



Financial Market Anomalies: efficient market non-existence evidence

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Abstract. This article researches the rightness of efficient market hypothesis. It one more time returns to the almost 30 years proceeding argument between agents' of traditional finance and behavioral finance theories. According to the analysis of scientific literature the evidence of significant advantages of behavioral finance versus traditional finance theory are presented. Financial market anomalies and investors' irrationality suppose quite logic inference about denial of efficient market hypothesis. Because of that in the article more comprehensively the concept of financial market anomalies and investors' irrationality as a cause of this phenomena are discussed. In the conclusion of the article the main idea is introduced: efficient market hypothesis is only the theoretical model, which do not work in reality. Efficient market hypothesis is only the aim to be achieved.

Keywords: traditional finance theory, behavioral finance, financial market anomaly, investors' irrationality, efficient market hypothesis

JEL Classification: G02

I. INTRODUCTION

The real world setting implies dealing with an abundant complexity of financial markets, but modeling human behavior itself presents even greater challenge. Very often it is impossible to explain sudden changes of financial markets by rational behavioral of its participants, which is based on information about the business, its changes, forecasts, etc. In the context of today global crises this tendency is even more evident, that is why behavioral financial models are very important scientific research object.

According to traditional financial theory, the market and its participants are rational "wealth maximizers" and emotions as well as other extraneous factors do not influence people when it comes to make a choices. However, the real market shows many examples then emotions and psychology influence people decisions, causing them to behave in unpredictable or irrational ways. These anomalies prompted academics to look to cognitive psychology to account for the irrational and illogical behaviors that modern finance had failed to explain.

The real world setting implies dealing with an abundant complexity of financial markets, but modeling human behavior itself presents even greater challenge. Very often it is impossible to explain sudden changes of financial markets by rational behavior of its participants, which is based on information about the business, its changes, forecasts, etc. In the context of today global crises this tendency is even more evident, that is why behavioral financial models are very important scientific research object. (Levišauskaitė, Kartašova, 2010).

It is said that an argument is a good way to find the real truth. An argument in science works like an engine, which forces scientists to generate new ideas and evidence in order to prove their theories and approaches. The argument between agents of traditional finance and agents of behavioral finance is one of the most intensive and persistent one in nowadays economics. It is quite difficult to achieve the final inference in this case, because these theories are completely different. Both of them define opposite approaches and explanations of events which happen in the financial markets. The main ideas of these theories are based in antonyms: efficient and inefficient market, rational and irrational investor or Homo economicus and Homo sapiens. Traditional finance theory is an example of the pure science of economics whereas behavioral finance is the symbiosis of economics and psychology.

From the fist sight both theories have sufficient advantages and both of them are good enough to work in theoretical models and they really work. The problem is the adapting of these theories in real financial markets. In the simplest way it is possible to define the financial market as a place, where buyers and sellers meet each other. Exactly in this place sometimes some financial market anomalies occur. In this situation the theory of traditional finance becomes helpless. The question is why? It is not difficult to notice that one of the major elements in the financial market is the human and the collection of human emotions (Faber, 2011). The human makes decisions, which have the impact on financial markets. Economics only can not explain all the reasons of the human decision making process, but psychology can. That is the main reason, why behavioral finance has a significant advantage in explaining financial market anomalies versus traditional finance theory.

The object of this article is financial anomalies as a proof of non-existence of the efficient market. The main focus is on financial anomalies which are caused by irrational investors' behavior.

Tasks of the article:

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- to compare traditional finance and behavioral finance theories;
- to describe the concept of financial market anomaly;
- to identify the irrationality of investors' as a cause of financial market anomalies origin.

The topic of the article is quite relevant, because lack of understanding of investors' behavior causes uncertainty in financial market performance. The disregard of possible financial anomalies distorts the real situation in the financial market. The only believe in traditional finance theories become an obstacle to make profitable and considered investing decisions. Also it is important to mention that one of the traditional market assumptions about non-existence of information asymmetry is one of the identified reasons of the global financial crisis. This fact one more time supposes the importance of this topic.

II. THE CONFLICT OF TRADITIONAL AND BEHAVIORAL FINANCE THEORIES

According to traditional financial theory, the market and its participants are rational "wealth maximizers" and emotions as well as other extraneous factors do not influence people when it comes to make a choices. However, the real market shows many examples then emotions and psychology influence our decisions, causing us to behave in unpredictable or irrational ways. So, the fact is that people frequently behave irrationally, for example, many people purchase lottery tickets in the hope of hitting the big jackpot, though from a purely logical assumption, it does not make sense to buy a lottery ticket when the odds of winning are overwhelming against the ticket holder (roughly 1 in 146 million, or 0.0000006849%, for the famous Powerball jackpot). These anomalies prompted academics to look to cognitive psychology to account for the irrational and illogical behaviors that modern finance had failed to explain.

Modern finance relies on two key assumptions: a rational homosapien and a "fair price" being determined by financial markets. Behavioral finance does not serve as a contradiction to these tenets, but complements them by emphasizing the importance of human psychology and groupthink in financial markets.

Behavioral finance is a relatively young field that offers considerable opportunity for informed investors. In the not-too-distant future, behavioral finance may be formally recognized as the missing link that complements modern finance and explains many market anomalies. Perhaps some market participants will even wonder how it was ever possible to discuss the value of stocks without considering the behavior of buyers and sellers.

We can ask ourselves if these studies will help investors beat the market. After all, rational shortcomings ought to provide plenty of profitable opportunities for wise investors. In practice, however, few if any value investors are deploying behavioral principles to sort out which cheap stocks actually offer returns that can be taken to the bank.

The impact of behavioral finance research still remains greater in academia than in practical money management.

While it points to numerous rational shortcomings, the field offers little in the way of solutions that make money from market manias. Robert Shiller, author of "Irrational Exuberance" (2000), showed that in the late 1990s, the market was in the thick of a bubble. But he couldn't say when it would pop. Similarly, today's behaviorists can't tell us when the market has hit bottom. They can, however, describe what it might look like.

The behavioralists have yet to come up with a coherent model that actually predicts the future rather than merely explains, with the benefit of hindsight, what the market did in the past. The big lesson is that theory doesn't tell people how to beat the market. Instead, it tells us that psychology causes market prices and fundamental values to diverge for a long time.

Behavioral finance offers no investment miracles, but perhaps it can help investors train themselves how to be watchful of their behavior and, in turn, avoid mistakes that will decrease their personal wealth. Although behavioral finance has been gaining support in recent years, it is not without its critics. Some supporters of the efficient market hypothesis, for example, are vocal critics of behavioral finance.

The efficient market hypothesis is considered one of the foundations of modern financial theory. However, the hypothesis does not account for irrationality because it assumes that the market price of a security reflects the impact of all relevant information as it is released.

The most notable critic of behavioral finance is Eugene Fama, the founder of market efficiency theory. Professor Fama suggests that even though there are some anomalies that cannot be explained by modern financial theory, market efficiency should not be totally abandoned in favor of behavioral finance.

In fact, he notes that many of the anomalies found in conventional theories could be considered shorter-term chance events that are eventually corrected over time. In his 1998 paper, entitled "Market Efficiency, Long-Term Returns And Behavioral Finance", Fama argues that many of the findings in behavioral finance appear to contradict each other, and that all in all, behavioral finance itself appears to be a collection of anomalies that can be explained by market efficiency.

Sometimes it seems that the conflict of traditional and so-called behavioral economics theories is endless. The good result of this argument is the constantly changing approach to economics and its transformation. Even novel research methods are created: choice architecture and design economics (Santos, 2011). These new research methods are crucial in improving data analysis of investors' behavior, their decision making characteristics and efficient portfolio managing. It is interesting to notice that there in the behavioral economics the main ideas of traditional economics – rationality and efficiency – are supported, but the interpretation of them is opposite (Santos, 2011). Behavioral economists state that individuals taking place in



the market are more likely Homo economicus than Homo sapiens. It means that people in the market are affected by a lot of factors from outside: mood, weather, relationship and other things, which in most cases do not have any connection with economics. All these external factors force investors to make irrational decisions, which cause big losses. Also the idea of traditional theory of individuals' utility maximization is quite misleading. The problem is that not all participants of the market have precise definition of their preferences. This is the main obstacle to reach maximized utility. Because of that it is very important to concentrate not only to the final result i.e. formed preference, but also to the conditions under which these preferences were made (Heap, 2013). This understanding broadens the concept of utility and state that both are important: final level of the individuals' satisfaction and the process of formation of his preferences. Analysis of different scientific opinions shows that this is the main advantage of behavioral finance theory.

Behavioral finance can be easier integrated into real life. "Assumption of rational man in financial theory is not always the same with the man in real life" (Chakrabarty et al, 2008, p. 194). The disregard of the human factor in real financial market can lead to serious problems. Furthermore, it is essential to understand the interrelationship between the investor behavior and stock price behavior (Deng, 2007). According to Deng, the relationship between stock prices in the past, unit stock price and possible return can be defined as the relationship between a sentence, word and the meaning of the sentence. It is not difficult to realize that in order to understand the meaning of the sentence it is needed to understand every single word in it, even minimal alteration will change the meaning of it. The same situation is with performance of investors and stock prices. The essence of connection between stock prices and investors is investors' interpretation of stock prices changes (Deng, 2007). If the goal is to predict the expected stock price in the most accurate way, disregard of human factors can become fatal. The word "interpretation" itself creates the possibility to both rationality and irrationality to appear. Traditional finance theory would be good in explaining only rational decisions, while irrational ones will be missed.

Market efficiency is another concern where traditional and behavioral finance disagree. The main idea of market efficiency is that prices in the market react to information (Wójcik et al, 2013). This assumption can be explained as non-existence of excess gains, because of perfect information spread in the market. All investors receive the same information and make the same interpretation of it and gain the same profit. "For the stock market to be inefficient, some investors must have advantages with respect to others" (Ferguson, 1983, p. 31). It is important to notice that these advantages can appear in the case of information in the whole, in process of new information analysis, in process of judgment or just because of idiosyncratic behavior (Ferguson, 1983). This behavioral proposition is based on distinction of human thinking. In this case behavioral finance theory partially agrees with traditional theory and states that absence of information asymmetry is

possible, but even in this situation the same information received can be processed absolutely differently by different investors. This peculiarity of financial market proves that efficient market could exist only in theoretical models, but this assumption does not work in reality. It means that excess gains are possible. Despite of significant advantages of behavioral finance theory in explaining market inefficiency phenomena and investors' irrationality this economic theory is still in a relatively weak position in relation to efficient market hypothesis (Wójcik et al, 2013). This situation partially can be explained according to newness of behavioral finance theory (the concept of behavioral finance first was mentioned about 30 years ago). It is difficult to convince traditional finance theory agents in rightness of behavioral ideas. Also behavioral finance has some indications of economics science transformation i.e. changes. Because of that the longer period of time must pass before all changes will be accepted.

The usage of one or another theory in practice has different consequences not only to investors, but to corporate finance and to market regulators too. According to traditional market theory, when market is efficient, cost of equity is an equilibrium cost: no undervaluation or overvaluation is possible. Behavioral finance challenges this theory and states that undervaluation and overvaluation exist in the market and suppose possibility to increase or decrease equity depending on situation (Szyszka, 2007). The right evaluation of company equity leads to correct decision about new equity offerings or buy-backs. It is useful to mention that corporate finance managers are humans also and their decisions are affected by external factors (Szyszka, 2007). The denial of efficient market is quite big challenge to market regulators. In this case it is clear that market regulation is inevitable: it is needed to make market to behave as close as possible to efficient market theory (Szyszka, 2007). This is the goal of policy makers, but inefficient market situation is better for investors. Their irrationality can "help" them to earn bigger profit (Berkstresser, 2010). In conclusion it is possible to say that traditional finance theory is like an aim to be achieved and behavioral finance is the reality, which one more time proves inefficiency and irrationality of existing financial markets.

III. THE CONCEPT OF ANOMALIES IN FINANCIAL MARKET

In the non-investing world an anomaly is identified as a strange or unusual occurrence. In financial markets anomalies refer to situations when a security or group of securities performs contrary to the notion of efficient markets, where security prices are said to reflect all available information at any point in time. Taking into account the constant release and rapid dissemination of new information, it is almost obvious that sometimes efficient markets are hard to achieve and even more difficult to maintain. Financial markets are complex and, as it turned out during the financial crisis, almost unpredictable.

Academics and finance professionals are making attempts to identify and predict enormous market fluctuations, so the appearance and existence of market anomalies become an important scientific research object. In scientific literature many market anomalies are identified. Some of them occur once and disappear, while others are continuously observed in different financial markets (Mačerinskienė Kartašova, 2012).

Financial market anomalies are like the litmus paper, which shows and proves that efficient financial markets do not exist. In order to collect as much information as possible about financial market anomalies plenty of different researches were made. The good example can be the research made by A. Agrawal and K. Tandon. Their research covered stock market returns of 18 countries. The main results of this study showed that almost in all analyzed countries some seasonal (only seasonal anomalies were analyzed) financial anomalies were founded (Agrawal et al., 1994). So the fact that this phenomena exists is clear.

During the analysis of scientific literature it was noticed that researchers found different reason for the appearance of

financial market anomalies. The basic reason is irrational behaviour and decisions of investors. According to basic findings of researches that evaluate financial market anomalies Mačerinskienė and Kartašova (2012) conclude that the main causes of investor irrationality and, as a consequence, the appearance of financial market anomalies are the following:

- false perception and interpretation of information;
- limitations of investors' focus and concentration;
- investors' lack of professionalism and lack of investment experience;
- investors' emotions and cognitive biases such as representativeness, overconfidence, availability and regret aversion, anchoring and the disposition effect.

It is interesting and useful to analyze different approaches of financial anomalies which can be founded in scientific literature. Six different definitions of "financial anomalies" are represented in the table 1.

TABLE 1.
DIFFERENT DEFINITIONS OF FINANCIAL MARKET ANOMALIES

Author	Definition
SANTOS, Ana C., 2011	Anomalies - patterns of judgment and choice that are inconsistent with utility maximization.
BRAV, Alon; HEATON, John B., 2002	A financial anomaly is a documented pattern of price behavior that is inconsistent with the predictions of traditional efficient markets, rational expectations asset pricing theory.
DENG, Min., 2007	Anomaly refers to unexpected event, which could bring opportunities for investors to earn abnormal return, such as seasonal anomalies, etc.
SZYSZKA, Adam., 2007	Observations that are difficult to explain in the traditional framework of financial economics have been named anomalies or puzzles.
KANTOLINSKIY M.I., 2010	Anomalies - stable configurations, which can generate higher revenues compared to the efficient market hypothesis model in the market.
BLOOMFIELD, Robert, 2010	Anomalies - observations inconsistent with the paradigm.

Source: prepared by the authors

According to information given in the table 1 it is possible to make some basic findings about the definition of financial anomaly. First of all, there is no generalized definition of this phenomenon in scientific literature. The three main definitions categories could be distinguished: definitions which are based on relationship between financial anomalies and efficient financial market hypothesis, definitions which are constructed in conformity with excess gains and definitions which have no connection with financial markets, but they are expressed as an inconsistent with the existing paradigm. The last category involves all possible types of anomalies, not only financial market anomalies. Because of that, the most appropriate definition of financial market anomaly is the combination of definitions from the first and second categories. Financial market anomaly – financial market phenomenon which rejects the efficient market hypothesis and provides the excess gain possibility for investors.

In scientific literature there exist two basic competing theories of financial market anomalies: behavioral theories

and rational structural uncertainty theories (Brav et al., 2002). Behavioral theories are based on investors' irrationality, while rational structural uncertainty ones are built on incomplete information about structures of the economy investors are operating in. Both these theories again force to doubt in efficient market hypothesis. The second theory is widely discussed because of the global financial crisis. The latter financial crisis proved that information in financial market is incomplete. Because of that this crisis was not predicted (in complete information conditions the crisis should be predicted), the asset "bubbles" were not identified (before financial crisis started). In general the collapse of financial institutions in the market shows market inefficiency and also information incompleteness (Ball, 2009).

The identification of financial market anomalies is based on the two main steps: identification of mispricing signs and evaluation (economic significance and statistical reliability) of these signs (Khan, 2011). The example of mispricing could be the amount of a corporation's earnings. This



statement confirms the rightness of earlier constructed definition of financial market anomaly. Financial market anomalies in most cases are related with excess gains in the market. Not all cases of mispricing could be interpreted as anomalies. To deal with that problem some statistical estimations should be done.

Financial market anomalies can be caused by the numerous amount of different factors: investors' risk

appetite, income, financial market entry possibility, transactional costs, economical cycles and other different factors (Linciano, 2010). Despite different reasons of financial market anomalies appearance they can be classified into three main categories. The list of financial market anomalies is represented in the table 2.

TABLE 2.
CLASSIFICATION OF FINANCIAL MARKET ANOMALIES

End-of-Quarter Effect	Sector Performance by Calendar Month	Turn-of-the-Month Effect	Day of the Dividend Payments Effect	Inauguration Effect
Annual Worldwide Optimism Cycle Effect	Worst and Best Days of the Year Effect	Third-of-the-Month Effect	Trading Around Option Expiration Days	Election Cycle Effect
12-Month Cycle for Stock Returns Effect	After-January Effect		Half-of-the-Day Effect	Presidential Election Years Effect
Mid-year Point Effect	January Barometer	Labor Day Effect	Last Hour and First Hour Effect	Democratic administrations effect
Two-Year Effect	Monthly Effect	Super Bowl Effect		

Source: prepared by authors according to КАНТОЛИНСКИЙ, М. И. АНОМАЛИИ НА ФОНДОВЫХ РЫНКАХ: ОПРЕДЕЛЕНИЕ И КЛАССИФИКАЦИЯ. ВЕСТНИК, 2010, стр. 26-27.

The table 2 is divided into 3 different colours. The orange colour demonstrates financial market anomalies related with calendar (during all the year period) features. This is the biggest part of the table; it means that calendar features affect investors in the most significant amount of ways. The green one part is also connected with calendar peculiarities, but it includes the shorter period, in most cases it is only some specified day. The purple colour is representing financial anomalies caused by events which are related with the authority changes in the country. According to this classification the main inference could be made: in most cases financial anomalies are caused by psychological biases of investors'. In most cases anomalies are caused not by one psychological factor, but by the relationship between an anomaly and other factors, for example, moon phase, attention, disposition effect or herd behaviour (Brahmana et al, 2012). The information role in financial anomalies appearance is also very important. For instance, anomaly of overreaction comes from the past performance of stock prices (Kaestner, 2006).

Knowing these anomalies may certainly help traders and investors view the stock market in a perspective that it really can become quite unpredictable. But trying to take advantage of such market anomalies for gains may be quite risky. They seem to occur without any explanation. Basing a trading strategy on them would just make it even more difficult to determine whether one beats or gets beaten by the market (Mačerinskiene, Kartašova, 2012).

IV. INVESTORS' IRRATIONALITY AS THE REASON OF FINANCIAL MARKET ANOMALIES

Irrationality is only one small detail in the total picture of descriptive investors' behaviour model. The process of investors' decision making is based on interaction between the investor and environment he is surrounded by. "In the modeling tradition of cognitive science and artificial intelligence, the investor is seen as a learning, adapting, and evolving entity that perceives the environment, processes information, acts, and updates its internal states" (Lovric, 2011, p. 40). It seems that investor is really intelligent person and there is no place for irrationality to appear. On the other hand, crossing the boundaries of pure theory and coming closer to real life some irrationality aspects could be noticed. In most cases the consequences of irrational investors' behavior are highly-priced (La Blanc et al, 2005). That is why it is very important to control and manage this phenomenon in financial market.

The main reasons of irrationality are psychological biases such as affection bias, attention bias, heuristic biases and cognitive dissonance (Brahmana et al, 2011). It is quite difficult to determine all reasons of irrationality because it depends on the concrete persons' psychology. The possibility to earn or lose a sum of money stimulates the same part of brain as cocaine or morphine is stimulating (Faber, 2011). Despite of this fact, the persons' reaction to these stimulators may be different. That is the main problem, why it so complicate to predict and manage irrationality of investors'.

Rational investors' behavior, when it is massive, creates the cycles and specific trends (Yudina, 2004). In this situation it is possible to predict financial market behavior.

This assumption was the important impulse to create efficient market hypothesis. However, irrationality in the market exists. This phenomenon demolishes trends and deviation from created theories appears. This described context could be defined as financial market anomaly.

In financial markets there are identified some really interesting interactions between investors' irrationality and other market factors or psychological elements. For example, interaction between irrationality and investors' market sentiment may have more significant impact on investors' behavior than only the fact of sentiment (Grigaliuniene, 2013). Market sentiment affects investors' behavior, but being rational he will decide correctly vice versa irrationality may lead to wrong decisions making. The example of the sentiment even football championship could be (Kaplanski et al, 2011) or weather (Floros, 2011). Weather has impact on investors' behavior in different ways: the impact of the temperature, humidity or amount of sunshine is researched. One more interesting research was made about investors' irrationality and his wealth. According to this study, the wealthier the investor is, less irrational decisions he makes (Vissing-Jorgensen, 2003). It could be explained in this way: in most cases wealthy investors are more experienced. Experience supposes the possibility to avoid irrational decisions because they already know the cost of these mistakes.

Irrationality of investors' may be different during various economical cycles. The assumption could be made about that: if irrationality is caused by psychological biases then psychological shape of investors' changes dependently on the state of economical cycle. For instance, the holiday effect anomaly disappears during the global crisis period (Dumitriu et al, 2012). In the time of economic recession the event of holiday loses its importance, a pre-holiday euphoria declines, it does not affect investors' behavior.

V. CONCLUSION

Modern finance relies on two key assumptions: a rational "homo economicus" and a "fair price" being determined by financial markets. Behavioral finance does not contradict to them, but complements by emphasizing the importance of human psychology and group thinking in financial markets.

Behavioral finance is a relatively young field that offers considerable opportunity for informed investors. In the near future, behavioral finance may be formally recognized as the missing link that combines modern finance and explains many market anomalies. Perhaps some market participants will even wonder how it was ever possible to discuss the value of stocks without considering the behavior of buyers and sellers (Levišauskaitė, Kartašova, 2012).

It should be kept in mind that market anomalies, like the stock market itself, are similar to a weather forecast: there definitely are some recurring patterns, but nobody knows what exactly is going to happen on any particular day. Market anomalies occur more frequently than not, but they do not occur always. Trying to profit from market

anomalies is a risky way to invest as they are very unpredictable. Even more, they are often a product of large-scale data analysis that looks at portfolios made up of hundreds of stocks that deliver just a fractional performance advantage. Since these analyses often exclude real-world effects like commissions, taxes, and bid-ask spreads, the supposed benefits often disappear in the hands of real-world individual investors (Mačerinskienė, Kartašova, 2012).

Science is the reason why we all the time are developing our world and ourselves. But it is crucial to understand that from time to time science could be wrong. In that situation new scientific theories should be accepted. The same situation happened with traditional and behavioral finance theories. It is naive and wrong attitude that market regulates itself. According to made scientific literature analysis it is clear that efficient market could exist only in theoretical models. In practice this hypothesis is denied because of appearance of financial market anomalies. One of the reasons of appearance of this phenomenon in the market is investors' irrationality.

The finance and investment decisions for some decades in the past are based on the assumptions that people make rational decisions and are unbiased in their predictions about the future. Traditional finance has focused on developing tools that investors use to optimize expected return and risk. This endeavor has been fruitful and yielding tools such as pricing models, portfolio theories and option pricing were developed by following these assumptions. But now it is obvious that sometimes people act in irrational way and they do the mistakes in their forecasts for the future. Investors should use these tools in their investments decision making, but they typically do not. This is because psychology affects their decisions more than financial theory does. Today both psychologists and economists agree that investors can be irrational and their predictable decision errors can affect the changes in the markets. That is why it is very important to understand actual investors' behavior and how psychological biases that affect their decision making.

The humans' behavior in the market is affected by a lot of external things and it is false opinion that all investors' decisions are based on his utility maximization. Because of all these facts market efficiency is only the aim to be achieved, but not the proper theoretical model to explain the real market performance. Also it is important to mention, that despite of significant advantages of behavioral finance theory versus traditional one, behavioral finance theory should be developed and more proper explanations should be found to interpret already known and still unknown patterns of all financial market participants' behavior. This idea could be the motive for further studies to be done.

According to Levišauskaitė and Kartašova (2012). The impact of behavioral finance researches still remains greater in academia than in practical money management as far as behavioral finance doesn't offer any investment miracles, but perhaps could help investors to train themselves how to be watchful of their behavior and, in turn, avoid mistakes that will decrease their personal wealth.



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