

Are Cryptocurrencies Hedges and Safe Haven? An Analysis of Relationship Among Stocks, Bond, Gold and Cryptocurrencies

Qi Zhou

Department of Electronic Business, South China University of Technology, China

Abstract

Are cryptocurrencies hedges or the safe haven? We carry out research with time series relations between S&P500, bond and gold returns and three forms of cryptocurrencies- Bitcoin (btc), Ethereum (eth) and Ripple (xrp) returns to investigate these cryptocurrencies as a hedge and a safe haven. We examine whether the variables are stationary to insure that the estimation results are valid. We find that these three forms of cryptocurrencies are not a hedge, but Bitcoin(btc) serves as a safe haven for stocks and Ethereum (eth) regards as a safe haven for bond and gold and Ripple (xrp) serves as a safe haven for bond. Our research gives useful advice for cryptocurrency investors.

Keywords

Safe haven, hedge, cryptocurrency.

1. INTRODUCTION

As a new form of digital asset based on a network, a cryptocurrency is distributed across a large quantity of computers. There are some universally acknowledged cryptocurrencies, such as Bitcoin, whose price was higher than 10000 dollar in 8th May, 2020 . The current discussion and research on Bitcoin mainly focuses on the following aspects: market efficiency and arbitrage(see, e.g., Seungho Lee, Nabil El Meslmani and Lorne N. Switzer,2020; Dimitrova V, Fernández-Martínez M and Trinidad Segovia J E,2019), hedge or safe haven property as well as price dynamics and bubbles(see, e.g., Ladislav Kristoufek, 2019; Alessandra Cretarola and Gianna Figà-Talamanca, 2019, Benjamin M. Blau, 2017) and so on. Only a few studies investigate other cryptocurrencies. We select these three forms of cryptocurrencies- Bitcoin(bth), Ethereum (eth) and Ripple (xrp), with their relevant data to investigate.

The approach to investigating the economic relationship is based on a regression model in which we use stock ,bond and gold returns to regress each cryptocurrency returns and test whether each cryptocurrency regards as a safe haven or hedge in case that stock, bond or gold markets suffer from a crash. Before investigating, understanding the definition of hedge and haven has a positive impact on distinguishing whether these two forms of cryptocurrencies are hedge or haven. Hedge is an asset that has no correlation or has negative correlation with another asset or portfolio. When it comes to safe haven, it is an asset that is uncorrelated or negatively correlated with another asset or portfolio in times of market crash.

The remainder of the paper proceeds as follows: Section 2 describes the data sample and illustrates the trend. Section 3 presents the model specifications and reports the empirical results .Section 4 draw a conclusion.

2. DATA

The relationship among stocks, bond, gold and cryptocurrencies(Bitcoin (btc), Ethereum (eth) and Ripple (xrp)) is examined using daily data spanning from 1st Sep. 2015 - 1th May. 2020

with total 1,219 observations. The graphs illustrate the level for all considered variables visually thorough time as Fig.1:

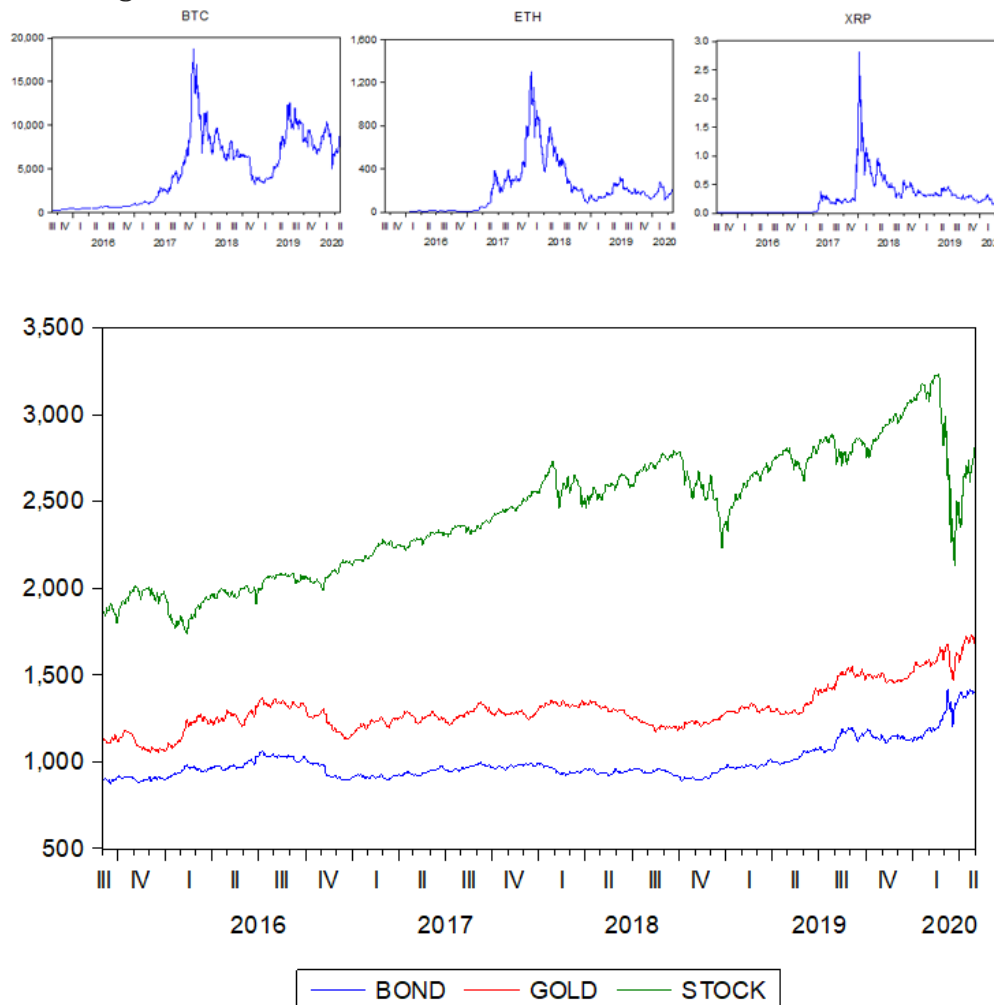


Fig 1. Time series plots of cryptocurrencies' prices (Bitcoin (btc), Ethereum (eth) and Ripple (xrp)), S&P500 index, bond price and gold price

Table 1 indicates that as for log-returns, variables are stationary.

Table 1. Unit-Root Test Statistics

	$R_{s,t}$	$R_{b,t}$	$R_{g,t}$	$R_{eth,t}$	$R_{btc,t}$	$R_{xrp,t}$
ADF	-10.4659	-34.8947	-34.1779	-35.4480	-34.8499	-36.5359
PP	-43.4650	-35.0169	-34.1778	-35.4651	-34.9043	-36.8572
KPSS	0.0622	0.3907	0.1315	0.4646	0.2744	0.1689

Note: $R_{c,t}$, $R_{s,t}$, $R_{b,t}$ and $R_{g,t}$ denote log-returns of a cryptocurrency, stock, bond and gold prices, respectively.

3. MODEL ANALYSIS

This model can be represented by:

$$R_{c,t} = \alpha + \beta_1 R_{s,t} + \beta_2 R_{s,t(\tau)} + \delta_1 R_{b,t} + \delta_2 R_{b,t(\tau)} + \gamma_1 R_{g,t} + \gamma_2 R_{g,t(\tau)} + u_t, \tag{1}$$

Where $R_{c,t}$, $R_{s,t}$, $R_{b,t}$ and $R_{g,t}$ denote log-returns of a cryptocurrency, stock, bond and gold prices, respectively. The $R_{s,t(\tau)}$, $R_{b,t(\tau)}$ and $R_{g,t(\tau)}$ accounts for market crashes in stock, bond and gold markets, respectively. These can be defined as the returns that are less than τ quantile of the returns (one can consider $\tau = 0.1, 0.05$ and 0.01).

Among the different estimation results taking various value of τ in to account, we choose estimation results with $\tau=0.01$ for Bitcoin (btc) and Ripple (xrp) and result with $\tau=0.05$ for Ethereum (eth), shown in Table3.

4. EMPIRICAL RESULTS

Table 3 presents the estimation result. In this model, if β_1 (δ_1 , or γ_1) is 0 or negative, the cryptocurrency is a hedge for stocks (bonds, gold) on account of the assets are uncorrelated with each other. If β_2 (δ_2 , or γ_2) is nonpositive, then the cryptocurrency serves as a safe haven for stocks, bonds and gold. The coefficient estimates for the average effect of stocks on three forms of cryptocurrencies imply that these three forms of cryptocurrencies are not a hedge for stocks ,bonds and gold because the assets are correlated with each other. As for market crashes in stock market, the estimates imply that Bitcoin(btc) serves as a safe haven for stocks and Ethereum (eth) serves as a safe haven for bond and gold and Ripple (xrp) serves as a safe for bond. As mentioned before, all variables are stationary, which is the basic principle of time series regression. What’s more, the value of P_{orb} (F-statistic) is under 1%, so the regression models are all statistically significant. Some variables are statistically significant, such as δ_2 for Bitcoin(btc) and β_2 for Ethereum (eth) at the 1% level.

Table 2. Best estimation results

	<i>Rbtc, t</i>				<i>Reth, t</i>				<i>Rxrp, t</i>			
	Coeff. est.	Std. Error	t-Statistic	Prob.	Coeff. est.	Std. Error	t-Statistic	Prob.	Coeff. est.	Std. Error	t-Statistic	Prob.
α	0.0035	0.0013	2.6472	0.0082	0.0044	0.0024	1.8499	0.0646	0.0025	0.0026	0.9619	0.3363
β_1	0.1864	0.2204	0.8458	0.3979	0.3166	0.2720	1.1639	0.2447	0.6734	0.2750	2.4489	0.0145
β_2	-0.7545	0.4339	1.7390	0.0823	1.0711	0.4023	2.6623	0.0079	0.5563	0.4873	1.1416	0.2538
δ_1	0.1307	0.1389	0.9409	0.3470	0.3639	0.4077	0.8926	0.3723	0.1327	0.4362	0.3042	0.7610
δ_2	1.1473	0.2462	4.6602	0.0000	-0.8215	0.6786	1.2106	0.2263	-0.4802	0.8589	0.5591	0.5762
γ_1	0.2692	0.1829	1.4720	0.1413	0.6608	0.3438	1.9221	0.0548	0.4435	0.3620	1.2253	0.2207
γ_2	0.6721	0.5037	1.3343	0.1823	-0.2698	0.6573	0.4105	0.6815	0.6255	0.9971	0.6273	0.5306
R^2	0.0415				0.0232				0.0164			
Adjusted R^2	0.0367				0.0183				0.0115			
F-statistic	8.7352				4.7855				3.3618			
Prob(F-statistic)	0.0000				0.0001				0.0027			

Note: $\tau=0.01$ for Bitcoin (btc) returns and Ripple (xrp) returns and $\tau=0.05$ for Ethereum (eth) returns

5. CONCLUSION

This paper examines whether three forms of cryptocurrency(Bitcoin (btc), Ethereum (eth) and Ripple (xrp)) could regard as a hedge or a safe haven for stocks, bond and gold. We figure out that they are not a hedge, but Bitcoin(btc) can be accepted as a safe haven for stocks and Ethereum (eth) regards as a safe haven for bond and gold and Ripple (xrp) regards as a safe haven for bond. It is of great interest to enlarge the number of stock market and cryptocurrency

investigated and take other characteristics of these assets into consideration. This will be involved in our future study.

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