

BITCOIN PERFORMANCE WITH GOLD - A STUDY

Author's ****

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ABSTRACT:- There were many electronic currencies got a merged in the global capital market out of these currencies bitcoin explain the vital role and getting strength to strength every day. Our analysis has been focused to measure the growth performance of bitcoin along with global economy movement. This paper has focused from the period of 2010 to 2015 present dates. Regression weight estimation indicated that bitcoin and gold where influenced by the global currency dollar index. Johnson co-integration analysis has been applied on augmented dick fuller stationary data and found global inflation granger cost bitcoin but fail to influence the MSCI. Calmar ratio had proven that bitcoin performance found to be superior from the inception period when it compared with Baltic dry index to present date. Regression equation as predicted that the bitcoin value is expected to move upside in the near future. This study is useful for the global currency trade as investors of crypto currency.

Keywords: Bitcoin, Gold index, Baltic dry index, dollar index, crude oil, MSCI, PIMCO, Global Inflation.

INTRODUCTION: - In the economic world, the decentralized math- based Digital currencies are one of the major intranet things, which are brought up with a revolution through all over world. Digital currency serves as money for anybody with an internet-enabled device and at present they act as money only to a limited extent. The economics of the schemes as currently designed, both in terms of each and every incentive and at a macroeconomic level, pose major challenges to their extensive adoption. Digital currencies do not pose any risk to monetary or financial stability in all over the world.

Crypto-currency: - Means money that is made hidden and private and therefore secure by means of encryption or code. All the data or methods of crypto currency are protected by long in the form of code or logics, each of which is unique to the item or person it's protecting. A significant feature of a crypto currency is that it is not issued by any central authority, interpretation it theoretically immune to government interference or manipulation. The unsigned nature of crypto currency transactions makes them well-suited for a host of immoral activities such as money launder and tax avoidance. The first crypto currency was Bitcoin, launched in 2009. Bitcoin's success has a number of competing crypto currencies such as LIT coin and PPCoin.

Bitcoin is the world's first global, decentralized, digital currency which is not controlled by any one person or group, who might be erroneous or partial. The transfer of Bitcoin looks like, sending a value like money between any two parties, without a third-party intermediary. This enables extremely low cost international remittances to anyone with an Internet connection or mobile phone. Bitcoin is an assured payment, like a check. If you receive bitcoins, that transaction cannot be reversed at a later on date by a criminal looking for to commit fraud. This has noticeable advantages for merchants selling or buying goods over the Internet. In addition to the various credit cards envelop only about 61 of the world's nearly all countries. Bitcoin enables any person in any country for the secure pay, without any risk.

In a hypothetical world, Bitcoin meets the needs of money and debates on possible regulation of crypto currencies, where Bitcoin is the principal medium of exchange, are being addressed all over the world. These observations mostly related to such issues as depreciation environment, possible tax collection in crypto currencies etc. It is apparent that recessions arising in correlation with natural disasters or conjunctures based on innovations cannot be eliminated in a market economy.

REVIEW OF LITERATURE

- 1. Charalambos Tsanidis & Dafni-Maria Nerantzaki (2015):** Bitcoin the online virtual currency relies on a combination of cryptographic protection and a peer-to-peer protocol for witnessing settlements. In spite of this burgeoning usage, research on users' attitudes towards Bitcoin is very limited. The paper aims to fill this gap by investigating consumers' attitudes towards online payments and adoption of Bitcoin in Greece. An empirical study was conducted via an online survey tool. Internet users have been chosen to be surveyed as non-users haven't favorable attitudes towards the use of Bitcoin.
- 2. Dini Amalia Dewi, and Subiacto Soekarno (2014):** The purpose of this study is to analyze the risk and return on bitcoins, as an alternative investment, and how the bitcoins' performance compared with other investment instruments such as gold and stock index in Indonesia, which is LQ45 index. The risk and return, performance evaluation and optimum portfolio formulas is applied to find the result. The finding result shows that bitcoins is good for short-term period investment and it is good for investors who are risk seekers.
- 3. K. Shruthi, Mynampati Uma Devi (2015):** The focus of this analysis has been done from currencies and global assets class perspective, This analysis had proven crude oil and dollar index are having impact on Bitcoin but at the same point of time Global economy impact not been observed on the fluctuations of electronic currencies. With the volatility formulae Bitcoin has been compared with the global assets classes and BDI the risk level is found to be ignore amount i.e., less than Global equity, Gold, but more than bond instruments. The performance measure calmer ratio has proven that the Bitcoin and Yen, Great Britain Pound in Canadian Dollar, are found to be stronger when it is compared with other select currencies.
- 4. Michael Bedford Taylor (2013):** Recently, the Bitcoin cryptocurrency has been international news. This paper tells the story about Bitcoin hardware, how groups of

early-adopters in self-organized and enhanced the creation of entire new industries, leading to the development of machines and including ASICs that had orders of magnitude better performance than what Intel, Dell, AMD, NVidia or Xilinx could provide.

5. **Joseph Bonneau, Andrew Millerx, Jeremy Clark, Arvind Narayanan (2015):** Bitcoin has emerged as the most successful cryptographic currency in history. This enables a more insightful analysis of Bitcoin's properties and future stable. We map the designing space for numerous proposed modifications, providing compare analyses for alternative currency allocation work, consensus mechanisms, computation puzzles and key management tools. Finally we provide new insights on what we term intermediate protocols, which absolve the need for trusted intermediaries in an interesting set of applications. We identify three general intermediate strategies and provide a detailed comparison.
6. **Mihaela Iavorschi (2014):** The human innovation in the field of monetary freedom takes shape in the virtual communities. Developed and implemented through a centralized algorithm, the bitcoin project has so far proved itself a success in the field of virtual money. Beyond the technical part of operation, in this paper we will analyze the theoretical principles following the bitcoin. This study shows that the bitcoin largely meets the role of natural money of gold and silver, in compliance to the free market's behavior. This allows us to observe the fact that people are aware of the negative implications the state's intervention has in the monetary filed, thus deciding to create and use their own currency in online transactions.
7. **Jerry L. Jordan (2014):** With full restoration of the protection of property and enforcement of agreement by the U.S. judicial system, a gold- end, market driven private money would not suffer the same vulnerabilities to political whims as gold backing of the official currency. The Founders' vision of a just, and micro, government that serves the people, we have checked to a government be-accuracy that evolve, "If the taxes increase, if it keeps increases, regulations it, if it stops moving, subsidized on it". The first two policies taxation and regulation must be dealt with for any currency competition to be available.
8. **Marc Gronwald (2014):** This paper deals with the economics of Bitcoins in 2 ways. First, it broadens the discussion on how to capture Bitcoins using economic terminologies. Center stage in this analysis takes the discussion of some unique characteristics of this market as well as the comparison of Bitcoins and gold. Second, the paper analyses Bitcoin prices using an autoregressive jump-intensity GARCH model; a model tested and proven by the central finance community. Results suggestions that Bitcoin price are mainly marked by extreme price movements; a behavior generally observed in immature markets.
9. **Garima Chaudhary (2014):** The Bitcoin transaction is a digitally signed message to take effect it must be recorded in a public ledger or public transaction database called block chain. Approximately every ten minutes a "block" of transactions, are added to the block chain database. The incentive for a particular accounting process, known as "mining". Where a reward of 25 bitcoins per block added to the block chain. This 25 bitcoins reward maintains the reliability of the Bitcoin system by allowing the computers

that confirm transactions. Bitcoin payment processing fees are optional, and generally significantly lower than those of credit cards or money transfers.

NEED OF THE STUDY: - Study is to understand the role bitcoin monopoly in electronic currency system and influence on the gold rate and Currency fluctuations. It also helps us in comparing the performance with the other portfolios and to find the impact of few global economic factors. It gives you the insight on the behavior of Bitcoin during different economic situations & also let us understands that the Bitcoin can emerge as a global electronic currency.

OBJECTIVES: -

1. To find the dollar index impact on gold and bitcoin
2. To know the inflation impact on bitcoin PIMCO gold and MSCI
3. To know the bitcoin performance along with the global economy movement
4. To measure the crude oil impact on bitcoin and gold
5. To know the future value of bitcoin along with gold global bond index

HYPOTHESIS: -

- H_0 null hypothesis: global inflation does not influence bitcoin.
- H_0 null hypothesis: global inflation does not influence PIMCO.
- H_0 null hypothesis: global inflation does not influence gold.
- H_0 null hypothesis: global inflation does not influence MSCI.

SCOPE OF THE STUDY: -This study as focused on bitcoin to measure x performance and how global factors influence is observed on it in this paper various global asset classes work consider along with the economic factors this study period as been considered July 2010 to June 2015.

EMPIRICAL STUDY: - Bitcoin, Gold index, Baltic dry index, dollar index, crude oil, MSCI, PIMCO, Global inflation.

RESEARCH METHODOLOGY: - This study has been done by using secondary data used descriptive statistical tool. The following tools were used such as;

Calmar ratio: - A comparison of the average annual compounded rate of return and the maximum drawdown risk of commodity trades advisors and hedge funds. The lower the Calmar Ratio, the worse the investment performed on a risk-adjusted basis over the specified time period; the higher the Calmar Ratio, the better it performed. Generally speaking, the time period used is three years, but this can be higher or lower based on the investment in question.

Formula: -

Calmar ratio = compound annual returns /maximum drawdown (MD)

1. **Regression equation:** - This is the correlation coefficient .It tells you how strong the linear relationship is. For example, a value of 1 means a perfect positive relationship and a value of zero means no relationship at all. It gives specific information about the components and chooses to put into the data analysis.

$$\text{Regression equation} = a+bx.$$

2. **Granger causality test:** - Granger causality test is a statistical hypothesis test for determining whether one time series is useful in forecasting another. A time series X is said to Granger-cause Y if it can be shown, usually through a series of t-tests and F-tests on lagged values of X (and with lagged values of Y also included), that those X values provide statistically significant information about future values of Y.

I. NULL hypothesis: - The null hypothesis refers to a general statement or default position that there is No relationship between two measured phenomena. Rejecting or disproving the null hypothesis and thus concluding that there is a relationship between two phenomena.

II. Alternative hypothesis:- In statistical hypothesis testing, the alternative hypothesis is applicable when probability is > 0.5. Alternative hypothesis is that the quality is poorer in the second half of the

3. **Augmented Dickey-Fuller Test:** - Augmented Dickey-Fuller Test is a test for a unit root in a time series sample. It is an augmented version of the Dickey-Filler test for a larger and more complicated set of time series models
4. **T-test:** As mentioned above, the t-test can only be used to test differences between two means. When there are more than two means, it is possible to compare each mean with each other mean using many t-tests
5. **Co-integration:** - Co-integration is a statistical property of time series variables. Two or more time series are co-integrated if they share a common stochastic drift. If two time series x and y are co integrated, a liner combination of them must be stationary.

$$Y - Bx = u, \text{ where } u \text{ is stationary.}$$

LIMITATIONS: -

1. Global inflation has been considered by averaging 180 countries monthly data
2. PIMCO has been considered global bond benchmark
3. Dollar index has been considered as a global currency.

DATA ANALYSIS: - The following analysis represents the Bitcoin interpretation with respect to the Gold index, Baltic dry index, dollar index, crude oil, MSCI, PIMCO, and Global inflation based on the Objects of the project.

1. Dollar Index Impact On Gold And Bitcoin: -

Model Summary	
Multiple R	0.531
R Square	0.282
Adjusted R Square	0.257
Std. Error of the Estimate	0.052
Log-likelihood Function Value	-170.854

ANOVA					
	Sum of Squares	df	Mean Square	F	Sig.
Regression	0.061	2	0.031	11.204	0
Residual	0.156	57	0.003		
Total	0.217	59			

Coefficients						
	Unstandardized Coefficients		Standardized Coefficients		t	Sig.
	B	Std. Error	Beta	Std. Error		
(Constant)	103.265	5.525			18.691	0
Bitcoin	-0.002	0.003	-0.096	0.14	-0.683	0.498
Gold	-0.015	0.004	-0.583	0.14	-4.16	0

Interpretation: - The above analysis of regression weight estimation has been applied to measure the impact of dollar index on gold and bitcoin, the r² value is observed 28.2% which is below the standard value of 60%. The probability value of bitcoin and gold found to be significant with dollar index. The result indicates that dollar index is having impact on movement of gold and bitcoin.

2. Inflation Impact on Bitcoin PIMCO Gold and MSCI:

Selected (0.05 level*) Number of Cointegrating Relations by Model					
Data Trend:	None	None	Linear	Linear	Quadratic
Test Type	No Intercept	Intercept	Intercept	Intercept	Intercept
	No Trend	No Trend	No Trend	Trend	Trend
Trace	5	5	5	5	5
Max-Eig	5	5	5	5	5
*Critical values based on MacKinnon-Haug-Michelis (1999)					
Information Criteria by Rank and Model					
Data Trend:	None	None	Linear	Linear	Quadratic
Rank or	No Intercept	Intercept	Intercept	Intercept	Intercept
No. of CEs	No Trend	No Trend	No Trend	Trend	Trend
Log Likelihood by Rank (rows) and Model (columns)					
0	-903.0314	-903.0314	-902.9914	-902.9914	-902.96
1	-883.876	-883.7619	-883.7227	-883.6718	-883.6426
2	-868.7586	-867.9813	-867.9635	-867.5261	-867.511
3	-857.6605	-855.7772	-855.7617	-853.8138	-853.8002
4	-849.2813	-847.2872	-847.2834	-843.1952	-843.1819
5	-841.4844	-839.2028	-839.2028	-834.7698	-834.7698
Akaike Information Criteria by Rank (rows) and Model (columns)					
0	32.56250	32.56250	32.73654	32.73654	32.91088
1	32.24126	32.27235	32.41132	32.44463	32.58395
2	32.06171	32.10461	32.20924	32.26407	32.36881
3	32.02317*	32.06236	32.13199	32.16891	32.23860
4	32.08004	32.15043	32.18538	32.18229	32.21691
5	32.15735	32.25273	32.25273	32.27262	32.27262
Schwarz Criteria by Rank (rows) and Model (columns)					
0	33.45858*	33.45858*	33.81183	33.81183	34.16538
1	33.49577	33.56270	33.84504	33.91419	34.19689
2	33.67464	33.78923	34.00139	34.12791	34.34017
3	33.99454	34.14125	34.28257	34.42702	34.56840
4	34.40984	34.62360	34.69439	34.83467	34.90513
5	34.84557	35.12017	35.12017	35.31928	35.31928

Interpretation: The above analysis Johnson co-integration as been applied between inflation to bitcoin PIMCO gold MSCI the log likelihood rank value where observed in decreasing trend in

both linear and quadratic model along with two Alfa levels. It hence the data is stated to be co-integrated by the inflation with all above set variables.

Null Hypothesis:	Obs	F-Statistic	Prob.
DGOLD does not Granger Cause DINFLATION	57	0.20431	0.8159
DINFLATION does not Granger Cause DGOLD		2.20974	0.1199
DBITCOIN does not Granger Cause DINFLATION	57	1.00658	0.3725
DINFLATION does not Granger Cause DBITCOIN		1.01953	0.3679
DPIMCO does not Granger Cause DINFLATION	57	1.43583	0.2472
DINFLATION does not Granger Cause DPIMCO		0.31014	0.7347
DMSCI does not Granger Cause DINFLATION	57	0.45971	0.634
DINFLATION does not Granger Cause DMSCI		0.09235	0.9119

Interpretation: - The granger causality test as been applied on the co-integrated data of augmented dickey fuller stationary variables h0 the null hypothesis of granger causality probability value between inflation to gold and bitcoin observed significant and accept the null hypothesis and reject the alternative hypothesis inflation to PIMCO and MSCI h0 null hypothesis as rejected and accept the alternative hypothesis this indicate that inflation influenced the PIMCO and MSCI.

3. Bitcoin performance along with the global economy movement: -

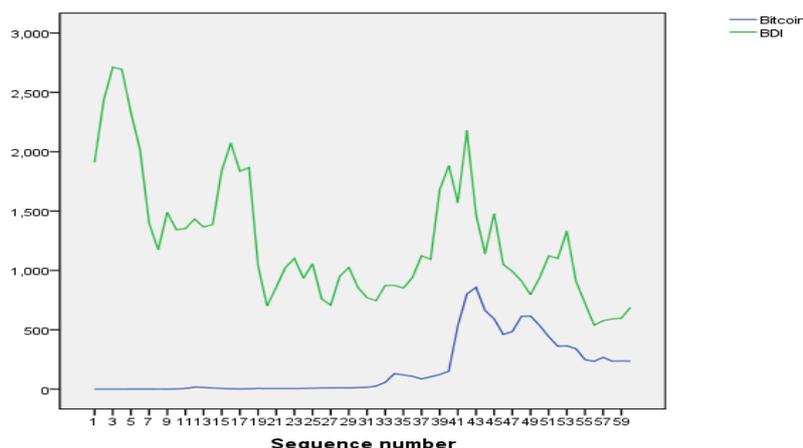
Bit Coin:

Compound Annual Returns(CAR)	Maximum Drawdown(MA)	Calmar Ratio	Result
273.4453307	0.197443333	1384.930684	1452.77
844.109783	17.69870247	47.69331448	
118.4392704	8.458158065	14.00296253	
5037.017443	786.1295871	6.407362763	
-60.27721227	516.6855323	-0.116661312	
-5.167889288	34.32576394	-0.15055424	

Baltic Dry Index (BDI): -

Compound Annual Returns(CAR)	Maximum Drawdown(MA)	Calmar Ratio	Result
5.666458519	802.034632	0.007065105	0.05793
33.40390652	897.3709273	0.037224191	
-17.67335181	400.0227273	-0.044180869	
182.6478742	1433.108824	0.127448712	
-38.22293568	683.8847826	-0.0558909	
-5.087005056	370.2111111	-0.013740822	

Interpretation: The above table of performance measure as been calculated with calmar ratio between Baltic dry index and bitcoin the analysis has been considered six years data and observed the global economy indicator Baltic dry index performance is observed inferior but at the same point of time bitcoin performance is superior.



Interpretation: The above graph after regression forecasting sequence chart depicts the movement between Baltic dry indexes to bitcoin and observed that Baltic dry index trend line as always move to above the bitcoin which indicates that the movement of performance is always inferior when it is compared with Baltic dry index.

4. Crude oil impact on bitcoin and gold : -

Model Summary	
Multiple R	0.346
R Square	0.12
Adjusted R Square	0.089
Std. Error of the Estimate	991.161
Log-likelihood Function Value	-228.954

ANOVA					
	Sum of Squares	df	Mean Square	F	Sig.
Regression	7630124.828	2	3815062.414	3.883	0.026
Residual	5.60E+07	57	982399.976		
Total	6.36E+07	59			

Coefficients						
	Unstandardized Coefficients		Standardized Coefficients		t	Sig.
	B	Std. Error	Beta	Std. Error		
(Constant)	52.4	15.196			3.448	0.001
Bitcoin	0.017	0.007	0.358	0.16	2.235	0.029
Gold	0.027	0.01	0.432	0.16	2.701	0.009

Interpretation : - The above analysis of regression weight estimation indicates that the crude oil price fluctuation effecting the gold but it has fail to influence the bitcoin the r2 is stated to be 12% which is below the base level i.e., Both the variables were found to be influenced by the crude oil.

5. Future value of bitcoin along with gold global bond index: -

A. Gold to Bitcoin

	Coefficients	Standard Error	t Stat	P-value	Lower 95%	Upper 95%	Lower 95.0%	Upper 95.0%
Intercept	1518.202182	25.206162	60.2313903	5.3902E-54	1467.74657	1568.6578	1467.746567	1568.657796
X Variable	-0.495537589	0.087534147	-5.6610775	4.8992E-07	-0.6707562	-0.320319	-0.67075622	-0.320318957

$b(x)$	a	$y=a+bx$
-752.3262488	235.4630038	-516.86324

B. PIMCO (Global bond Index) to Bitcoin:

	Coefficients	Standard Error	t Stat	P-value	Lower 95%	Upper 95%	Lower 95.0%	Upper 95.0%
Intercept	12.67810738	0.119427191	106.157629	3.8817E-68	12.4390479	12.9171669	12.43904789	12.91716687
X Variable 1	-0.000724992	0.000414738	-1.7480704	0.0857436	-0.0015552	0.0001052	-0.00155518	0.000105197

$b(x)$	a	$y=a+bx$
-0.00919	235.463	235.4538

Interpretation:- Regression equation as been applied to predict the future movement of bitcoin with gold and PIMCO The future value of bitcoin is expected to go down side when it is predict with gold but at the same time with PIMCO bitcoin is expected to move upside the regression equation analysis is given contradicted result.

FINDINGS: -

1. The study observed the dollar index is having significant impact on gold and bitcoin.
2. Global inflation fail to cause the bitcoin and gold but during the same analysis period PIMCO and MSCI were not caused by the global inflation.
3. Bitcoin performance for the inception period July 2010 to till date is found to be superior in comparison with the global economy movement.
4. International crude oil is having the significant impact on bitcoin and gold during the study period.
5. Future movement of bitcoin is expected to move upside with PIMCO but with gold its movement predicted down fully.

CONCLUSION: - We conclude the analysis of bitcoin performance with gold from the period of 2010-2015 bitcoin as merging in the global currency segment from the inception point. in this study gold has been considered as a substitute for currency in comparison with bitcoin as crypto currency due to global economic conditions all the country's currencies where getting influence and in order to protect the currency value central bank of respect countries are using gold. Bitcoin performance is found to be superior in comparison with global economic movement indication (BDI) Global economic variables such as crude oil and dollar index where also having influence on bitcoin. Hence further study is recommended on bitcoin because it is

having less history and across the global many country regulators where in ambiguous model there is a need to compare bitcoin with other global currencies to measure the its evaluation .

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