Economic and Education Transformation: Changing the Financial Paradigm

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Abstract - The formation of a new information paradigm of financial markets is an objective process that is taking place at the moment. The idea of rational consumer behavior in recent times is in question. Increasingly, researchers note the growth of anomalies in making investment decisions and the acquisition of consumer goods by market participants. In this study, attempt has been made to explain such behavior on the example of the stock market. The obtained results allow shaping a new paradigm based on behavioural features of market formation and educational restructuring. The analysis of theoretical studies and empirical evidence became the basis for the development of a new logistics paradigm for financial markets, which explains the anomalies arise when using linear and non-linear paradigm and is based on a modified Efficient Market Hypothesis (EMH). The object of the analysis is the financial market of economically developed countries through the application of event analysis in the original. The information base is the data of the exchanges indices: "Eurex" (European Union), "NASDAQ" (USA), "MICEX-RTS" (Russian Federation); and indexes of confidence – the analytical company: "Sentix" (European Union), "Business-insider" (Australia), "The new York non-profit research organization under the Ministry of Commerce" (USA) and banks: "Bank of Japan", "Federal reserve Bank of St. Louis" (USA); commercial banks: "Alfa-Bank" (Russia), "Natixis" (France) for the period from 8.03.2010 year, on 08.08.2016. The aim of this work is to develop a theoretical basis for the formation of event-driven research base.

Keywords - anomalies of the stock market, information efficiency, entrepreneurship education, educational restructuring, event analysis, efficient market hypothesis (EMH), logistics paradigm.

1. INTRODUCTION

Innovations in education are an endogenous factor of economic growth, the potential of which is realized under the condition of formation of measures of the state influence for the solution of a problem of integration of economy into the world scientific landscape (Khairutdinov et al., 2018; Ali et al., 2018). One of the innovation drivers is the informational efficiency (or simply efficiency) of the stock market is a complex indicator characterizing the change in the price of equity instruments under the influence of various events. Information efficiency is a prerequisite of a completely competitive market, which is the reference point should aspire to the economy of any country (Andreou et al., 2001; Elton et al., 2009; Lebedev, 2011). From the point of view of financial theory, investors make decisions about financial investments, are guided, first, their own goals and preferences from relatively risk and income; secondly, the assessment of profitability of investment opportunities offered by the market, that is, the estimate of the true value of financial assets (Barnard and Simon, 1947; Beaver, 1981; Boldt and Arbit, 1984).

The history of EMH development includes several stages:
1. Bachelier L. (1900) used a mathematical description of the concept of Brownian motion in the dynamics of the stock price movement. This was the first attempt at a mathematical description of the evolution of stock prices (in the Paris market), based on the concept of probability theory.

2. The model built by Norbert Wiener in the 20-ies of XX century makes it possible to make a probabilistic calculation of the position of the Brownian particle at time "t". The "sinuous curves", such as the price charts in the technical analysis, have ceased to be a "thing in itself" within the Wiener model, which can not be calculated in determining the directions of its changes (Wiener, 1923).

3. A. Cowles (1933), G. Woking (1934), on the example of shares of American companies showed that price changes can not be predicted, and brokers using fundamental analysis in their trading strategies can not outgive the market.

4. M.J. Kendall (1953) analyzed 22 price series (using, in contrast to L. Bachelier, price logarithms) with a weekly interval and found that they were, in fact, random. He came to the conclusion that "in the series of prices that are observed over a fairly short interval, the changes are so great that no system can be detected," and finds such behavior close to a random walk.

At the moment, given the fact that the EMH considers the formation of prices as a random walk (Bachelier, 1900; Malkiel and McCue, 1985; Tucker, 1992), or a martingale process (Mandelbrot and Hudson, 2010; Peters, 2004; Shefrin and Statman, 1985) and suggests a normal distribution, non-correlation and stationary of market prices, as well as various kinds of anomalies that can be confirmed empirically, has led to the modeling hypothesis and the transition to the price distribution of a family of Pareto-levy distributions that, is a stage in the evolution of this theory and the preservation of its values and relevance for further research (Shiller,1981; Shiller, 2012; Shleifer, 2000; Tonis, 1990; Tucker, 1992; Verhulst, 1845).

2. BACKGROUND

Some scientists questioned (Akgiray and Booth, 1988; Blattberg and Gonedes, 1974; Grossman and Stiglitz, 1980) use Pareto-levy distributions when modeling the returns of securities as this interferes with the property of invariance of the characteristic exponents (defines "ecowaste" probability density). Subsequent studies showed that the t-student distribution provides a better approximation to the yield, compared with the distribution of the Pareto-levy (Blattberg and Gonedes, 1974; Tucker, 1992). The EMH is based on the fact that investors react to information in a linear way, which is not always true. As an alternative to EMH, developed the fractal market hypothesis and coherent market hypothesis.

The development of the theory of the effective market hypothesis (EMH) is widely represented in foreign and domestic works on this issue.

3. HYPOTHESIS TESTING

To check the fairness of each form of EMH have been a number of studies that have carried out most of the shares traded on the new York stock exchange (NYSE). Besides, it was out of stock, on which there was a complete history of trades, that is liquid. And the higher the liquidity of a particular stock, the more reason to expect that the market for it to be effective. How to conduct similar studies in illiquid assets, it is not very clear, and there remains an open question. Therefore, the results of the studies may be biased in favor of supporting the EMH (table 1).

We investigated the possibility of obtaining a statistically significant improvement over the simple purchase of an asset at the beginning of the study period and selling it at the end (the strategy of "buy and hold"). In those cases, when we studied the selection of assets or slices market by assets, was done correction for risk (beta), it has not turned so that the excess return is provided by a simple increase in risk. Here the excess return was defined as the difference between the
actual investment yield and the yield predicted based on the CAPM, given the beta of the specific stock. It should again be clarified that market efficiency is assumed in the middle — or the slice of the assets. If is a one-time sampling by some parameter, it was conducted on the most available set of assets.

\[ \Delta IF_i = \frac{[IF_{i+1}] - [IF_i]}{K_i} \]  

(1)

2. Moving average deviation (as an indicator of volatility, see formula 2):  

\[ M\Delta IF_i = \frac{\sum_i \Delta IF_i}{n} \]  

(2)

where: the sum is taken from 1 to n, that is n – adjacent days, and after each calculation is shifted one day forward, while the first day is excluded – this is the nature of the moving average (in our case n = 3 days, since the very nature of forgetting after a three-day period dramatically reduces memories of the first day, so three days in our opinion is sufficient);

\[ \Delta IF_i \] – change event-factor the i - th day;

n- the order of the moving average;

i – event day (date) in the period under review;

\[ K_i \] – the number of events per day i.

That is, when the calculation of the change event of the factor base, the value is taken modulo. This is done to ensure that in the presence of a previous negative event factor, the subsequent negative factor is not reduced, but rather intensified it, which is correct based on the logic of formation of this indicator. Next, we should determine the possible values of the coefficient of elasticity of information and their interpretation. As can be seen from the above table (see table 2), our coefficient has two "poles": either the market not associated with the economy – and events do not cause the reaction of the market, or the market shows activity in the background of the event lull, which indirectly confirms the insider effect. However, in the first and in the second case, the market is informational inefficient. In addition, the table contains in the last column the type of market structure. As can be seen from the above table the null hypothesis is the assumption about the absence of the stock market. Criterial boundaries formed on the basis of a common correlation parameter. ( table2 )

4. METHODOLOGY OF EVENT FUNDAMENTAL-TECHNICAL ANALYSIS

Within the event of fundamental and technical analysis of the developed methodological approaches (methods) of estimation of information efficiency of stock market.

The steps in the application of the event study of fundamental and technical analysis (see figure 1).

**Step 1.** Assessment of the historical availability of information, Windows events and informational sources.

**Step 2.** Collecting historical information and the formation of a database of events.

**Step 3.** The identification and description of specific elements associated with the registration of an event.

**Step 4.** Calculation of event profile.

**Step 5.** Calculation of Event factor.

**Step 6.** The calculation of the information elasticity.

As can be seen (see figure 1) from the formula, calculated the average change of event factor. Besides will be used and a moving average (for this we modify the formula of MA). This needs to be done to the scale factor values had a smaller range, as the number of events may differ significantly based on age. The use of average values will give the opportunity for this influence to neutralize. The moving average will also allow you to "smooth" the impact of individual days, which corresponds to the effect one day to another and forgetting, which was mentioned earlier. We will use the following working formulas average deviation:

1. The average deviation (see formula 4):
Thus, logically linked to a theoretical basis for the methodology of our study and the proposed logistics paradigm.

As can be seen according to the "Logistics paradigm" the market is the bimodality of the reactions of market actors up to the inflection point (point "pulse" – the start of its action), there overreaction (if we move on schedule from the bottom up), and after passing the inflection point observed underreaction. Next, you need to determine what methods we will use upon confirmation of the forms of efficient markets hypothesis: the null, weak, medium and strong (the first four hypotheses).

5. SOLUTIONS AND RECOMMENDATIONS

In order to adapt the proposed methodology it is necessary to modify the coefficient of elasticity information (formula 3) replacing average change event-factor on the indexes characterizing the mood of the investors, then the working formula will be as follows, see formula 3:

\[ E = \frac{\Delta \text{ the index of the exchange in } \%}{\Delta \text{ indices of investor sentiment in } \%}, \quad (3) \]

The first index in our list is the Index of investor confidence from Sentix (Sentix Investor Confidence) is a fundamental indicator reflects the opinion of investors and analysts about the current state of the Eurozone economy. It was first presented in March 2006. The investor confidence index is calculated based on a weekly poll of fairly extensive sampling in the survey considered the opinions of about 2,800 participants. Anyone an economist is to take part in the survey release.

The index of investor confidence is a good indicator for forecasting on the European stock market. The combination of the Index of confidence of investors with different economic indicators may help to predict the behavior of various tools in the stock market of Europe. For the calculation we use the data on Index of investor confidence from Sentix index Euro Stoxx 50 (Official website of the stock exchange Eurex Frankfurt AG, n.d.) (FinApex.ru. n.d.) for the period from 8.03.2010, 08.08.2016. Based on these data was formed by a table (see Annex 2, tab. 2, 3), which presents data and calculation of the modified information coefficient of elasticity for the index \( E_s \). Then was built the following schedules: "schedule of combined changes in the Index Sentix Euro Stoxx 50" (see figure 2, "a") and "Coefficient of elasticity information of the Index Sentix Euro Stoxx" (see figure 2, "b").

As can be seen from the figure (figure 2, "a") confirmed the assumption of different directional responses of market actors in different periods. Analysts explain such a reaction positive nature of the responses of stock indices, which does not contradict this conclusion – speculators trying to anticipate the market dynamics that often play against the trend.

But this is not happening, which confirms the conclusion about the logistical nature of the reactions. In addition, the analysis with the help of the chart P-P (standard and remote trend) this ratio shows a very similar distribution with overt anomalies (long tails) (see figure 3).

Important leading economic indicator in Japan is the index business climate consumer confidence. This figure is used to describe the business environment in the country, it is the most accurate and well describe state of the industry in the sector of large-scale production. In Tankan are used data on orders, production, employment, business inventories and export prices-import.


For characteristics favorable or unfavorable conditions for conducting large business uses Tankan Index of Sentiment at Large Manufacturers (the sentiment Index for large manufacturers Tankan), on the basis of which make the calculation of the elasticity information (see Annex 2, table 4) by the
ratio of the increments of the Tankan index and the Tokyo stock exchange index (Official website of the Tokyo stock exchange, n.d.) Nikkei-225 (Official website of the Nikkei Stock Average, n.d.) $(E_{\text{TANKAN}} = \Delta\text{Nikkei-225}/\Delta \text{DI})$. Using these data, construct a similar index Sentix charts "combined chart of the Nikkei-225 Index and Tankan" and "Coefficient of elasticity information Tankan Sentiment Index $E_{\text{TANKAN}} = \Delta\text{ES50}/\Delta \text{DI}" (see figure 5, “a” and “b”).

As can be seen from the data plots there are also zones (marked by grey blocks, figure 14), where there are abnormal reactions: the Tankan index and the Nikkei are trading mixed, which confirms the assumption about the coherence of the market and binary reactions. Correlation analysis revealed a low correlation (at the level of 0,322, see Annex 2, table 5), which confirms the non-linearity and diversity of the reactions of the market to change in fundamental factors. Only a third of the reactions were justified by fundamentals. The analysis of the "information Coefficient of elasticity Tankan Sentiment Index" (see figure 4) also revealed the presence of outliers, which confirms the nonlinearity of the reaction, furthermore a number of emissions are negative – that is, changing one of the indices was reverse.

Analysis using R graphics-P (standard and remote trend) this coefficient also has a similar shape (see figure 5), which confirms the hypothesis of the logistic distribution (the distribution is characterized by long "tails" and S – shaped):

The next indicator in our analysis is the American "investor confidence Index" of State Street, which provides an objective, quantitative measure of global risk tolerance of investors in the world. The index is published at 10 a.m. local time in Boston, Massachusetts on the last Tuesday of each month and includes regional components for separately measuring the risk of institutional investors in North America, Europe and the Asia-Pacific region. The individual weights of these three components vary from month to month based on investment activity and are not published. Also included in the global index, but not published, and exchange activity in South America and the middle East.

The idea of building an index as an indicator of confidence is based on the fraction of assets allocated to bonds and stocks. The prevalence of share capital in bonds suggests that investors have little faith in a speedy recovery.

The index of investor confidence State Street measures confidence based on actual levels of risk in investment portfolios. The confidence index is calculated directly by evaluating the changes of investments into shares. The more institutional investors are ready to invest in a portfolio of stocks, the greater their confidence. The main index is global in nature and is based on activities in 45 countries. The report tracks more than 22 million transactions a year (Official website of the Nikkei Stock Average, n.d.).

As a stock index will use the index NASDAQ.

NASDAQ (Official website of State Street California, Inc., n.d.) – "automated quotation National Association of securities dealers" (National Association of Securities Dealers Automated Quotation). The system began its development in 1969, at the same time, when the beginning of its development itself is a field of high technology. The first auction "the forge of millionaires" as it was later called, began on 8 February 1971, Then its main function was to display the average of quotations over 2500 illiquid securities, which could not for one reason or another to be located on the NYSE (new York stock exchange) and AMEX (American stock exchange). Data exchange at the time was (and still remains) the largest and most prestigious in the world, so the demands placed on them, the stock was very strict. On NASDAQ traded and listed shares not only the American companies, the listing of this exchange can be called truly international, there are companies in Europe and Asia.

On the basis of data on the dynamics of the considered indices was formed by the table, where it was also calculated the Coefficient of elasticity information of the investor confidence Index State Street (Annex 2, table 6).
These data formed the basis for the creation of the graphs "combined graph of changes in investor confidence Index State Street and NASDAQ" (see figure 7, "a") and the "Coefficient of elasticity information of the investor confidence Index State Street" (see figure 6, "b").

As can be seen from the first graph, there is a sufficiently large number of anomalies (marked in units), in fact, they occur systematically: the reactions are not only evaluated as over and underreaction, but are different-vector character. Chart the information the elasticity of the index of confidence (figure 6) also contains a significant amount of emissions and meets the anomalies of the merged graph indexes. So, the considered correlation indexes has a higher value (0.414 see Annex 2, table 7) and evidence of a different orientation reactions of the market participants upon receipt of event data have similar information on the characteristics of fundamental importance

The graph plots a P-P (standard and remote trend) this ratio confirms that the logistic distribution of values (see figure 7) is observed in the binary reactions (normal distribution involves placement near the trend line, and trend eliminated values are similar to sine waves with equal waves at the top and bottom of the graph, which eliminates the asymmetry and bimodality).

The advantage of this type of graph is a reflection of the rank values, which is important for research, as it allows you to see the distribution of abnormal reactions with the diversity of the studied parameters.

Thus, it can be noted that in the Eurozone, USA and Japan, the index of consumer confidence calculated for a long time. They are based on a sample survey of consumers to determine their moods. To date, there is no indicator of trust, which would simultaneously cover all groups of market entities; characterized by the cumulative level of confidence in the economy of these groups; characterized by the trust that is not determined by emotional perception, and the level of economic activity of all subjects of the market and its structure; demonstrated changes in the level of trust cumulative.

In the Russian practice already there are precedents for the construction of indices of trust. You can argue about whether it is legitimate to consider various indexes of consumer sentiment, consumer expectations, consumer confidence, etc. trust indices. Despite all the differences and the shortcomings, no doubt you can think so, because these indicators characterize the level of trust.

In Russia, in a practical with the confidence, perhaps, only Alfa-Bank, which in may 2003, leads him on a monthly basis. The index was intended to be, according to the developers themselves, a leading indicator of investor sentiment towards Russia. The index includes three groups of indicators:

- an indicator of confidence in the stock market (weight 20%);
- an indicator of confidence of foreign investors (37 weight%);
- an indicator of confidence in the economy (weight 43%).

As, on the one hand, multi-factor, confidence, Alfa-Bank still can not be regarded as the most complete because it covers only a group of professional investors. It is obvious that the relation to those or other events professionals, to whom it belongs considering the alpha Bank group of counter parties, and of the inhabitants, including the population, are different and can not be a guide for the integral indicator.

The investor confidence index of Alfa-Bank (AB-ICI), developed in the framework of the joint project of Alfa-Bank and the Russian Economic School (NES), combines multiple series of data about the relationship as portfolio and strategic investors in Russia and is an effective modulation tool to predict the intentions of the investors, size of foreign direct investment and investment flows in the financial markets.

The new index is the first real indicator of investment trends in Russia. The methodology used in constructing the index, allows you to "smooth out" extreme values of individual observations, because it reflects both long-term and medium-term economic trends and less dependent on
short-term changes in the underlying variables.

Index, AB-ICI is calculated at the beginning of each month, starting in June 2003, and is accompanied by a review of economists of Alfa-Bank.

"The investor confidence index Alfa-Bank eliminates the subjective component and gives managers, investors, analysts, and representatives of the business press effective indicator of changes in the investment climate (Official website of Alpha Bank, n.d.). Unfortunately, open access to this index is limited, and the details which can be found in open sources over the year 2012.

However, it is possible to note the development of the company's specialists Smart-lab, who expect an "Index of optimism of investors of Russia" since August 2013 through a survey of 447 respondents (last survey). The index is calculated monthly on the basis of estimates conditions for business, employment, family income and major purchases.

We use the data at this index (Official website of Smart-lab, n.d.) and dynamics of the RTS (Official website of the Moscow Exchange MICEX-RTS, n.d.) for the period from August 2013 to August 2016 and will form a table (see Annex 2, table 8), which presents the dynamics of the considered indices, as well as the information Coefficient of elasticity of the Index of optimism of investors of Russia. Based on the graphs "combined schedule changes the Index of optimism of investors of Russia and RTS" (see figure 8, “a”) and "Coefficient of elasticity information of the Index of optimism of investors of Russia, CPD = DRD/DIR" (see figure figure 8, “b”). From the first graph it appears that there is some anomaly (marked with blocks), but the overall picture is even slightly better compared to previous indices of trust.

Plot a graph of elasticity information of the index of confidence (figure 8, “b”) contains the emissions, which is also celebrated in the form of anomalies combined graph indexes. Correlation of the above indices has a value above the average (0.579, see Annex 2, table 9), however, the directionality of reactions and in this case almost half of the observed deposits is reversed. Graphics P-P (standard and remote trend) this ratio confirms that the logistic distribution of values (see figure 9) – as observed in the binary reactions is a significant deviation from the line normal (logistic) theoretical distribution.

In this regard, we can recall the work of the Nobel laureate in Economics, Robert Shiller (2012) which clearly pointed to the redundancy and lack of reactions, their diversity observed in today's highly-volatile market.

According to Schiller, asset prices are more volatile than fluctuations in fundamental factors even with rational expectations that was shown with the graph of the dynamics of dividends (dash-dotted line) and stock (thick line).

Stock prices, in theory, would have to vary as well as the level of dividends or their expectation in the future, but in practice they jump much stronger. Schiller, in contrast to Fama, made the probability of significant and long-term over-or underestimation of financial assets is influenced by irrational factors (Korneluk, N.D.). Revaluation of assets that is overly optimistic on the "bull markets", leads to an increase in asset prices, the formation of speculative bubbles, boom, euphoria and pyramid schemes.

Thus, the information itself on the growth of quotations is a fundamental event – in fact the stock market itself. "produces" critical news and rumors, leading to a seemingly unmotivated self-expansion of the market. The purpose of this section was the selection of test instruments informational efficiency and performance with their help the analysis of empirical data. Despite the fact that EMH is actually an idealization, which does not fully reflect the actual state, it can serve as a measure of the relative efficiency of the markets. But to use it you need to have a well-developed system of disclosure of information, which, unfortunately, our country is still underdeveloped.

The future direction of research in this area is to develop theoretical and methodological foundations for the use of special software to automate event analysis. It is expected that the use of computer programs is built on the
algorithms of neural networks can be used to analyze sentiment in the media.

6. CONCLUSION

However, as a result of the empirical section, state: the above approach allows conducting research on the efficient market hypothesis in the emerging market and poor awareness on the basis of event analysis. For this purpose, the paper justified the selection of tools for the assessment of information efficiency, the binding of the generated hypotheses and their verification tools developed by the theoretical basis for the formation of event-driven research base, etc.

On the basis of empirical research we have determined the criterion values of the coefficient of elasticity information of the stock market and their interpretation, divided into five groups in accordance with types of market structures (Monopoly; Oligopoly; Monopolistic competition; Perfect competition; Pure monopoly) and with their help, a grouping of all observations. Based on the grouping identified five suspicious cases, when the market was active, is clearly not the appropriate event profile and was received empirical evidence of significant precision (in 4 cases out of five) the use of the proposed method for the detection of insider exposure of the second kind.

Confirmation of logistics distribution pattern was implemented using widely used in the statistics is a powerful tool of graphic analysis of the distribution of the "Probability-probability" (chart P-P). The advantage of this tool is to automatically hold the rank transformation that allows to estimate a distribution with even a few elements of the time series (coefficient of elasticity information). Analysis using this tool, confirms the logistics distribution pattern. So according to the markets of several countries are "long tails" of the distribution that is generally consistent with the binary nature of the generated data (as well as a bimodal nature based on S-shaped track distribution with the theoretically established the trend) and division of market participants into two large groups. The reaction of these groups varies coherent way and depend primarily on psychological factors. For further study of information efficiency, and to identify the actions of insiders is necessary to use a range of monitoring tools, forecasting and provision of liquidity, built, and event analysis.

REFERENCES


Table 1: Factors shaping the information paradigm

<table>
<thead>
<tr>
<th>Factors</th>
<th>The informational paradigm</th>
</tr>
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<tbody>
<tr>
<td>formati</td>
<td>LINEAR</td>
</tr>
<tr>
<td>on</td>
<td>PARADIGM</td>
</tr>
<tr>
<td>Type of analysis</td>
<td>Based on the linear reaction – rate prices securities appropriately modified events in accordance with the EMH (Fama &amp; French, 1996)</td>
</tr>
<tr>
<td>Technical</td>
<td>The “new&quot; technical analysis graphics that are generated manually, that is, slowly enough, that compensates for the emotional effects</td>
</tr>
<tr>
<td>The subjects of the market</td>
<td>Actors of market professionals (brokers, dealers, and brokers) act rationally on the basis of fundamental news and technical analysis simple</td>
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</tbody>
</table>
Table 2: Values of the coefficient of elasticity information the stock market and their interpretation

<table>
<thead>
<tr>
<th>The value of the coefficient</th>
<th>Form elasticity</th>
<th>Interpretation</th>
<th>Type of market structure</th>
</tr>
</thead>
<tbody>
<tr>
<td>$E_{le} &lt; \text{extreme values}$</td>
<td>Completely inelastic</td>
<td>Many events are reflected in the movements – in fact, the market is not connected with the economy of the state. The market is inefficient.</td>
<td>Monopoly (monopsony)</td>
</tr>
<tr>
<td>$0.09 &lt; E_{le} &lt; 0.9$</td>
<td>Not elastic</td>
<td>There underreactive.</td>
<td>Oligopoly</td>
</tr>
<tr>
<td>$E_{le} \approx 1$</td>
<td>Unit elasticity</td>
<td>The market reacts weakly to the events in the country, its share in total economic turnover is negligible. The market is efficient in weak form.</td>
<td>Monopolistic competition</td>
</tr>
<tr>
<td>$(0.9 &lt; E_{le} &lt; 1.1)$</td>
<td>Elastic</td>
<td>Events directly affect the dynamics of the course. The market is efficient.</td>
<td>Perfect</td>
</tr>
<tr>
<td>$1.1 &lt; E_{le} &lt; \text{extreme values}$</td>
<td>Brand elastic</td>
<td>Courses of securities (or index of the exchange) responds instantly to events. The market is efficient in strong form.</td>
<td>competition</td>
</tr>
<tr>
<td>$E_{le} = \text{extreme values}$ *</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

* – extreme value is determined empirically based on the analysis of emissions.
Figure 1. Stages of information effectiveness evaluation based on event analysis
Figure 2. Analysis of the Index Sentix Euro – Stoxx 50 dynamics according to the proposed methodology: a) Combined schedule of changes in the Index Sentix Euro Stoxx 50 (the gray boxes represent the different directions of the researched indicators); b) Coefficient information of the elasticity Index Sentix κ Euro Stoxx 50 (EIS = ΔES50(%) / ΔIS(%)).

Figure 3. Chart P-P "Coefficient of elasticity information Index Sentix" (EIS)
Figure 4. Analysis of the Index Nikkei-225 – Tankan dynamics according to the proposed Methodology: a) United chart Index Nikkei-225 and Tankan; b) The coefficient of elasticity information Tankan Sentiment Index \( E_{TANKAN} = \frac{\Delta ES50}{\Delta DI} \)

Figure 5. Chart P-P "Coefficient of elasticity information Index Tankan Sentiment Index (DI)"
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Figure 7. Chart P-P «State Street Investor Confidence Index»
Figure 8. Analysis of the Index State Street – NASDAQ dynamics according to the proposed methodology: a) Combined graph of changes in the Index of optimism of investors of Russia and RTS (the gray boxes represent the different directions of the research indicators); b) Coefficient information of the elasticity Index of optimism of investors of Russia, CPD=DRD/DIR

Figure 9. Chart P-P "Index of optimism of investors of Russia"