock

markets is dependent on different countries. For example, the NSE and BSE stock markets in India exhibit R2 values of 0.048 and 0.048 respectively, which means little impact. The NYSE and NASDAQ of the United States have relatively higher with R2 values of 0.146 and 0.181, respectively. The European market also has a relatively higher and moderate relationship with R2 values of 0.098 and 0.101 for DAX and Euronext stock exchanges respectively. The South Korean market of KOSPI and KOSDAQ have relatively lower relationships of 0.038 and 0.035. The Japanese TSE market has the lowest relationship of 0.014. The TSX of Canada has the highest relationship of 0.273 when compared to other stock markets of different countries included in this study. The results suggest that cryptocurrencies have a relatively lower and the moderate relationship with traditional stock markets.

### Scope for Future Research:

Future research can expand this study by including a larger number of cryptocurrencies and additional global stock market indices to provide a broader understanding of the interaction between digital assets and traditional financial markets. The study can also be extended over a longer time period to capture long-term trends and the effects of major economic or financial events. Further research may include macroeconomic variables such as inflation, interest rates, exchange rates, and GDP growth to better explain the relationship between cryptocurrency markets and stock markets. Moreover, the use of advanced econometric techniques such as VAR, GARCH, and machine learning models can help in analysing volatility spillovers and dynamic linkages more effectively. Comparative studies between developed and emerging economies may also offer deeper insights into the role of cryptocurrencies in the global financial system.

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