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Role of Bitcoin in Global Portfolio - An Empirical Study

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Abstract

In the modern economy role of electronic currency is playing a vital role for exchanging of goods and services between the countries in present days. There are many crypto currencies which are traded by the investors among them bitcoin has merged global leader. This study has been emphasized from the period of 2011-2015. Johanson co-integrated analysis has been applied on ADF values (Augmented Dicky Fuller) and formed the co-integration with select global assets along with dollar index. The granger casualty test results unveil that gold is the only asset class which is getting influenced by the dollar index. Modigliani risk adjusted method shows that performance of bitcoin is superior than the other asset classes. Vector auto regression analysis indicates that MSCI, gold and bitcoin future momentum is expected to go downside when sentiment index moves upside. This study is useful to the investors fraternity like global exporters and importers, investors of currency and retail investors of bitcoin.

Keywords: *Bitcoin, ADF values, MSCI, Global Reality Index, Sentiment Index.*

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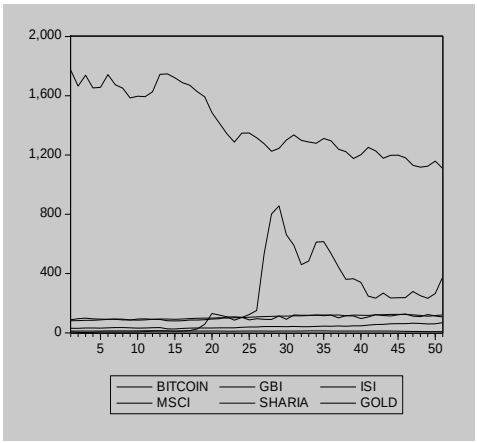
1. INTRODUCTION

Bitcoin is dispersed basic cash that adopts a peer-to-peer accord arrangement to affirm and authenticate contracts. The Bitcoin chain was arranged and begun in January 2009 by a association of programmers under the pseudonym of "Satoshi Nakamoto," based on the perception of open-source crypto-currency 1 defined by cryptologist Wei Dai in 1998. Significant to Bitcoin is its autonomy from any academy or authority, granting any keen parties to enlist in a direct budgetary contract at a low cost. Rather of believing a financial mediator to intervene and certify an agreement, all authentic agreements are encrypted into a single agreed-upon past or journal of agreements. This completely averts anyone's endeavor to spend the same coin numerous times or to build false Bitcoin.



Bitcoin works just like currency. It can be acquired or disposed off in currency swaps, Mt. Gox being the most frequently recycled one. It can also serves as premium for commodity or maintenance at a flourishing number of employments. An agreement is built by "sending" Bit coins to the location of the account to be credited. Once an agreement is built, it is advertised honestly among the network, which is convinced of persons, known as "miners," who allot measuring capacity to clear up the agreements. These agreements are "pending" until the bulk of the organization certifies they are accurate. Then, the documented section is set to the public section group, and the network starts to clear up the next contract section. To appreciate anonymity, buyers are cheered to design new locations for each agreement to be accepted, yet the public section group and account balances can be drawn to channel accounts and buyers. Since the establishment of Bitcoin, proof-of-work has been the main design of peer-to-peer crypto currency. The approach of proof-of-work has been the determination of casting and security model of the study.

2. REVIEW OF LITERATURE

Dafni-Maria Nerantzaki: Bitcoin is 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.

Dini Amalia Dewi, and Subiakto Soekarno: The purpose of this study is to analyze the risk and return on bitcoin, as an alternative investment, and how the bitcoin' 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 applied to find the result. The finding result shows that bitcoin is good for short–term period investment and it is good for investors who are risk seekers.

Mynampati Uma Devi: The focus of this analysis has been done from currencies and global assets class perspective, This analysis had proven that 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 ignorable amount i.e., less than Global equity, Gold, but more than bond instruments. The performance measure calmer ratio has proven that the Bitcoin vs. Yen, Great Britain Pound and Canadian Dollar, are found to be stronger when it is compared with other select currencies.

Michael Bedford Taylor: Recently, the Bitcoin crypto currency has been an international sensation. This paper tells the story of Bitcoin hardware: how a group of early-adopters self-organized and enhanced the creation of an entire new industry, leading to the development of machines, including ASICs that had orders of magnitude better performance than what Dell and Intel could provide.

Joseph Bonneau, Andrew Millerx, Jeremy Clark, and Arvind Narayanan: They map the design space for numerous proposed modifications, providing comparative analyses for alternative consensus mechanisms, currency allocation mechanisms, computational puzzles, and key management tools. Finally we provide new insights on what we term disintermediation protocols, which absolve the need for trusted intermediaries in an interesting set of applications. We identify three general disintermediation strategies and provide a detailed comparison.

Mihaela Iavorschi: in this study they analyzed the theoretical principles underlying 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 the research scholars 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.

Jerry L. Jordan: With full restoration of the protection of property and enforcement of contracts by the U.S. judicial system, a gold-backed, market driven private currency would not suffer the same vulnerabilities to political whims as gold backing of the official currency. The Founders' vision of a just, and minimal, government that serves the people, we have evolved to a government bureaucracy that believes, "If it moves, tax it; if it keeps moving, regulate it; if it stops moving, subsidize it". The first two policies taxation and regulation must be dealt with for any currency competition to be available.

Marc Gronwald: This paper deals with the economics of Bitcoin in two ways. First, it broadens the discussion on how to capture Bitcoin using economic terms. Center stage in this analysis takes the discussion of some unique characteristics of this market as well as the comparison of Bitcoin

and gold. Second, the paper empirically analyses Bitcoin prices using an autoregressive jump-intensity GARCH model; a model tested and proven by the empirical finance community. Results suggest that Bitcoin price are particularly marked by extreme price movements; a behavior generally observed in immature markets.

Felix Brezo and Pablo G: Bitcoin is an electronic currency designed to use a public protocol that implements it in a totally decentralized manner, so as not to need the control of any central issuing organization that manages it. Though still in development, it has been proven to be a modern payment system referred to have been used in some procedures commonly associated to money laundering or tracking of illegal substances of various kinds. Thus, in this article, we analyses those features which transform such a crypto currency in a useful tool to perform any kind of transactions far from the control of any kind of regulatory agency, as well as we pinpoint some of the fields in which their usage can derive in new illicit behaviors.

Garima Chaudhary: The Bitcoin transaction is a digitally signed message to take effect it must be recorded in a public ledger or public transaction database called the block chain. Approximately every ten minutes a bundle of transactions, called a "block", is added to the block chain. The incentive for this accounting process, known as "mining", carries a reward of 25 bitcoins per block added to the block chain. This 25 bitcoins reward maintains the integrity of the Bitcoin system by allowing the computers that confirm transactions and also mint new bitcoins in the process. Bitcoin payment processing fees are optional, and generally substantially lower than those of credit cards or money transfers.

3. RESEARCH GAP

In modern economy of global asset classes, bitcoin has emerged as strong electronic currency in recent past. Across the globe people started using the bitcoin to replace the normal currency. Though bitcoin is having a less history; many research scholars had done research in many angles. This virtual currency is having many hurdles in its path because many countries federal banks have blocked the crypto currency as exchanging instrument. By reading of the many research papers and thesis of virtual or crypto currency I found a gap of research, where how bitcoin returns performance when it is compared with global assets bench marks.

4. OBJECTIVES OF THE STUDY

1. To measure the relationship between bitcoin, MSCI, global bond index, gold and reality.
2. To measure the global currency impact on global assets.
3. To study the bitcoin influence on global asset returns performance.
4. To study the investor sentiment index impact on global asset class movement.

5. SCOPE OF THE STUDY

This study has been emphasized from the period of 2011-2015 the focus of the analysis is to identify the bitcoin momentum along with the select global asset.

6. RESEARCH METHODOLOGY

Empirical study:

1. Gold

2. Bitcoin
3. GBI
4. Global Reality index
5. MSCI
6. Sentiment index
7. Global Sharia index
8. Dollar index

This study has been done on the basis of secondary data and by using descriptive statistical tools for the analysis. The following formulas were applied.

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.

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, Where, u is stationary.

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, that those X values provide statistically significant information about future values of Y.

- **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.
- **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 record.

Cross Correlogram: In the analysis of data, a Correlogram is an image of correlation statistics. This is used only when we have time series analysis. $s_{\bar{Y}} = s/\sqrt{N}$

Modigliani risk-adjusted performance: It is a measure of the risk-adjusted returns of some investment portfolio. It measures the returns of the portfolio, adjusted for the risk of the portfolio relative to that of some benchmark. It is derived from the widely used Sharpe ratio, but it has the significant advantage of being in units of percent return, which makes it dramatically more intuitive to interpret.

Vector Autoregressive models: VAR models (vector autoregressive models) are used for multivariate time series. The structure is that each variable is a linear function of past lags of itself and past lags of the other variables.

The vector autoregressive model of order 1, denoted as VAR (1), is as follows:

$$x_{t,1}=a_1+\phi_{11}x_{t-1,1}+\phi_{12}x_{t-1,2}+\phi_{13}x_{t-1,3}+w_{t,1}$$
$$x_{t,2}=a_2+\phi_{21}x_{t-1,1}+\phi_{22}x_{t-1,2}+\phi_{23}x_{t-1,3}+w_{t,2}$$
$$x_{t,3}=a_3+\phi_{31}x_{t-1,1}+\phi_{32}x_{t-1,2}+\phi_{33}x_{t-1,3}+w_{t,3}$$

7. DATA ANALYSIS

1. To measure the relationship between bitcoin, MSCI, global bond index, gold and reality.

Table 1: To measure the relationship between bitcoin, MSCI, global bond index, gold and reality.

		Bitcoin	GBI	Gold	MSCI	Reality Index
Bitcoin	Pearson Correlation	1	-0.085	-.686***	.449**	.446**
	Sig. (2-tailed)		0.555	0	0.001	0.001
	N	51	51	51	51	51
GBI	Pearson Correlation	-0.085	1	.493**	-.605**	-0.226
	Sig. (2-tailed)	0.555		0	0	0.112
	N	51	51	51	51	51
Gold	Pearson Correlation	-.686**	.493**	1	-.836**	-.742**
	Sig. (2-tailed)	0	0		0	0
	N	51	51	51	51	51
MSCI	Pearson Correlation	.449**	-.605**	-.836**	1	.659**
	Sig. (2-tailed)	0.001	0	0		0
	N	51	51	51	51	51
Reality	Pearson Correlation	.446**	-0.226	-.742**	.659**	1
Index	Sig. (2-tailed)	0.001	0.112	0	0	
	N	51	51	51	51	51

Source: Complied Data

The above table indicates that bitcoin is having slightly to strong negative correlation with global bond index and gold but of the same time it is having moderately positive correlation with MSCI and reality index.

1. **To measure the global currency impact on global assets**.

Table 2: Measure the global currency impact on global assets.

	Log Likelihood by Rank (rows) and Model (columns)				
0	-662.7328	-662.7328	-661.3834	-661.3834	-658.6337
1	-646.9065	-645.017	-643.668	-643.6676	-641.0159
2	-633.7916	-629.522	-628.1957	-627.7172	-625.0837
3	-623.6266	-619.099	-617.919	-617.4402	-614.8079
4	-616.7375	-611.2618	-610.0846	-609.4635	-606.8397
5	-615.5552	-605.8956	-605.8956	-605.1994	-605.1994

Source: Complied Data

The above analysis of johansen co-integration test indicates that the log likelihood rank values where in decreasing mode in both non, linear and quadratic intersect trend models among dollar index with select asset classes. Hence data is stated to be co integrated among the variables.

Table 3: Granger Causality Test

Null Hypothesis	Obs	F-Statistic	Prob.
DMSCI does not Granger Cause DALLOR	48	3.4568	0.0405
DALLOR does not Granger Cause DMSCI		2.29559	0.1129
DGOLD does not Granger Cause DALLOR	48	0.14522	0.8653
DALLOR does not Granger Cause DGOLD		0.10849	0.8974
DBOND does not Granger Cause DALLOR	48	5.08108	0.0104
DALLOR does not Granger Gause DBOND		1.09375	0.3441
DREALITY does not Granger Cause DALLOR	48	4.88357	0.0123
DALLOR does not Granger Cause DREALITY		1.20866	0.3085

Source: Complied Data

The granger causality test has been applied on ADF stationery data with co-integration the null hypothesis has been accepted with dollar index to MSCI, bond reality and reject the H1 alternative hypothesis it means the dollar index is not causing the MSCI, bond and reality. The null hypothesis of dollar with gold has been rejected and accepted. The H1 alternative hypothesis that indicates gold, got influenced with global currency dollar index.

3. To study the bitcoin influence on global asset returns performance.

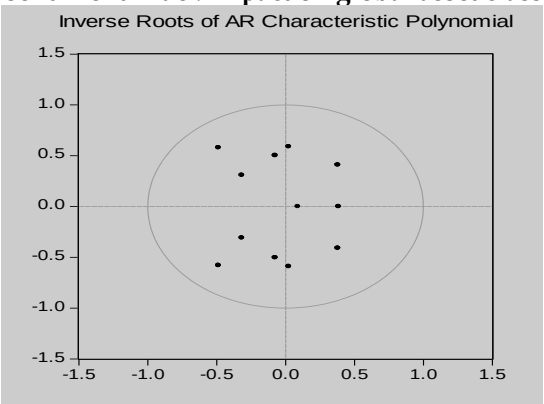
Table 4: performance measure by Modigliani risk adjusted method

	Average of Rp-Rf	Rp-Rf	S
Bitcoin	14.33	47.82	0.3
Bond	-1.21	4.75	-0.25
Gold	-1.53	3.25	-0.47
MSCI	1.11	5.81	0.19
Reality	-0.07	3.06	-0.02
Sharia	0.16	2.36	0.07

Source: Complied Data

Interpretation: The above analysis of performance measure by Modigliani risk adjusted method indicates that bond, gold and reality had given negative performance but MSCI, sharia and bitcoin had given positive performance during the study period.

4. To study the investor sentiment index impact on global asset class movement.



The above cholesky polynomial graph indicates that all the variables were observed inside the circle, which means that all variables data is normally distributed. Hense VAR can be applied.

Vector Auto regression Estimate

	DDSENTIMENT	DMSCI	DGOLD	DBOND	DREALITY	DDBITCOIN
	5p 7n	5p 7n	4p 8n	7p 5n	8p 4n	5p 7n
DDSENTIMENT(-1)	-0.949348	-0.01835	-0.51943	0.006823	0.010837	-0.30993
	-0.13449	-0.0307	-0.54932	-0.00661	-0.01484	-1.14771
	[-7.05871]	[-0.59761]	[-0.94558]	[1.03194]	[0.73004]	[-0.27005]
DDSENTIMENT(-2)	-0.599778	0.000479	-0.30137	0.004773	0.001299	-0.00318
	-0.13945	-0.03183	-0.56956	-0.00685	-0.01539	-1.19
	[-4.30107]	[0.01505]	[-0.52913]	[0.69633]	[0.08440]	[-0.00267]
DMSCI(-1)	0.138891	0.115831	-1.4169	0.046997	-0.08041	-6.43296
	-0.89609	-0.20453	-3.65998	-0.04405	-0.09891	-7.64689
	[0.15500]	[0.56633]	[-0.38713]	[1.06690]	[-0.81299]	[-0.84125]
DMSCI(-2)	-0.116749	-0.10616	-2.15248	-0.05764	-0.16395	4.65654
	-0.98574	-0.22499	-4.02615	-0.04846	-0.1088	-8.41194
	[-0.11844]	[-0.47183]	[-0.53462]	[-1.18946]	[-1.50690]	[0.55356]
DGOLD(-1)	-0.020388	-0.00084	0.225431	-0.00211	0.004687	-0.01366
	-0.04172	-0.00952	-0.17039	-0.00205	-0.0046	-0.35599
	[-0.48872]	[-0.08842]	[1.32305]	[-1.02774]	[1.01794]	[-0.03838]
DGOLD(-2)	0.018885	-0.0083	-0.03113	0.000199	0.00184	0.078899
	-0.04491	-0.01025	-0.18344	-0.00221	-0.00496	-0.38326
	[0.42049]	[-0.80965]	[-0.16969]	[0.09010]	[0.37118]	[0.20587]
DBOND(-1)	0.272996	-1.04909	17.96487	0.212534	0.002604	-10.233
	-5.13412	-1.17184	-20.9697	-0.25238	-0.56668	-43.8126
	[0.05317]	[-0.89525]	[0.85670]	[0.84211]	[0.00460]	[-0.23356]
DBOND(-2)	-4.24488	-0.34391	2.227937	0.280245	1.134859	-15.4474
	-4.39325	-1.00274	-17.9437	-0.21596	-0.4849	-37.4903
	[-0.96623]	[-0.34297]	[0.12416]	[1.29766]	[2.34038]	[-0.41204]
DREALITY(-1)	-0.178124	0.545561	-4.31157	0.00985	-0.10827	17.92977
	-2.06907	-0.47226	-8.45089	-0.10171	-0.22837	-17.6566
	[-0.08609]	[1.15522]	[-0.51019]	[0.09684]	[-0.47410]	[1.01547]
DREALITY(-2)	2.123348	-0.02502	-5.31726	-0.12909	-0.30563	2.901344
	-1.75754	-0.40115	-7.17847	-0.0864	-0.19399	-14.9982
	[1.20814]	[-0.06238]	[-0.74072]	[-1.49413]	[-1.57550]	[0.19345]
DDBITCOIN(-1)	-0.0363	0.001808	-0.07305	-0.00022	0.001084	0.029998
	-0.02063	-0.00471	-0.08426	-0.00101	-0.00228	-0.17604
	[-1.75969]	[0.38389]	[-0.86697]	[-0.21560]	[0.47609]	[0.17041]
DDBITCOIN(-2)	0.025854	0.000468	0.057335	-0.00044	0.001456	-0.26429
	-0.02137	-0.00488	-0.08727	-0.00105	-0.00236	-0.18234
	[1.20997]	[0.09597]	[0.65697]	[-0.41401]	[0.61741]	[-1.44946]
C	-0.919651	0.406976	-3.22768	-0.02363	0.61616	-2.85831
	-2.43966	-0.55684	-9.9645	-0.11993	-0.26928	-20.8191
	[-0.37696]	[0.73087]	[-0.32392]	[-0.19703]	[2.28821]	[-0.13729]

P-positive n- Negative : Source: Complied Data

The above analysis vector auto regression estimates that MSCI, gold ,and bitcoin goes along with sentiment as the value of MSCI, gold, bitcoin increases then the value of bond and reality goes downward and as the value bond and reality increases then the value of MSCI, gold, bitcoin goes downward.

8. FINDINGS OF THE STUDY

- The study observe that MSCI and reality indices are moving with bitcoin but during the same study period gold and bond are having negative co-relation momentum.
- Global currency is causing gold price but MSCI, bond, and reality were failed to influence by the dollar index.
- The study observed that performance returns of equity index MSCI, sharia and bitcoin is superior but bond, gold and reality performance is found to be inferior.
- The bitcoin, MSCI and gold where predicted upside based on sentiment index in the future period.

9. CONCLUSION

I conclude the analysis of Role of Bitcoin In Asset Class Portfolio - A Study the analysis been emphasized the global asset class variables (MSCI, GBI, reality, gold and bitcoin) variables where considered and found that the bitcoin performance are superior than the other asset classes the bitcoin behaviour is observed along with the select global asset classes and considered that global equity index and reality index where behaving in a same manner. Hence there is a further scope to do research in this area by considering various global economic factors influence on bitcoin returns.

REFERENCES

[1]. Bitcoin: A Peer-to-Peer Electronic Cash System - S Nakamoto -https: // bitcoin. Org / bitcoin.pdf
[2]. Bitcoin: An Innovative Alternative Digital Currency - R Grinberg - http://papers.ssrn.com/ sol3/ papers.cfm?abstract_id=1817857
[3]. Bitcoin: Network Based Currency and Its Self-Organizing Emergency - Michael Paetau - https://isaconf.confex.com/isaconf/wc2014/webprogram/Paper48144.html
[4]. http://www.coindesk.com/price/ (Bitcoin Data)
[5]. http://www.investing.com/currencies/ (EURO,GBP,SWISS FRANC, DOLLAR ,YEN, CAD Data)
[6]. http://www.mcxindia.com/sitepages/HistoricalDataForVolume.aspx (Gold Data)
[7]. http://www.msci.com/products/indexes/performance.html (MSCI Data)
[8]. http://www.pimcoindex.com/Pages/indexdata.aspx?ticker=GLAD (PIMCO Data)
[9]. Information propagation in the Bitcoin network - C Decker – ieeexplore .ieee. org/ xpls / abs_all.jsp.