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GOLD PRICE AND BITCOIN EXCHANGE RATE: IS THERE A CORRELATION?

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Abstract

The purpose of this paper is to study the empirical relation between Gold price and Bitcoin exchange rate. Both the rates have been expressed in US dollars. The empirical analysis has been run via quantitative techniques – correlation analysis and Granger causality test. These procedures have been applied on data with monthly frequency for the period March 2013 – November 2019. The output suggests existence of a weak positive correlation.

Keywords: *Gold price; Bitcoin exchange rate; US dollars; correlation*
JEL Codes: *G11; G13*

1. Introduction

Since love has not made so many people to look foolish so the attempts to speak about the nature of money, the focus of this paper is not on the money in general nor on the types of money. The focus also is not on the comparison between two assets that claim to be considered as money. The focus is not on the transition from crude commodity money towards the most intangible form of money as well. The main focus is on two assets that are subject of organized trading.

Coupling these assets does not seem to be a random choice. The symbolic character of coupling two pseudo-monetary assets could be accepted as a prior reason for this choice. This is seen at first glance. Somebody else could see this coupling as a meeting between the past and the future of money. Gold was money for centuries but not today. Crypto-currencies are expected to be money in future but not today. The lack of monetary role is not only focal point of these assets but also the possibility to be traded on organized markets. And what is more,

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derivative instruments on these assets enjoy wide popularity among the investors for organized regular trading.

Being traded, these assets are subject of demand, supply, lending, borrowing, using as a basic asset for a derivative instruments. In this sense, investing in gold or crypto currency is a decision that is determined by the proportion of risk and expected return. Comparisons on this proportion would make the assets have diametrically opposed specificities. Gold could provide the investors with sustainability, easy predictability, and even a safe haven for their money. The investors however would enjoy a lower return. Nevertheless, more than half of investors trusted gold more than "currencies of countries" (Havilland, 2019). On the opposite end of the proportion, the investment in crypto-currency is more risky choice but giving far higher profitability than conventional currency and gold. Meanwhile, the wide fluctuations in the exchange rates were among the most prominent arguments against accepting crypto-currencies as virtual money.

This dichotomy is tending to be diluted. The most recent developments of the markets let the analysts redefine their views with respect to Bitcoin as a speculative investment. Moreover, it is even assumed to be a safe haven or a "new digital gold" (Hougan, 2019). Jerome Powell also defines it as a store of value but a "speculative store of value" (Kuhn, 2019).

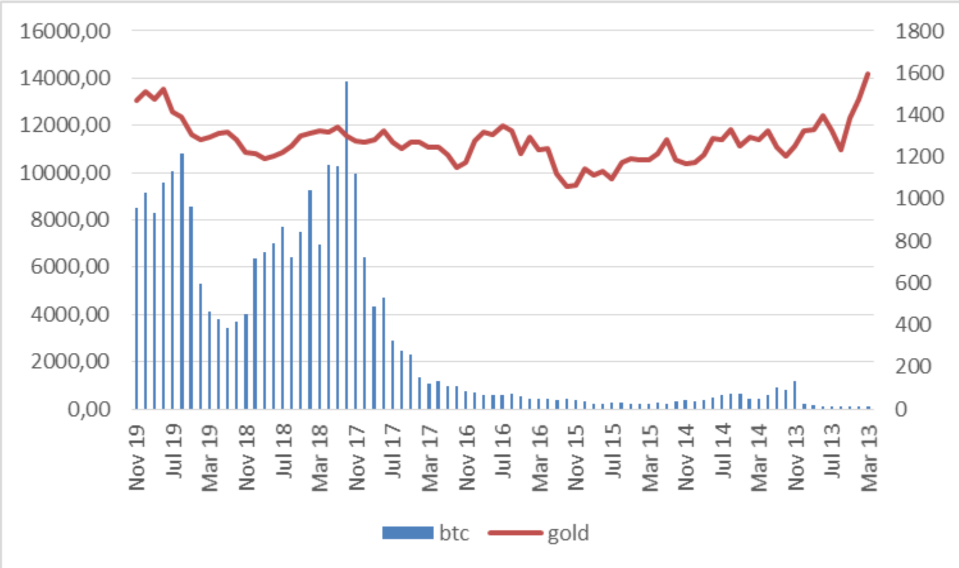
Therefore, the purpose of this paper is to study the empirical relation between Gold price and Bitcoin exchange rate. Bitcoin is accepted as the most prominent crypto-currency. Both the rates have been expressed in US dollars. The empirical relation will be studies via quantitative techniques – correlation analysis and Granger causality test. These procedures will be applied on data with monthly frequency for the period March 2013 – November 2019.

Quantitative data is derived via the trading platform MetaTrader 4. The raw data will be processed via both the econometric software products – E-Views 5 and SPSS-19.

2. Developments of the Gold price and Bitcoin exchange rate

The period of study covers post-crisis years and the years of the recovery of economic growth worldwide. It is commonplace the demands for gold and save haven are decreasing. It is an interesting development that the price of gold remains relatively high and does not reach the pre-crisis levels. It could be explained by the political risks such as military operations, economic sanctions, Brexit, trade wars, etc. What is more, its price fluctuates in relatively narrow limits – between $1061.30 and $1596.74 per ounce. In this sense, the standard deviation is 99.54.

Figure 1. Dynamics of Gold price and Bitcoin exchange rate



Source: *Author's calculations*

The innovative crypto asset seems to have fully opposite developments over the period. Seen on Figure 1, the second half of the period of interest is determined by an unprecedented growth of the Bitcoin's price. This crypto-currency increased multifold its price. The investors' interest towards this asset was moved by market enthusiasm rather than a strong economic reason. It could be understood by a look at its exchange rate's fluctuations. The trading days closed on prices from $93.00 to $13850.40. Meanwhile, the record of $19412.20 has been achieved in a time of daily trade. Soon after this top values, there were sharp downs finding support around $4000 levels. The price erupted up to $10000 and above anew in 2019. The main specifics of Bitcoin - its "volatility and 24/7 trading frustrate any attempt to correlate its daily returns with those of other assets" (Moore, 2019) except other crypto-currencies.

3. Gold price versus Bitcoin exchange rate: correlation analysis

Descriptive statistics are a starting point for a looking for a possible correlation between Gold price and Bitcoin exchange rate. The statistics of each variable are given in Table 1. As seen, both the variables have empirical distributions that are far from the normal symmetric distribution. Therefore, correlation could not be searched via the procedures that are based on this theoretical distribution.

The procedure of Spearman has been chosen for estimating the coefficient of correlation. The test of Granger for bilateral causal relations has also been chosen for additional verification of the assumption for correlation. It has potential to give information for the time structure of the relationship between both the variables of interest.

Table 1. Descriptive Statistics

	BTC	**GOLD**
Mean	2951.974	1272.673
Median	698.7000	1274.760
Maximum	13850.40	1596.740
Minimum	93.00000	1061.300
Std. Dev.	3625.935	99.54275
Skewness	1.136991	0.633967
Kurtosis	2.977173	4.099771
Jarque-Bera	17.45387	9.507896
Probability	0.000162	0.008618
Sum	239109.9	103086.5
Sum Sq. Dev.	1.05E+09	792700.7
Observations	81	81

Source: *Author's calculations*

Table 2. Correlation Coefficients

			BTC	GOLD
Spearman's rho	BTC	Correlation Coefficient	1,000	0,295**
		Sig. (1-tailed)	0.000	0,004
		N	81	81
	GOLD	Correlation Coefficient	0,295**	1,000
		Sig. (1-tailed)	0,004	0.000
		N	81	81

***. Correlation is significant at the 0.01 level (1-tailed).*
Source: Author's calculations

The output of Spearman's procedure applied is presented in Table 2. As seen, the correlation coefficient is statistically significant. The coefficient is positive that means these market assets are positively correlated. The value of the coefficient is on the line between 0,29 and 0,30 that is more than the threshold for defining the correlation as a weak but it is less than 0,30 to define the correlation as a moderate positive relationship.

It is reliable empirical evidence that rejects assumptions such as “Bitcoin’s price has never shown a correlation with gold, positive or negative, for any length of time, since early 2015” (Moore, 2019).

Table 3. Pairwise Granger Causality Tests

Lags: 1; Null Hypothesis:	Obs	F-Statistic	Prob.
GOLD does not Granger Cause BTC	80	0.00528	0.9422
BTC does not Granger Cause GOLD		7.97713	0.0060
Lags: 2; Null Hypothesis:	Obs	F-Statistic	Prob.
GOLD does not Granger Cause BTC	79	0.21185	0.8096
BTC does not Granger Cause GOLD		3.17880	0.0474
Lags: 3; Null Hypothesis:	Obs	F-Statistic	Prob.
GOLD does not Granger Cause BTC	78	0.47275	0.7022
BTC does not Granger Cause GOLD		1.92070	0.1340

Source: *Author’s calculations*

The output of the Pairwise Granger Causality Tests is presented in Table 3. As evident, there are causal links from Bitcoin exchange rate towards Gold price. The link exists at first and second lags. It fully disappears at third lag. It confirms the causal relation has a short-term character. It is in line with the statement of Moore (2019) “over the long term, it’s moved toward less correlation, not more”.

Conclusions

Despite accepting Bitcoin as a new safe haven, the wide fluctuations in its exchange rate are arguments against its eventual monetary function. They still hold Bitcoin in the category of speculative investment. So far, even artificial intelligence and advanced technology are not enough powerful to keep Bitcoin sustainable.

Gold seems to be more appropriate investment as safe haven. Its price fluctuates in more narrow limits and remains its relatively high price over the period of study.

The empirical analysis confirmed the existence of a positive correlation. What is more, it provided reliable empirical evidence for a positive correlation. It is also confirmed by the test for bilateral causal relationships. The last procedure proved the short-term character of the relation. It also confirmed a causal link in one direction – from the Bitcoin exchange rate towards Gold price. As a whole, the analysis rejects the popular hypothesis that Bitcoin's price has never shown a correlation with gold.

REFERENCES

Moore, G. (2019, October), Is Bitcoin a Safe Haven Like Gold? These Four Charts Say Not Yet. Retrieved October 11, 2019, from Coindesk: https://www.coindesk.com/is-bitcoin-a-safe-haven-like-gold-these-four-charts-say-not-yet

Havilland, P. (2019, November), Interest in Bitcoin Versus Gold Surging for All Age Groups. Retrieved November 16, 2019, from CryptoBriefing: https://cryptobriefing.com/surging-interest-bitcoin-vs-gold/

Kuhn, D. (2019, July), Fed Chairman Jerome Powell Compares Bitcoin to Gold. Retrieved October 11, 2019, from Coindesk: https://www.coindesk.com/fed-chairman-jerome-powell-compares-bitcoin-to-gold

Hougan, M. (2019, August), Bitcoin vs. Gold: Is Bitcoin Really A New 'Safe Haven' Asset?. Retrieved October 11, 2019, from Forbes: https://www.forbes.com/sites/matthougan/2019/08/21/bitcoin-vs-gold-is-bitcoin-really-a-new-safe-haven-asset/