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The Influence of Cryptocurrency Bitcoin over the Romanian Capital Market

Ştefan-Cosmin DĂNILĂ,
Master Student, "Alexandru Ioan Cuza" University of Iasi, Faculty of Economics and Business Administration, e-mail: danila.stefan96@gmail.com

Ioan-Bogdan ROBU,
Lecturer, PhD., "Alexandru Ioan Cuza" University of Iasi, Faculty of Economics and Business Administration, e-mail: bogdan.robu@feaa.uaic.ro

Abstract

Within the decision-making process, investors are interested in finding the most effective solutions that will allow them to obtain short-term benefits. Current economic environment is characterized by the emergence of new financial instruments that can assist investors to diversify their investment portfolio. Crypto-currencies represents a category of financial assets that can be used by investors to reduce risk and achieve significant returns. Therefore, the study intends to analyze the financial behavior of investors in the moment of publishing the financial statements. Financial statements could have a positive or negative influence on the investment portfolio and structure.

The issue analyzed by this study is represented by the ability of the cryptocurrency Bitcoin to be considered as an alternative investment asset. The study is divided into two parts. In the first part, the study presents the review of literature about value-relevance, cryptocurrency term and speculative bubble. The second part presents the research methodology and results. The results of the study validate the hypothesis of this study, cryptocurrency Bitcoin being a financial asset that can be used as an alternative investment asset for diversification of investment portfolio.

Keywords: *capital market, crypto-currency, Bitcoin, financial information, value relevance, conservatism accounting*

JEL Classification: *C58, M41, O16*

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1. Introduction

For the economic environment, financial market represents a mean of mobilizing the capital towards profitable areas for the participants. Depending on the time horizon used, the financial market has two components: the monetary market (short term) and the capital market (long-term). The capital market represents the meeting place between the demand for securities from investors seeking diversification of their investment portfolio and the supply of securities of companies. Investors, seen as participants to the capital market, are looking for financial instruments to reduce investment risks and increase returns. The annual financial statements represent for the modern investor a credible source that could help them in the decision-making process (IASB, 2015). The value relevance of the information presented in the financial statements is a subject approached in the literature by many researchers. The concept of relevance is defined as the impact that a financial information may have on decision-making process (Barth, 2001).

Cryptocurrencies are financial instruments that are used by investors to diversify their investment portfolio, and this concept is growing with the insertion of Bitcoin cryptocurrency. Following the success of Bitcoin, other virtual coins also appeared, known as *altcoins* in the specialized literature, expanding the area in terms of investment opportunities (Krafft et al., 2018). Many researchers have drawn attention to the fact that Bitcoin is a financial instrument not regulated by any financial institution, making it possible for the speculative bubble to emerge. The current study aims to analyze the impact of the virtual Bitcoin currency on companies listed on Bucharest Stock Exchange.

The analyzed companies have been selected on the basis of the availability of exchange price data and published annual financial statements. The study proposes to analyze the value relevance of financial information through positive or negative news, starting from Basu (1997). The market price of the listed companies will be calculated as a ratio between $P_{31.12}$ and $P_{01.01}$. The analysis will be based on a multiple linear regression between the stock market price seen as dependent variable and the main return ratios and financial leverage, seen as independent variables. The standardization of the first relationship will make it possible to analyze the correlations between the virtual Bitcoin stock market price and the stock price of firms influenced by financial information.

The current study is structured in three sections. The first part presents the review of the literature on the concept of value-relevance, the concept of speculative bubble and the definition of the Bitcoin cryptocurrency. The second section presents the research methodology used to obtain the results, showing the significant models for analyzing the value-relevance, the Bitcoin cryptocurrency evaluation model, as well as the model used to study the correlation between the price of the stocks and the price of Bitcoin cryptocurrency. The last part of the study presents the results of the empirical model and the conclusion based on the results obtained.

2. Literature review and hypothesis development

In the current section, the study proposes to analyze the concept of value-relevance together with an example of how to measure it. Also, the cryptocurrency market seen as an emerging market will be explained in terms of its evolution. In the last part, the study will formulate the research hypothesis that will be used to test the correlation between the stock market price and the cryptocurrency market price.

2.1. The value-relevance of financial information on the stock market

Financial information represents, for the modern investor, a fundamental resource for the investment process, for its processing and decision-making regarding the maintenance, supplementation or, as the case may be, the decrease of the participations in a particular company. Companies report their financial position and performance to current and potential investors through both annual and quarterly financial statements. The financial statements are intended to provide relevant information on financial position, financial performance, and the cash flow statement for large categories of stakeholders (Toma, 2018), but their preparation requires certain qualitative and fundamental characteristics and compliance with certain accounting principles. The framework of the IASB (2015) concept displays the two fundamental qualitative characteristics that annual financial statements must meet, respectively: relevance and faithful representation.

The value relevance of financial information refers to the impact it may have on decision-making through the projected value of the company's financial position and future performance (IASB, 2015). A financial information is relevant if it is able to influence the decisions of its user (Jianu et al., 2018). The value relevance of financial information can be analyzed through the correlation between the capital market and the financial information published by companies (Barth, 2001). The value relevance of financial information has been a widely discussed topic for the academic environment, starting with Miller & Modigliani (1966), the first scientific paper in which the term value-relevance of information was published for the first time by Amir *et al*. (1993).

Faithful representation or credibility (IASB, 2015) can be defined as a true and a fair representation of the financial position and performance of a company, based on the conservatism accounting principle. This principle, which, on one hand, considers avoiding the overvaluation of assets as well as the underevaluation of the debt elements and, on the other hand, takes into account the possible write-downs of an asset, write-downs evidenced by the adjustments accounts for the items of temporarily impaired assets and depreciation in the case of irreversibly depreciated assets and the rise in debt items (Toma, 2018). According to the literature, the conservatism principle forbids the overvaluation of the assets and proposes a pessimistic attitude towards the future benefits of company (Toma, 2018).

The conservatism principle implies an economic approach according to which: at the close of the financial year, only profits earned in that financial year are taken into consideration, account shall be taken of all foreseeable and potential liabilities occurring in the current and also previous years and shall be taken into account of all value adjustments regardless of whether the result of the exercise is profit or loss (Toma, 2018). Toma & Robu (2014) describes the involvement of the accounting conservatism principle in financial reporting, as an increase in depreciation, loss, and a decrease in the value of assets and economic benefits generated. Lev & Zarowin (1999), by studying the relationship between equity and the stock price, concluded that firms that have intangible assets that have a high proportion in the firm's structure can see differences between the times of recognizing the costs and revenues of these assets. The IASB concept (2015) defines the intangible asset as a non-monetary, identifiable but non-physical resource. Srivastava (2014) has shown that with the changes in the economy, the number of companies focused on activities involving the use of intangible assets has increased. Barth (2017) by analyzing the stock price and financial information based on the CART, estimates an increase in relevance to data on the intangible assets situation.

The relationship between financial information and the stock price could be explained through the market efficiency concept. An efficient market describes how financial instruments react when a positive or negative news is published, and there is a direct correlation between the two. Basu (1997) analyzed the impact of the conservatism principle on the results of a company. In his assessment, he analyzed the financial news and classified them as: positive news ($P_{31.12} > P_{01.01}$) or negative news ($P_{31.12} < P_{01.01}$) on the market. His analysis of the influence of the prudence principle on the results of a company concluded that negative events had an impact of two to six times greater than in the case of positive events. Thus, given the implications that news may have on stock market prices, investors will be more reticent in investing in a company providing negative news.

Robu & Toma (2014) analyzed Basu's (1997) relationship with the impact of the conservatism principle on the stock price of companies listed on Bucharest Stock Exchange. The variables used in the model are: total assets, total liabilities, equity, net result and stock price. On the basis of the results obtained, the study determined the significant influence that the total assets variables and total debts have on the stock price. Therefore, investors will be interested in the publication of financial statements and increases or decreases in the structure of assets and liabilities, based on which specific profitability rates are calculated, such as the return of assets, return on equity and the financial leverage. Filip & Raffournier (2010) analyzed the value relevance of financial information according to the two categories of companies listed on the Bucharest Stock Exchange: standard and premium. The link between financial information and the stock price variation is explained at a rate of 40% under a transition economy. After adjusting the data, the stock price variation according to financial information is explained in a proportion of 19.9%. The analysis presented the investment behavior at the time of publication of the financial statements. Investors at the time of publication

of positive results have a negative attitude, while negative changes can positively influence their behavior, this result being a consequence of the relatively inefficient market (Filip & Raffournier, 2010).

2.2. Cryptocurrencies and their evolution on the financial market

Cryptocurrency market has recorded an increase in investor interest over the last few years due to the high returns that these financial instruments provide, but also to the potential they display. Venter (2016) presents the difference between the term of *electronic money* used in commercial bank transactions and the term of *cryptocurrencies*. The electronic money gives us the equivalent of money in physical form and expressed in a particular currency (e.g. USD) placed in a bank account. On the other hand, the term cryptocurrency does not refer to any form of physical money, but only a form of transactions that take place in the digital environment. The most used example is Bitcoin, which will be analyzed within this study.

2.2.1. Concept of Bitcoin cryptocurrency

Officially introduced in 2009, Bitcoin digital currency (BTC) has enjoyed real success in the financial markets, gaining value that has brought tremendous returns to investors, many of them being convinced that Bitcoin is the currency that will bring a new perspective on what concerns the term "money". F.M. Ametrano (2016) said that Bitcoin created a competitive environment between digital coins and money circulating on the fiduciary principle, or money that runs on a trustworthy basis, which puts virtual Bitcoin money in the position of the future internationally accepted payment means. Although, Bitcoin is currently rated as the most traded virtual currency with a market capitalization of 216 billion US dollars at the end of 2017 (www.coinmarketcap.com, accessed on February 25, 2018), its main objective remains the electronic commerce. Malhora (2014) asserted the fact that Satoshi Nakamoto, presumed “the creator of Bitcoin”, conceived this currency as an autonomous monetary system, simultaneously fulfilling the function of money and the means of online payment, the novelty element being related to the parties involved in the transaction accomplishment, because e-commerce is traditionally done through an intermediary, but with the emergence of Blockchain technology, transactions are made between partners without the intervention of an intermediary (*peer-to-peer*).

The value of a financial asset can be measured by various methods, but fundamentally, a financial asset (shares, bonds, etc.) can also be expressed by a fundamental value, this being the market value of a supported asset based on credible information that supports price dynamics. Such information may be generated in the case of shares, mainly by the financial statements of that company, including half-yearly and quarterly financial statements. In case of bitcoin, it is made up of nothing more than bits (Alstyne, 2014). Alstyne (2014) provides an answer related to the reason why Bitcoin has market value, as long as it is not backed by any support, such as sovereign bonds that are covered by treasury certificates issued by to the US Treasury.

First of all, even if Bitcoin has no fundamental value (Cheah et al., 2015), Bitcoin still has a technical value represented by the problem-solving algorithm, each virtual coin having a public key that can record a transaction highlighting the three components (buyer, seller, and quantity), the amount of bitcoin not being able to be copied with the software key that does not allow the use of coins but that of their owner. The initial purpose of this e-commerce support coin allowed the use of bitcoin at a zero transaction cost, which led to an increase in its use especially by low-activity traders with a profit of around 5% -10% of the transaction.

Since its launch in 2009, the virtual currency price has seen significant increases overtaking the yields of companies' shares and national indices. Since the beginning of 2013, the virtual currency has seen massive increases, with the end of the year characterized by a fall in the stock market price. The study divides the price dynamics during 2013 into four moments, which have had an impact on the future developments of Bitcoin. In March 2013, Cyprus decided to increase bank deposit taxes, which created a panic at European level, many European citizens looking for a solution to protect themselves against the fall of the Euro. Therefore, they decided to convert the Euro into the virtual Bitcoin currency (Warner, 2013). The United States' financial debt limitation was an investment issue, a global financial problem, the moment when the attention of many turned to the decentralized monetary system, making the virtual Bitcoin currency a possible candidate, so the demand for this currency is rising

(Fontevecchia, 2013). In November of the same year, the interest shown by the Chinese in Bitcoin, as well as rising demand, was a determinant of Bitcoin growth (Hill, 2014).

The rapid rise in the virtual currency drew the attention of the Chinese government that decided to suspend transactions and its acceptance as a means of payment in December 2013, which led to a 50% fall in the stock price from $ 1,132 to $ 542 (Hill, 2014). Bitcoin is traded at roughly $ 7,000, the historic maximum being set on December 17, 2017, when the value of a Bitcoin reached approximately $ 19,665.

Growing interest from investors looking for new financial instruments to diversify their investment portfolio as well as accepting Bitcoin as the means of payment has attracted the attention of financial authorities. The first step towards regulation in the area of cryptocurrency was represented by the legislative framework drawn up by the Belarusian authorities (Lubomir Tassev, 2018). Thus, the virtual currency could be accounted for its destination as a financial asset acquired for the purpose of maintaining the long-term or short-term income that generates income for the person holding it or as a commodity that can be sold further. Venter (2016) presented the need to develop a new legal framework in the IASB for the presentation and accounting of virtual currencies. Currently, the current company's approach to accounting for Bitcoin's assets is the following standards: IAS 7, “Cash Flow Statement”, IAS 39, “Financial Instruments: Recognition and Measurement”, IAS 2, “Inventories”, and IAS 38, “Intangible Assets”.

2.2.2. Bitcoin’s evolution in the context of speculative bubbles

The speculative bubbles represent a financial cycle characterized by a price increase determined by the interest of the participants who trade the asset and generate an imbalance between the fundamental value and the value at the actual moment, giving rise to the speculative bubble. After the rising trend of growth, there is a period of decline, a drop that creates a shock on the world's biggest financial markets. Rosser (1997) classifies the term „speculative bubble” into two broad categories: rational bubbles, at which time investors know about its existence and can make a decision in this regard and irrational bubbles, when investors are driven by the market feeling, feeling not correlated to the fundamental value of that asset. Cheung (2013) exemplifies the causes through which these financial imbalances can arise, among which are listed cases that refer to regulatory elements such as: inadequate market infrastructure in terms of information flow (Taipalus, 2012), inadequate regulation (Sornette, 2003), overestimation of some information or growth prospects (Shiller, 2000) and over-selling of that element (Vogel, 2010). The largest speculative bubbles that have remained in history were: the *Tulipmania* crisis (Holland, 1637-1638), the *Mississippi* bubble and the *South Sea Company* bubble. In the first case, investors bought and sold tulip bulbs, considered at the time a symbol, this "asset" being an element that was speculated until 1637, when the speculative bubble burst, many traders who purchased significant quantities of tulips having suffered significant losses. The other two bubbles were characterized by investment of large amounts of cash in the capital of some monopolistic companies that led to the increase in the value of that company until the public discovery that the companies were overvalued, their value being higher than the fundamental value that led to the collapse in 1720.

Cheah & Fry (2015) studied the virtual Bitcoin currency price between July 2010 and December 2012 and November 2012 to November 2013, respectively, and concluded that the Bitcoin price is overvalued, which determines the presence of a speculative bubble, more important being Cheah & Fry's (2015) discovery of the emergence of a speculative bubble at the beginning of 2013. In order to analyze the hypothesis that Bitcoin is a speculative vehicle, Baek & Elbeck (2015) used an econometric regression model in which the price fluctuation of Bitcoin was the dependent variable, while the main macroeconomic indicators as well as the spread between the maximum price and the minimum of the day of the virtual currency were the independent variables, the significant element of the regression being the maximum and minimum price of the Bitcoin, from which the study conclude that the profitability of the Bitcoin market is driven by investors, with the other indicators not having a significant influence. The most recent speculative bubble was recorded on February 2, 2018, when the DJIA index fell by 666 points, a phenomenon due to higher yields on the bond market, many investors wondering whether this increase in returns provided by bonds and wage increases can also trigger inflation. As for Bitcoin, the study can identify similar factors that could determine that the virtual

currency is in a speculative bubble: inadequate regulation, overselling, and overestimation of growth prospects. As mentioned in section 2.1.1. Bitcoin has no fundamental value, but buy-in buyers rely on the computer algorithm, considered indestructible, with a limitation in the number of virtual currencies and operating on an unregulated market.

2.3. The development of research hypothesis

For the modern investor, diversification of the investments' portfolio represents a way of reducing the risk associated with depreciation of the component assets. Bitcoin, viewed from the position of a financial instrument represents another asset used in the investment process. Also, along with the literature which has been presented above, the present paper wants to test the following hypothesis:

H1: The cryptocurrencies prices are inverse correlated with the evolution of the companies' stock prices listed on Bucharest Stock Exchange, at the time of publication of the financial statements.

3. Research methodology

The present paper proposes to study the correlation between the stock prices, for the companies which are listed on Bucharest Stock Exchange, and the cryptocurrency market price, represented by the digital currency Bitcoin, in the context in which investors present a high investment tendency for the cryptocurrencies field. Hence, the paper has an empirical character through the factors that are analyzed: rate of returns, stock prices and Bitcoin price.

3.1. The estimation of the financial information influence over the market

The influence of the financial information represents for many researchers, a starting point in terms of providing an answer about the position and performance of a particular company or about an index which is available for trading purposes. Therefore, among the most representative models for value relevance measures is the Ohlson model (1995).

Ohlson model (1995) represents a valuation model for the relevance of financial information, which is presented in relation number 1.

$$P_t = \beta_0 + \beta_1 ANCPS_t + \beta_2 EPS_t + \varepsilon_t \quad (1)$$

The variable presented in the model are:

P_t – the stock price at the half of the fiscal year t+1;

$ANCPS_t$ – book value per share at the end of the year t;

EPS_t – earnings per share at the end of the fiscal year t;

$\beta_{0;1;2;}$ – regression coefficients;

ε_t – error term, a random variable;

The value relevance is measured by using R square (R^2), where elements such as earnings per share and book value per share are measured in order to explain the changes in the stock price.

Basu (1997) has analyzed the relation between positive and negative results of a company and their stock prices. The results concluded that the persistence of the negative changes in the structure of results is more pronounced than in the case of the positive changes that occur in the structure of results. The equation is presented in relation number 2.

$$\frac{X_{it}}{P_{it-1}} = \gamma_0 + \gamma_1 DR_{it} + \gamma_0 R_{it} + \gamma_1 R_{it} * DR_{it} \quad (2)$$

The variables presented in the model are:

$\frac{X_{it}}{P_{it-1}}$ – earnings per share during the fiscal year T and the share price at the beginning of the fiscal year;

DR_{it} – dummy variable which sets out the condition of $R_{it} < 0$, whose value is 1, failing this, its value is 0;

R_{it} represents the profitability of the firm.

The same way as the Ohlson model, the value relevance is measured by using R square (R^2), in order to explain the variation of the stock prices through the earnings per share element and those two dummy variables.

3.2. Testing the influence of Bitcoin over the financial market

Bitcoin as an international financial instrument came into the attention of academic sector in 2013, at the moment when Bitcoin has exceeded the returns provided by other financial instruments such as: bonds, stocks,

options and others. The first country which reacted in this context was China, which in December 2013 decided to suspend Bitcoin transactions, which caused a drop in the price of the virtual currency of approximately 50%. The academic sector decided to analyze the international consequences that this unregulated asset could have after this violent drop at an international level.

Baek & Elbeck (2014) analyzed the cryptocurrency price between July 2010 and February 2014, by examining data regarding the main macroeconomic indexes. The equation is presented in relation no.3.

$$R_t = \beta_0 + \beta_1 \Delta cpi + \beta_2 \Delta ip_t + \beta_3 \Delta rpce_t + \\ + \beta_4 \Delta sp500_t + \beta_5 \Delta TN_t + \beta_6 \Delta euro_t + \\ + \beta_7 \Delta unemployment_t + \beta_8 \Delta spread_t + \varepsilon_t \quad (3)$$

Where:

R_t represents the monthly changes in the Bitcoin price;

Δcpi represents the monthly changes of the consumer price index;

Δip_t represents the monthly changes of industrial production;

$\Delta rpce_t$ represents the monthly changes of the real personal consumption expenditures;

$\Delta sp500_t$ represents the monthly changes of Standard & Poor's 500 index;

ΔTN_t represents the monthly variation in the 10-year Treasury notes;

$\Delta euro_t$ represents the monthly changes of the euro exchange rate;

$\Delta unemployment_t$ represents the monthly changes in national average unemployment rate;

$\Delta spread_t$ represents the monthly changes in the spread between daily high and low Bitcoin prices;

In order to confirm the analyzed hypothesis, R square has been used, the result of the econometric regression presented that the monthly changes variation can be explained by the difference between daily maximum and minimum Bitcoin prices, as a significant element at an alfa risk of 0.01. Therefore, the study has concluded that Bitcoin price is not influenced by the external factors represented by macroeconomics indexes, on the contrary Bitcoin price is influenced by the participants involved in the virtual currency selling-buying process.

3.3. Population, sample and data source

The current section wants to present the total population, as well as the criteria used in the selection of the sample from the total population of BET companies. The variables used in the empirical analyze will be presented, as well as the source of data.

3.3.1. Sample data

The population studied in the present paper is represented by the companies listed on the Bucharest Stock Exchange, component companies of the national Bucharest Stock Exchange index (BET Index). From the total of 12 companies operating in different areas of activity such as: banking sector, oil sector, medical sector and so on, which constitute the BET index, a number of 6 companies has been extracted, the availability of the financial statements and stock prices being the selection criteria. The financial data which have been processed and used in the empirical analyze have been taken over from the financial statements of the companies during the period 2012-2016. The elements from the financial statements which are of interest for the study have been: Operating Result, Total Assets, Total Debts, Owner's Equity and Net Result. The elements previously mentioned have allowed calculation of the three of the most important rate of returns. The prices of Bitcoin and firms which constitute the sample, have been taken over from www.investing.com, the prices which were used in the model being the daily open prices. The data and econometric models have been processed using SPSS 20.0.

3.3.2. The econometric models used in the research

The variables used to develop the econometric models are represented, on one hand, by the companies' stock prices and the Bitcoin price, both being expressed in logarithmic scale and, on the other hand, by the return on equities, return on assets and financial leverage. The empirical models used in the present paper are represented by two multiple regression models, through which the study is going to analyze, as a first step, the influence of rate of returns on companies' stock price.

$$\text{Company\_Price} = \beta_0 + \beta_1 ROE + \beta_2 ROA + \beta_3 FL + \varepsilon \quad (4)$$

where:

Company_Price = $\ln\left(\frac{P_1-P_0}{P_0}\right)$;

P_1 – represents the stock price on 31.12.N;

P_0 – represents the stock price on 01.01.N;

$(P_1 - P_0)$ – represents the diference between the stock price on 31.12.N and the stock price on 01.01.N;

ROE – return on equity;

ROA – return on assets;

FL – financial leverage;

βi, i = $\overline{1,3}$ - represents the regression coefficients;

ε = error random variable;

The next step of the empirical approach is represented by the standardization of equation number 4 and analyzing the relation with the Bitcoin price. The equation is presented in relation number 5.

$$\text{Standard\_Company} = \beta_0 + \beta_1 \text{Bitcoin\_Price} + \varepsilon \quad (5)$$

Where:

Standard_Company - represents the standardized equation of the econometric model presented in relation number 4.

Bitcoin Price – $\ln(P_1/P_0)$

$\ln(P_1/P_0)$ – represents the logarithmic changes in the Bitcoin price;

βi - represents the regression coefficients;

ε = residual component;

4. Results and discussions

Starting from the proposed objectives, the study aims to present the influence of return ratios and financial leverage on companies' stock prices. The standardization of the first econometric relationship to allow us to study the influence that Bitcoin's virtual currency has on the investors' investment behavior. The equations used are shown in **Table no. 4**, respectively relationship no 5.

4.1. Descriptive statistics

The results of the descriptive statistics are presented in **Table no. 2** and indicate for the total sample (n) a number of 30 observations, where are presented the averages of the return ratios and financial leverage, calculated on the basis of the items included in the financial statements. The mean of the analyzed variables is positive, ROE presenting that companies which are included in the sample, in terms of net result and owner's equity are positive which have a positive impact over the stock price. The use of assets efficiency' value being 0,0795 is reflecting the operating income and total assets as being positive in the analyzed period. The financial leverage has the highest value comparing to other variables, because the companies present in their financial statements a value of total debts higher than owner's equity. The companies' stock price presents a positive value, which can represent that companies based on the financial statements have recorded a positive trend on the market.

Table no.1. Descriptive statistics

	N	Minimum	Maximum	Mean	Std. Deviation
ROE	30	-0,0747	0,1850	0,0734	0,0650
ROA	30	-0,0429	0,6232	0,0795	0,1130
FL	30	0,0000	8,1200	1,5513	2,7030
Company Price	30	-0,3410	0,6180	0,0494	0,2356
Valid N	30				

Source: Own processing in SPSS 22.0

The results of the descriptive statistics are presented in **Table no. 2** and indicate for the total sample (n) a number of 30 observations, where are presented the company's stock prices and the Bitcoin averages. The mean of standardized equation of companies' stock prices are positive, while the mean of Bitcoin price is negative. Based on these results, the difference between the positive sign of stock prices and the negative sign of Bitcoin price could present the backward correlation in the analyzed period.

Table no. 2. Descriptive statistics

	N	Minimum	Maximum	Mean	Std. Deviation
Standard_ Company	30	-0,2045	0,3664	0,0494	0,1247
Bitcoin_Price	30	-0,0090	0,003	-0,0018	0,0046
Valid N (listwise)	30				

Source: Own processing in SPSS 22.0

4.2. Results on the impact of financial statements on the financial market

Table no. 3 presents the correlation and determination coefficients calculated on the basis of the econometric equation no. 4, where we can see the direct average intensity link between the company's stock price and the company's profitability ratios, calculated on the basis of the elements taken from the financial statements of the company. The relation between the two types of variables demonstrates the value relevance of financial data provided by the companies, with positive and negative events being found in the stock price of the shares. By analyzing the determination coefficient (R square), we can present the fact that the shown items, on return rates basis, explains the variation of the stock price fluctuation for approximately 28%.

Table no. 3. Statistics regarding model no. 4

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	0,529[a]	0,280	0,197	0,2111

a. Predictors: (Constant), FL, ROA, ROE

Source: Own processing in SPSS 22.0

The parameters estimates for the econometric model are presented in **Table no. 4**, where each parameter is explained by its relation to the market price of the listed companies. The positive sign of the parameters of the analyzed model indicate the direct link with the stock price, but significant for the analyzed model is the return on equity and return on assets, as the financial leverage has no significant influence on the model. Depending on their influence on the dependent variable, we can say that the return on equity has the greatest influence on the price, because the investors are interested, on the one hand, of the net result of the company, viewed as an indicator of performance, but also as an opportunity of increase of the own financial sources by dividends collecting, and on the other hand the size of the own equities may influence the decision-taking process on the number of shares issued by the company. A company that has issued a large number of shares can influence the net earnings per share in a negative sense, investors being interested in a bigger gain. Tracking the moment when the company distributes dividends may be another opportunity that investors can exploit to diversify their investment portfolio by engaging in short selling operations that will allow the coverage of the stock price decrease, when dividends are distributed. The operating result, component of the return on assets, influences the stock price by measuring the efficiency of the use of financial resources in the exploitation activity.

Table no. 4. Parameters estimates for model no.4

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.
		B	Std. Error	Beta		
1	(Constant)	-0,134	0,077		-1,731	0,095
	ROE	1,443	0,692	0,398	2,084	0,047*
	ROA	0,658	0,367	0,315	1,791	0,085*
	FL	0,016	0,016	0,186	1,001	0,326

Dependent Variable: Company_Price

* significant at a risk of 0.05, respectively 0.1

Source: Own processing in SPSS 22.0

The correlations of the analyzed model are presented in **Table no. 5**, where we can see the significant link between the stock price and the financial ratios. However, we can observe the positive correlations between the return on equity and the return on assets, which can explain the efficiency of the activity valued by the operating result, whose value is 0.658, explaining the increase in the net result, on the basis of which the shareholders are remunerated. Also, the financial leverage has a positive correlation with the return on equity, which is explained through the own equities, its size being the one that determines the maximum level of debt that companies can achieve without putting their exploitation activity at risk. The literature recommends that the total debts should not exceed twice the amount of the Company's equity. The debt contracting attracts the increase of the borrowing cost, through interest, penalties and commissions, which will then be reflected in the net result of the company.

Table no. 5. The correlations between the variables included in model no.4

		Company_ Price	ROE	ROA	FL
Person Correlation	Company_Price	1,000	0,415	0,399	-0,059
	ROE	0,415	1,000	0,314	-0,438
	ROA	0,399	0,314	1,000	-0,223
	FL	-0,059	-0,438	-0,223	1,000
Sig. (1-tailed)	Company_Price	0.00	0,011*	0,015*	0,379
	ROE	0,011*	0.00	0,046*	0,008*
	ROA	0,015*	0,046*	0.00	0,118
	FL	0,379	0,008*	0,118	0.00
N	Company_Price	30	30	30	30
	ROE	30	30	30	30
	ROA	30	30	30	30
	FL	30	30	30	30

* significant at a risk of 0.01, respectively 0.05

Source: Own processing in SPSS 22.0

4.3. Results on Bitcoin's influence on the standardized stock price of listed companies

Table no. 6 shows the direct link of weak intensity between the Bitcoin stock price and the stock price that includes the influence of the main rates of returns. The study presents that the exchange rate fluctuation of listed companies only influences the change of the Bitcoin in the proportion of 5.6%. The securities quoted on the Bucharest Stock Exchange are characterized by a low level of volatility, unlike Bitcoin, which is characterized by a high level of volatility. Investors, in order to better manage their risks, are tempted to diversify their investment portfolio by adding uncorrelated or inversely correlated financial instruments that will allow them, in the event of a fall of a security, to cover the loss of other securities, which are part of the investment portfolio.

Table no. 6. Statistics regarding model no. 5

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	0,237[a]	0,056	0,022	0,123

[a] Predictors: (Constant), Bitcoin Price

Source: Own processing in SPSS 22.0

Table no. 7 shows the correlations between the stock price of listed companies and the Bitcoin exchange rate. On the basis of the results obtained, we can sustain that the investors, depending on the capital they hold, will be tempted, during the publication of the favorable financial statements, to invest their funds in the shares of the listed companies, otherwise they will be interested in investing the capital in Bitcoin. The investors are interested, on the one hand, in the long-term investment, but also from earning some income from speculation on the Bitcoin currency. Hence, hiring a long-term position to buy securities and diversifying the portfolio through short-term sell-purchase operations could be key to a meaningful investment portfolio. Therefore, the result obtained in Table 7 validates the hypothesis formulated at the beginning of the study on the reverse correlation between the companies' stock price and the Bitcoin exchange rate.

Table no. 7. The correlations between the variables of model no. 5

		Company_ Standard	Bitcoin Price
Person Correlation	Company_ Standard	1,000	-0,237
	Bitcoin Price	-0,237	1,000
Sig. (1-tailed)	Company_ Standard	0.00	0,104*
	Bitcoin Price	,104*	0.00
N	Company_ Standard	30	30
	Bitcoin Price	30	30

* significant at an associated risk of 0.11

Source: Own processing in SPSS 22.0

From the above presented through **Tables no. 6** and **no. 7**, we can also add the negative sign of the coefficient β1, indicating the inverse relation between the two variables and the investment behavior at the time of publishing the financial statements. The Bitcoin price is significant, so at an increase of one unit of the company's stock price, the Bitcoin price tends to depreciate by 6.41 lei.

Table no. 8. The parameters estimates for model no. 5

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.
		B	Std. Error	Beta		
1	(Constant)	0,038	0,024		1,564	0,129
	Bitcoin Price	-6,408	4,967	-0,237	-1,290	0,208*

Dependent Variable: Companies Standard

* significant at an associated risk of 0.21

Source: Own processing in SPSS 22.0

If we are looking at the obtained results, we can observe that Bitcoin could be used by investors through speculation. These quick earnings that the virtual currency registers have contributed to the increase in the number of transactions, the market value becoming higher sooner than the fundamental value. Thus, the fundamental value being 0 (Cheah et al., 2015), and the Bitcoin price being influenced by the sale-purchase transactions (Baek & Elbeck, 2014), without the presence of a legal framework, may lead to the emergence of speculative bubbles. This investor interest towards the virtual currency could be likened to the Dutch tulip crisis (Shiller, 2018). Therefore, to hedge the risk of a possible speculative bubble, investors could mitigate this risk through hedging operations, which involve investing capital in a wide range of low-risk assets (bonds, treasury bills, etc.). Scaramucci (2015) showed the impact of the 2008-2009 financial crisis on hedging funds, these registering the lowest loss on the market, with an average of 21.37%, while the S&P 500 Total Return index registered decreases of approximately 36.99%, the investment portfolio being based on the investment profile and the risk tolerance of the investor.

5. Conclusions

With the purpose of diversifying the investment portfolio, the investors are interested in finding the best solutions that can guarantee the increase of the invested capital both in the short and the long term. Cheung (2013) drew attention to the fact that the price of the Bitcoin virtual currency is overvalued, the objective of this study being to study the correlation between the stock market price of the companies and the Bitcoin exchange rate as published in the annual financial statements. Return rates used as variables of the empirical model demonstrated the influence of financial statements on the stock market price of the companies, the direct correlation between the independent variables and the dependent variable explaining the fluctuation of the stock price.

The results of the empirical study validated the initial formulated hypothesis regarding the backward correlation between the stock price of quoted companies and the Bitcoin price. This correlation between the two instruments also highlights the emergence of speculative bubbles, which can occur due to massive investments in an asset whose underlying value is lower than the traded price. Basu (1997) concluded that negative events have an impact of two to six times greater than positive events on the stock market price of the companies, the investor being interested in the financial instruments offering the highest returns.

Thus, negative market news influences investment behavior, which leads to a high interest of investors when negative news is published. The limits of this study were represented by the relatively low sample of only 6 listed companies that were selected based on the availability of annual financial statements and daily stock prices. Baek & Elbeck (2014) concluded that the investors directly influence the price of the virtual currency through sale-purchase operations, the fundamental value of the Bitcoin being zero (Cheah et al, 2015), the study propose in future to investigate through time series, the price of the Bitcoin cryptocurrency, in order to determine the existence or the absence of speculative bubbles.

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