



## THE EVALUATION OF FUNDAMENTAL METHODS EFFECTIVENESS ON THE RUSSIAN STOCK MARKET

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### ABSTRACT

**Objective:** The purpose of the study is a comparative analysis of various fundamental analysis indicators and indicators based on expected levels of return and risk usage. The aim also lies in identifying the most promising of them in the current state of the modern Russian stock market. **Methods:** To achieve this goal, 13 portfolios are formed and analyzed based on the application of various indicators. Both the effectiveness of individual indicators and the methods of their application are compared; index and average levels of profitability are added as an additional basis for comparison. For the purposes of the study, historical data from 2015 to mid-2021 is considered; portfolios are formed as of the first trading day of each year, starting from 2017. **Results:** Based on the results of the study, recommendations for traders on the use of the considered indicators were formed. **Conclusion:** The novelty of the study is the obtained results of comparing the effectiveness of individual groups of indicators used in compiling a portfolio in the modern state of the Russian stock market.

**Keywords:** Investments; Fundamental analysis; Return; Risk; Portfolio; Trading strategies.



## A AVALIAÇÃO DA EFICÁCIA DOS MÉTODOS FUNDAMENTAIS NA BOLSA DE VALORES RUSSA

### RESUMO

**Objetivo:** O objetivo do estudo é uma análise comparativa de vários indicadores de análise fundamental e indicadores baseados em níveis esperados de retorno e utilização de risco. O objetivo também está em identificar os mais promissores no estado atual do moderno mercado de ações russo. **Métodos:** Para atingir este objetivo, 13 carteiras são formadas e analisadas com base na aplicação de diversos indicadores. A eficácia dos indicadores individuais e os métodos de sua aplicação são comparados; O índice e os níveis médios de rentabilidade são adicionados como base adicional de comparação. Para efeitos do estudo, são considerados os dados históricos de 2015 a meados de 2021; as carteiras são formadas a partir do primeiro dia de negociação de cada ano, a partir de 2017. **Resultados:** Com base nos resultados do estudo, foram formadas recomendações para os traders sobre a utilização dos indicadores considerados. **Conclusão:** A novidade do estudo são os resultados obtidos ao comparar a eficácia de grupos individuais de indicadores usados na compilação de uma carteira no estado moderno do mercado de ações russo.

**Palavras-chave:** Investimentos; Análise fundamental; Retorno; Risco; Portfólio; Estratégias de negociação.

### 1 INTRODUCTION

The growth and development of the modern economy largely depends on the fair evaluation of the national companies' assets by the market. This evaluation depends not only on the speed of information inclusion in the market price and the level of information asymmetry inherent in this particular market, but also on many other parameters. Country risks, industry specifics of the national economy, the degree of involvement in global economic processes, the level of economic activity of the population, etc, are all on this list.

The modern Russian market has a wide range of problems caused by the factors named above. One of these problems is the uneven distribution of capitalization between sectors. Thus, the oil and gas sector accounts for almost half of the entire market, while metallurgical and financial companies occupy another third (Kolesnikova, 2019).

Also, high level of risk and a low degree of organization of the entire market as a whole complicate significantly the possibilities of attracting new participants and negatively affect the investment attractiveness of the national economy (Zemlyacheva & Popandopulo, 2018).

In addition, one have to keep in mind that the volumes of the Russian stock market

are significantly inferior to their Western counterparts (Guzhina & Halidov, 2018).

The liquidity problem should be highlighted separately. It can be explored in two different ways. On one hand, there is the lack of general liquidity in the entire market. On the other hand, one can see the uneven distribution of liquidity between different sectors. The first problem is characterized by a general low level of trading. It reduces market efficiency, which does not turn out to be so critical for the Russian market, although it do scares off a number of investors. Meanwhile, the uneven distribution of trades and liquidity causes much more trouble to the Russian economy (Tolkachev & Kotov, 2021).

All the problems above reduce the effectiveness of fundamental analysis methods application in the process of issuers selection while forming the portfolio. That is why the need exists to determine the most effective methods suitable for application on the Russian stock market.

This study compared the effectiveness of various fundamental analysis indicators application with each other, as well as with models based on risk and profitability levels, and with an index strategy. To achieve this, the data for the period from 2015 to 2021 has been analyzed.

## 2 LITERATURE REVIEW

By now, because of some markets inefficiency, researchers face the task of optimizing existing classical trading models for market realities and developing new endemic models applicable in such markets. Therefore, it is not surprising that so much attention is paid to the issues of trading models and portfolio formation.

A common approach to trading on the stock market is the application of fundamental analysis. For this reason, many researchers form models based on these methods. Within it, there are income and comparative approaches. While in most cases the income approach allows you to get a more reliable result, the future income predictions can reduce its effectiveness (Rusjaev, 2013).

The issue of identifying effective indicators is also widely considered. Thus, in the work "Methodological aspects of assessing the investment attractiveness of a company", a number of indicators were selected: P/E, EV/EBITDA, DIV/FCF. It was also revealed that there is no relationship between the beta coefficient of CAPM and fundamental indicators (Nemtseva & Vorozhbickaya, 2021). The effectiveness of P/E at various time intervals and the relationship between this indicator and the change in

the stock price was also considered by S. Park (2021).

A simple rearrangement of the formulas can be used to detect the relationship between finance and market indicators. At the same time, cash flow indicators have a significant effect, due to their impact on the profitability. In general, when analyzing the issuer, it is necessary to take into account the full range of fundamental analysis factors, paying attention not only to absolute indicators, but also to relative ones (Natocheeva et al., 2018).

The effectiveness of fundamental analysis techniques is also considered by M.M. Abdusalamova and A.O. Kurbanov. According to the authors, this approach is the most effective method of evaluating and forecasting the stock price (Abdusalamova & Kurbanov, 2019).

Researchers also pay close attention to liquidity indicator. Along with profit, this indicator is one of the key benchmarks for the investor. At the same time, if profit has been the most important factor for a significant time interval (more than 100 years), then the influence of liquidity is most relevant in modern conditions (Snigaroff & Wroblewski, 2018).

Liquidity impact on stock price and profitability is considered separately. Based on this, asset price determination models that take into account the asset's liquidity risk are formed (Gonzalez-Sanchez et al., 2021). At the same time, S. Hauser and H. Kedar-Levy believe that maximizing liquidity does not always have a positive effect. The increase in liquidity is often accompanied by an increase in the securities volatility, which can lead to higher risk levels. Thus, high liquidity carries within it an additional risk premium – the so-called "liquidity price" (Hauser & Kedar-Levy, 2018).

An important area of trading models research at the present stage is the application of computer technologies and artificial intelligence. The advantage of such methods is that even relatively simple artificial intelligence models that combine fundamental and technical analysis elements are able to predict the stock price movement with sufficient accuracy (Singh & Khushi, 2021).

In many cases, regression models are used to predict the stock price movement. Such models show high efficiency and can be used on the most markets. At the same time, it is important to take into account the various features of individual stock exchanges and, accordingly, adjust the applied model. It is also important to note that most exchanges have a certain correlation between themselves, which, however, may be absent with less significant markets (Khan et al., 2018).

Generalization of stock market trading techniques is considered by D.A. Milhomem

and M.J.P. Dantes in the "Analysis of New Approaches Used in Portfolio Optimization: a Systematic Literature Review". The authors analyzed a wide range of models which include both technical and fundamental analysis tools. Based on this, a wide range of opinions is revealed, as well as the presence of diverse approaches to the trading strategies implementation (Milhomem & Dantas, 2020). C. Edirisinghe, J. Jeong and J. Chen (2020) offer a new approach to portfolio optimization, which allows forming a portfolio with a significant number of securities (1000). Also, new optimization models were proposed in the paper "Fuzzy portfolio optimization model with estimation of results" (Perepelitsa et al., 2016).

The problems of classical trading models optimization are most acute for the modern Russian stock market. L.P. Kharchenko, Yu.S. Zharkova and V.A. Stadnik consider the main features and trends of the Russian stock market for the second decade of the 21st century. The key features are revealed, which are expressed in a significant degree of undervaluation, a high concentration of capitalization and the absence of stable growth rates (Harchenko et al., 2021).

Gulyatkin A.I. in his work "Selection of methods for analyzing shares of the second and third echelon in the formation of an investor's portfolio" compares the stock selection methods taking into account their suitability for possible application in trading securities of the second and third echelon. The study is based on low liquidity and high spreads of such securities, which leads to the impossibility of classical valuation methods usage with normal distribution. It is concluded that for low-liquid securities, the use of the Markovitz model is ineffective, and investors should apply VSA methods (Guljatkin, 2016).

This research is based on a wide range of works on fundamental analysis, trading strategies and portfolio models. It sets the task of evaluating the effectiveness of the fundamental methods application in the modern conditions of the Russian stock market and identifying the most effective approaches to market analysis. The results of the study give better understanding of the investing specifics on the Russian market; create a foundation for a wide range of trading strategies.

### 3 METHODS

The "issuers-by-sector" classifier of the Moscow Exchange identifies 12 sectors (as of 01.07.2021). To conduct the research, it is advisable to take into account those sectors that have sufficient liquidity levels and also have a number of companies that

allow selecting issuers for inclusion in the portfolio. Such sectors include: the Oil and Gas sector, Metals and Mining, Electric Utilities sector, Financial, and the Consumer sector (Tolkachev & Kotov, 2021).

During our research we used data on stocks and issuers obtained from the official websites of the Moscow Stock Exchange (2021), the investing company “FINAM” (2021) and Investing.com (2021).

The study has been conducted at several stages:

- An initial selection of stocks was carried out. The possibility of inclusion of each stock in the portfolio was explored based on the average level of trading volumes.
- The selection of issuers was carried out on the basis of fundamental analysis methods and also by accounting risk and return.
- The return rate of portfolios was calculated based on the actual change in the stocks price for the period under review.

The first step is the initial selection of stocks. Let's consider this process on the example of the Electric Utilities sector. For each stock at the time of the first trading day of 2018, 2019, 2020 and 2021 the average weekly trading volume was calculated based on the historical data from the previous three years. For each of the four periods, a geometric average was calculated (in the previous study, the highest efficiency of this average indicator had been proved when analyzing the liquidity of the Russian stock market (Tolkachev & Kotov, 2021). Stocks with a trading volume below the sector's geometric mean were excluded from consideration. Only those stocks that have been selected in each of the four periods were accepted for further examination.

This process is shown in the Table 1. For ease of perception, the stocks excluded from consideration are highlighted in red; the stocks that have been selected in all four periods are highlighted with a color fill.

**Table 1.** Initial stock selection in the Electric Utilities sector

2015-2017		2016-2018		2017-2019		2018-2020	
Ticker	Volume, ths. rub.	Ticker	Volume, ths. rub.	Ticker	Volume, ths. rub.	Ticker	Volume, ths. rub.
HYDR	2 070 176	HYDR	2 173 543	IRAO	2 245 214	IRAO	3 947 203
FEES	1 700 110	FEES	1 894 473	HYDR	1 983 594	HYDR	2 604 114
IRAO	1 299 073	IRAO	1 764 806	FEES	1 650 364	FEES	1 551 690
RSTI	988 293	RSTI	1 078 849	RSTI	1 032 139	RSTI	1 335 598
UPRO	345 614	UPRO	322 299	UPRO	319 384	UPRO	593 619
MSNG	224 933	MSNG	234 392	OGKB	235 111	OGKB	393 261
OGKB	173 539	OGKB	183 032	MSNG	215 223	TGKA	238 221
TGKA	66 778	LSNGP	99 137	ENRU	125 661	ENRU	191 452
ENRU	52 301	ENRU	92 966	LSNGP	118 049	MSNG	187 509
LSNGP	50 517	TGKA	83 273	TGKA	113 994	MRKP	129 730
IRGZ	40 621	MRKP	59 658	MRKP	110 097	LSNGP	129 447
RSTIP	38 272	RSTIP	43 113	MRKV	50 759	RSTIP	61 679
MRKC	37 280	MRKV	39 984	RSTIP	46 127	MRKV	54 697
MRKP	30 227	MRKC	38 769	MRKC	27 780	TGKB	45 294
MSRS	23 051	IRGZ	34 752	MSRS	23 004	MRKC	33 332
MRKV	19 949	MSRS	25 077	IRGZ	14 859	MSRS	23 299
LSNG	13 153	MRKU	13 647	MRKU	12 928	MRKZ	11 296
TGKB	11 185	LSNG	13 342	TGKB	10 954	LSNG	10 980
TGKD	10 382	TGKB	12 585	LSNG	10 760	MRKU	10 158
MRKU	9 571	TGKD	10 059	MRKZ	9 676	TGKD	9 264
TGKN	5 459	MRKZ	7 158	TGKD	7 893	DVEC	8 256
MRKZ	4 911	DVEC	6 961	DVEC	7 009	IRGZ	7 716
MRKY	3 338	TGKN	5 681	MRKY	6 787	TGKN	7 371
DVEC	2 105	MRKY	5 261	MRKS	6 189	MRKS	7 209
MRKS	1 735	MRKS	2 253	TGKN	2 163	MRKY	6 619
KGKC	20	KGKC	18	KGKC	101	KGKC	536
Geometric mean							
31 397		39 868		43 424		59 169	

As Table 1 shows, only 11 of the 26 instruments passed the primary selection. It is worth mentioning that the structure of top five issuers in terms of trading volume does not change over time.

We repeated the same operation with Oil and Gas, Metals and Mining, Consumer and Financial sectors.

In the Oil and Gas sector, 8 stocks out of 13 were selected, this result is significantly better than in the Electric Utilities sector, which is not surprising given the higher level of liquidity. However, as in the previous case, the sector leaders do not change over time, and the first three companies have a significant gap in terms of trading volume when compared to other issuers.

In the Metals and Mining sector 11 stocks out of 21 were selected. It is worth noting that there is only one clear leader in the sector in terms of trading volume.

After the selection, the Consumer sector is represented by stocks of only 3 issuers out of 8, which makes it unrepresentative for the purposes of the study. The choice of an undervalued/overvalued asset relative to the sector average issuer's value from a

combination of three instruments leads to the fact that only one instrument lies in the zone of undervaluation/overvaluation, which makes it impractical to compare different methods of finding it.

In the Financial sector, 4 out of 8 stocks were selected, with 2 of them belonging to the same issuer, which makes the situation similar to the previous one.

Thus, in the further research, the analysis was carried out in Electric Utilities, Oil and Gas, Metals and Mining sectors. Let's consider it in detail on the example of the first one of them.

The analysis involves the use of three groups of indicators:

- undervaluation/overvaluation;
- profitability;
- return/risk rate.

At the beginning we used the first group. This group of indicators allows to measure the undervaluation/overvaluation levels of a particular stock and to compare it to the average value. There are many indicators of this type, but the principles of their calculation and application are similar. The company's stock value is divided by a value equal to the amount of profit, revenue, cash flow or balance value. In the calculations total or divided per share amount value can be used. Taking into account that various types of profit and revenue can be used in the calculations of these indicators, a huge number of such indicators exists. However, in most cases, when comparing companies from the same sector, a slight change of one indicator in the formula will not have a significant impact on the result. Therefore, it makes no sense to use the entire list of indicators. In our research, we used indicators that are frequently used in practice and values of which differ the most. We also excluded indicators that use book value, since their application implies investments for a longer period than when using the rest, which makes it impractical to compare their effectiveness over an interval of the same duration. Therefore, we used P/E, P/S and EV/EBITDA. Now let's consider these indicators in more detail.

P/E is an undervaluation/overvaluation indicator which uses market price of the share and earnings per share in its calculation formula, which has the following form:

$$P/E = \frac{P}{EPS}, \text{ where:}$$

P – the market price of the share; EPS – earnings per share.

The value of this indicator for selected company is compared with the average value for the sector. If the value is lower than the average, the stock price will rise, if higher,

it will drop.

P/S indicator is mostly similar to P/E. Its only difference is the usage of sales instead of the earnings. Its formula looks as follows:

$$P/S = \frac{P}{SPS}, \text{ where:}$$

P – the market price of the share; SPS – sales per share. This indicator has the same application as P/E.

The calculation of EV/EBITDA indicator is slightly different from P/S and P/E. It uses total values instead of divided per shares. The formula looks this way:

$$EV/EBITDA = \frac{EV}{EBITDA}, \text{ where:}$$

EV – the enterprise value (the market capitalization + the net debt); EBITDA – earnings before interest, taxes, depreciation and amortization.

Its application is similar to P/E and P/S.

All of the indicators mentioned above can be used to predict the future movement of the price. Nevertheless, their effectiveness can vary and each of them has its own strengths and weaknesses. Earnings per share have the greatest impact on the share price of all the parameters considered by these indicators, so in most cases P/E is the most accurate indicator. However, earnings between different periods vary higher than sales, so P/S is the more stable indicator than P/E and it can be more accurate in the long term. The usage of the full enterprise value also has its pros and cons. On the one hand, this allows you to see a more complete picture, but on the other hand, it is the capitalization to which most traders pay their attention, so the usage of additional parameters may be superfluous.

On this stage two methods are used. The first one is the search for the three most undervalued issuers in the sector, while the second one is the sampling of all those in the undervalued zone, regardless of their quantity. In the second case, the undervalued zone is considered a value below the market average by at least 25%. This allows to allocate the real undervalued assets and to avoid accidental mistakes. Further on we call this method “percentage border”. Given that the selection is based on issuers, and not instruments, preferred and ordinary stocks are considered as one instrument; when included in the portfolio, its share is divided in half between the corresponding stocks.

Next we formed portfolios for each time period by selecting three best instruments according to the P/E indicator.

**Table 2.** P/E ratio of the Electric Utilities sector stocks for 2017-2020

Ticker	Year			
	2017	2018	2019	2020
HYDR	4,96	2,93	4,60	5,56
FEES	3,20	2,07	3,11	4,08
IRAO	6,49	5,65	6,43	6,60
RSTI/RSTIP	1,35	1,70	3,58	6,17
UPRO	4,83	9,86	9,52	12,59
MSNG	4,20	3,85	9,36	11,10
OGKB	6,85	4,21	5,17	6,10
TGKA	6,17	2,99	6,22	5,19
ENRU	5,99	4,74	36,42	8,09
LSNGP	6,26	5,10	5,97	5,60
Average	5,03	4,31	9,04	7,11

The sampling is illustrated in the Table 2, the selected issuers are marked in green.

Then we proceed to the use of the undervalued zone. In this case, the portfolio includes all issuers whose P/E index is 25% lower than the sector average.

**Table 3.** Undervaluation/overvaluation levels of the Electric Utilities sector stocks on the basis of P/E indicator for 2017-2020

Ticker	Year			
	2017	2018	2019	2020
HYDR	-1,39%	-32,02%	-49,10%	-21,78%
FEES	-36,38%	-51,97%	-65,59%	-42,60%
IRAO	29,03%	31,09%	-28,86%	-7,15%
RSTI/RSTIP	-73,16%	-60,56%	-60,39%	-13,20%
UPRO	-3,98%	128,77%	5,33%	77,12%
MSNG	-16,50%	-10,67%	3,56%	56,16%
OGKB	36,18%	-2,32%	-42,80%	-14,18%
TGKA	22,66%	-30,63%	-31,18%	-26,98%
ENRU	19,09%	9,98%	302,97%	13,82%
LSNGP	24,45%	18,33%	-33,95%	-21,22%

Table 3 shows that the new sets of instruments differ from ones formed by previous method, although some of the selected instruments coincide.

We repeated the previous steps with the P/S indicator. The results are displayed in Table 4 and Table 5.

**Table 4.** P/S ratio of the Electric Utilities sector stocks for 2017-2020

Ticker	Year			
	2017	2018	2019	2020
HYDR	0,89	0,58	0,65	0,97
FEES	0,85	0,74	1,02	1,19
IRAO	0,41	0,42	0,51	0,51
RSTI/RSTIP	0,17	0,15	0,27	0,27
UPRO	2,08	2,11	2,18	2,32
MSNG	0,53	0,41	0,47	0,49
OGKB	0,35	0,24	0,46	0,67
TGKA	0,52	0,33	0,51	0,48
ENRU	0,69	0,50	0,50	0,67
LSNGP	0,63	0,69	0,86	0,81
Average	0,71	0,62	0,74	0,84

**Table 5.** Undervaluation/overvaluation levels of the Electric Utilities sector stocks on the basis of P/S indicator for 2017-2020

Ticker	Year			
	2017	2018	2019	2020
HYDR	25,00%	-6,00%	-12,52%	15,75%
FEES	19,38%	19,94%	37,28%	42,00%
IRAO	-42,42%	-31,93%	-31,36%	-39,14%
RSTI/RSTIP	-76,12%	-75,69%	-63,66%	-67,78%
UPRO	192,13%	241,98%	193,41%	176,85%
MSNG	-25,56%	-33,55%	-36,74%	-41,53%
OGKB	-50,84%	-61,10%	-38,09%	-20,05%
TGKA	-26,97%	-46,52%	-31,36%	-42,72%
ENRU	-3,09%	-18,96%	-32,71%	-20,05%
LSNGP	-11,52%	11,83%	15,75%	-3,34%

Similarly, we selected by the EV/EBITDA indicator. This process is illustrated in Table 6 and Table 7.

**Table 6.** EV/EBITDA ratio of the Electric Utilities sector stocks for 2017-2020

Ticker	Year			
	2017	2018	2019	2020
HYDR	4,14	3,38	4,08	4,33
FEES	3,34	2,98	3,40	3,61
IRAO	2,10	1,53	1,91	2,62
RSTI/RSTIP	1,98	2,06	2,51	2,66
UPRO	3,29	5,70	5,82	6,60
MSNG	2,25	1,63	4,73	3,14
OGKB	3,87	2,79	3,68	3,98
TGKA	3,13	2,05	2,94	2,70
ENRU	3,91	3,25	2,40	4,77
LSNGP	3,24	2,92	3,12	2,77
Average	3,13	2,83	3,46	3,72

**Table 7.** Undervaluation/overvaluation levels of the Electric Utilities sector stocks on the basis of EV/EBITDA indicator for 2017-2020

Ticker	Year			
	2017	2018	2019	2020
HYDR	32,48%	19,48%	17,95%	16,46%
FEES	6,88%	5,34%	-1,71%	-2,90%
IRAO	-32,80%	-45,92%	-44,78%	-29,53%
RSTI/RSTIP	-36,64%	-27,18%	-27,44%	-28,46%
UPRO	5,28%	101,48%	68,26%	77,51%
MSNG	-28,00%	-42,38%	36,74%	-15,55%
OGKB	23,84%	-1,38%	6,39%	7,05%
TGKA	0,16%	-27,54%	-15,00%	-27,38%
ENRU	25,12%	14,88%	-30,62%	28,29%
LSNGP	3,68%	3,22%	-9,80%	-25,50%

Next, we proceed to the selection of issuers by profitability levels. For this purpose, approaches similar to the previous selection methods were used. However, not the smallest values of indicators, but the largest were selected, and in the second method, the deviation of 25% higher (not lower) than the sector average was a goal.

When choosing issuers, we used two indicators of profitability: return on assets and return on revenue. Taking into account the two selection methods mentioned earlier, this allowed us to form 4 groups.

To begin with, we selected the issuers by the return on assets indicator. As in the previous tables, issuers selected for the portfolio are marked in green (Table 8 and Table 9).

**Table 8.** Return on assets rates of the Electric Utilities companies for 2017-2020

Ticker	Year			
	2017	2018	2019	2020
HYDR	6,1%	7,6%	5,6%	7,1%
FEES	5,4%	7,5%	6,4%	5,2%
IRAO	5,3%	7,7%	10,9%	8,7%
RSTI/RSTIP	5,0%	3,6%	2,9%	1,6%
UPRO	26,2%	12,7%	13,5%	10,2%
MSNG	7,4%	6,5%	2,3%	2,0%
OGKB	3,3%	3,9%	5,3%	5,9%
TGKA	4,6%	6,1%	4,4%	4,3%
ENRU	10,6%	9,2%	1,3%	4,7%
LSNGP	3,4%	5,1%	5,6%	5,5%
Average	7,7%	7,0%	5,8%	5,5%

**Table 9.** Deviations from the average return on assets rates of the Electric Utilities companies for 2017-2020

Ticker	Year			
	2017	2018	2019	2020
HYDR	-21,09%	8,73%	-3,78%	28,62%
FEES	-30,14%	7,30%	9,97%	-5,80%
IRAO	-31,44%	10,16%	87,29%	57,61%
RSTI/RSTIP	-35,32%	-48,50%	-50,17%	-71,01%
UPRO	238,94%	81,69%	131,96%	84,78%
MSNG	-4,27%	-7,01%	-60,48%	-63,77%
OGKB	-57,31%	-44,21%	-8,93%	6,88%
TGKA	-40,49%	-12,73%	-24,40%	-22,10%
ENRU	37,13%	31,62%	-77,66%	-14,86%
LSNGP	-56,02%	-27,04%	-3,78%	-0,36%

Next, we moved on to the return on revenue indicator (Table 10 and Table 11).

**Table 10.** Return on revenue rates of the Electric Utilities companies for 2017-2020

Ticker	Year			
	2017	2018	2019	2020
HYDR	18,0%	19,7%	14,0%	17,5%
FEES	26,6%	35,8%	32,9%	29,2%
IRAO	6,3%	7,5%	7,9%	7,7%
RSTI/RSTIP	12,8%	8,9%	7,5%	4,4%
UPRO	43,2%	21,4%	22,9%	18,3%
MSNG	12,7%	10,8%	5,1%	4,4%
OGKB	5,1%	5,8%	8,9%	11,0%
TGKA	8,4%	11,1%	8,2%	9,3%
ENRU	11,5%	10,5%	1,4%	8,3%
LSNGP	10,0%	13,6%	14,5%	14,5%
Average	15,5%	14,5%	12,3%	12,5%

**Table 11.** Deviations from the average return on revenue rates of the Electric Utilities companies for 2017-2020

Ticker	Year			
	2017	2018	2019	2020
HYDR	16,43%	35,77%	13,54%	40,45%
FEES	72,06%	146,73%	166,83%	134,35%
IRAO	-59,25%	-48,31%	-35,93%	-38,20%
RSTI/RSTIP	-17,21%	-38,66%	-39,17%	-64,69%
UPRO	179,43%	47,48%	85,73%	46,87%
MSNG	-17,85%	-25,57%	-58,64%	-64,69%
OGKB	-67,01%	-60,03%	-27,82%	-11,72%
TGKA	-45,67%	-23,50%	-33,50%	-25,36%
ENRU	-25,61%	-27,64%	-88,65%	-33,39%
LSNGP	-35,32%	-6,27%	17,60%	16,37%

After that we selected the instruments based on their risk and return rates. To do this, we used the average weekly levels of risk and return for every stock in three years. Three portfolios were created for each period: the least risky one, the most profitable

one and the one including instruments with the best risk and return comparison results. In order to avoid accidental mistakes, as in the previous cases, the portfolios of maximum income/minimum risk included three instruments each. The third portfolio included all instruments that have a lower risk with a static return and a higher return with a static risk.

Table 12 shows the selection of instruments for the most profitable and the least risky portfolios.

**Table 12.** Return and risk stocks levels of the Electric Utilities companies for 2017-2020

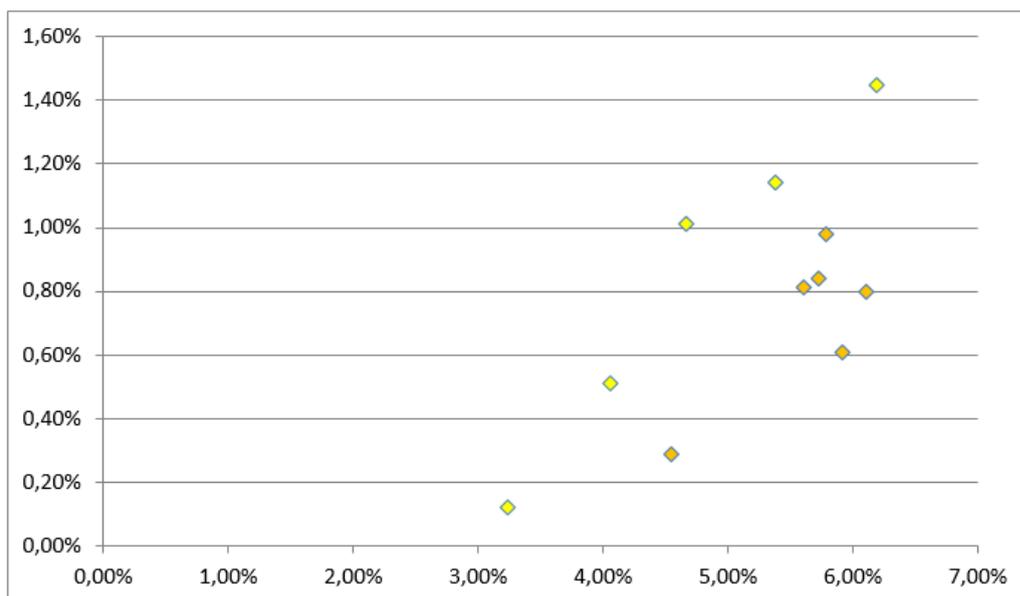
Ticker	Year							
	2017		2018		2019		2020	
	Return rate	Risk rate						
HYDR	0,29%	4,55%	-0,13%	3,81%	-0,28%	3,04%	0,12%	3,75%
FEES	0,98%	5,78%	0,7121%	4,96%	0,09%	3,86%	0,28%	3,95%
IRAO	1,14%	5,38%	0,92%	4,64%	0,24%	3,56%	0,37%	4,21%
RSTI	0,61%	5,92%	0,48%	5,30%	0,24%	4,60%	0,62%	4,94%
UPRO	0,12%	3,23%	-0,08%	2,94%	0,02%	2,54%	0,10%	2,60%
MSGNG	1,01%	4,67%	0,69%	4,66%	0,02%	3,79%	-0,07%	4,03%
OGKB	0,81%	5,61%	0,34%	4,63%	0,17%	4,19%	0,42%	4,73%
TGKA	0,80%	6,11%	0,61%	6,14%	-0,01%	4,19%	0,07%	4,74%
ENRU	0,51%	4,06%	0,33%	4,28%	0,02%	3,64%	-0,25%	3,49%
LSNGP	1,45%	6,19%	1,50%	5,90%	0,72%	4,20%	0,50%	4,56%
RSTIP	0,84%	5,73%	0,7118%	5,86%	-0,10%	4,11%	0,32%	4,96%

The selection for the third portfolio was made by the "risk lowering" method, which consists in the following: in each period, the stock with the highest yield (regardless of its risk) is selected and automatically included in the portfolio. The yield of any other stock is lower than the yield of the selected one, only those stocks whose risk is also lower than the selected stock's risk are included. The selection process is illustrated in Table 13, the selected issuers are highlighted in yellow and the others are orange.

**Table 13.** The stocks selection process on the basis of their risk and return

Ticker	Year							
	2017		2018		2019		2020	
	Return rate	Risk rate						
HYDR	0,29%	4,55%	-0,13%	3,81%	-0,28%	3,04%	0,12%	3,75%
FEES	0,98%	5,78%	0,7121%	4,96%	0,09%	3,86%	0,28%	3,95%
IRAO	1,14%	5,38%	0,92%	4,64%	0,24%	3,56%	0,37%	4,21%
RSTI	0,61%	5,92%	0,48%	5,30%	0,24%	4,60%	0,62%	4,94%
UPRO	0,12%	3,23%	-0,08%	2,94%	0,02%	2,54%	0,10%	2,60%
MSGNG	1,01%	4,67%	0,69%	4,66%	0,02%	3,79%	-0,07%	4,03%
OGKB	0,81%	5,61%	0,34%	4,63%	0,17%	4,19%	0,42%	4,73%
TGKA	0,80%	6,11%	0,61%	6,14%	-0,01%	4,19%	0,07%	4,74%
ENRU	0,51%	4,06%	0,33%	4,28%	0,02%	3,64%	-0,25%	3,49%
LSNGP	1,45%	6,19%	1,50%	5,90%	0,72%	4,20%	0,50%	4,56%
RSTIP	0,84%	5,73%	0,7118%	5,86%	-0,10%	4,11%	0,32%	4,96%

For a better clarification, the portfolio formation process is illustrated on the example of the 2017 period:



**Figure 1.** The stocks selection process on the basis of their risk and return comparison (2017)

The selection of stocks for the Oil and Gas, Metals and Mining companies was carried out in a similar way. Based on the results obtained, portfolios were formed for each selection method and analyzed period.

## 4 RESULTS

All selection systems described in the previous section gave a total of 13 portfolios. The gained values of return rate for each period were calculated, as well as the average value of yield for 3 years for each portfolio. As a comparison base, the index gained profitability (taking into account the weights of individual stocks) for the corresponding periods and the average return rate for all stocks in the sector (excluding the distribution of weights) are given. The result is presented in the Table 14.

**Table 14.** Gained portfolio yield of the Electric Utilities sector for 2017-2020

Group	Portfolio		2017-2018	2018-2019	2019-2020	Average
Undervaluation / Overvaluation	P/E	Top 3	-10,65%	35,61%	22,96%	<b>15,98%</b>
		25%	-3,39%	38,88%	14,77%	<b>16,76%</b>
	P/S	Top 3	-8,34%	59,45%	14,42%	<b>21,84%</b>
		25%	-14,52%	45,62%	4,51%	<b>11,87%</b>
	EV/EBITDA	Top 3	-4,63%	32,82%	4,90%	<b>11,03%</b>
		25%	-4,63%	38,79%	4,90%	<b>13,02%</b>
Profitability	Return on assets	Top 3	-14,38%	13,92%	2,18%	<b>0,58%</b>
		25%	-12,46%	-1,64%	-2,69%	<b>-5,60%</b>
	Return on revenue	Top 3	-12,21%	19,31%	10,70%	<b>5,93%</b>
		25%	-1,73%	19,31%	6,01%	<b>7,86%</b>
Risk and return rate	Return rate		2,65%	37,73%	10,71%	<b>17,03%</b>
	Risk rate		-19,37%	4,25%	9,87%	<b>-1,75%</b>
	Risk and return comparison		-3,39%	35,24%	4,90%	<b>12,25%</b>
Base	Index		-11,06%	28,00%	10,22%	<b>9,05%</b>
	Average		-11,82%	33,24%	10,56%	<b>10,66%</b>

According to results in the Table 14, it can be concluded that the stocks undervaluation/overvaluation indicators application allows investors to get a higher yield than the average sector level, while a separate usage of the profitability levels brings yield below the sector average or losses.

The analysis of portfolios compiled on the basis of historical indicators of risk and return rates clearly illustrates the paradoxes of the Russian stock market. Thus, the portfolio that maximizes return (i.e., ignores risk) showed the second best result out of all 13 (17,03%), while the portfolio that minimizes risk gave the second worst result (-1,75%). It is interesting to note that a portfolio that takes into account both indicators at the same time got a worse result by including an additional parameter, losing almost 5% of profitability on average.

We conducted a similar analysis for the two remaining sectors.

**Table 15.** Gained portfolio yield of the Oil and Gas sector for 2017-2020

Group	Portfolio		2017-2018	2018-2019	2019-2020	Average
Undervaluation / Overvaluation	P/E	Top 3	9,52%	35,36%	-7,96%	<b>12,31%</b>
		25%	9,52%	50,69%	-10,59%	<b>16,54%</b>
	P/S	Top 3	34,14%	30,07%	-7,96%	<b>18,75%</b>
		25%	28,33%	20,92%	-7,96%	<b>13,76%</b>
	EV/EBITDA	Top 3	18,84%	30,07%	-10,63%	<b>12,76%</b>
		25%	31,55%	40,63%	-16,44%	<b>18,58%</b>
Profitability	Return on assets	Top 3	50,86%	16,73%	-13,58%	<b>18,00%</b>
		25%	53,46%	12,69%	-13,58%	<b>17,52%</b>
	Return on revenue	Top 3	24,09%	10,03%	-14,95%	<b>6,39%</b>
		25%	24,09%	15,71%	-13,18%	<b>8,87%</b>
Risk and return rate	Return rate		48,74%	16,73%	-25,49%	<b>13,33%</b>
	Risk rate		25,48%	35,18%	-2,62%	<b>19,35%</b>
	Risk and return comparison		30,56%	28,01%	-23,15%	<b>11,81%</b>
Base	Index		32,66%	26,75%	-13,60%	<b>15,27%</b>
	Average		29,77%	26,27%	-10,50%	<b>15,18%</b>

According to the data presented in Table 15, the group of undervaluation/overvaluation indicators allows investors to exceed the average sector return rate by sector not in every

case. However, the most significant difference is the high efficiency of the return on assets rate application. It is also worth paying attention to the high efficiency of the risk indicator application and the fact that the use of one criteria (profitability or risk) gives a better result than their joint consideration.

**Table 16.** Gained portfolio yield of the Metals and Mining sector for 2017-2020

Group	Portfolio		2017-2018	2018-2019	2019-2020	Average
Undervaluation / Overvaluation	P/E	Top 3	-1,42%	-2,19%	66,24%	<b>20,88%</b>
		25%	9,65%	-5,45%	42,75%	<b>15,65%</b>
	P/S	Top 3	-21,13%	2,85%	8,26%	<b>-3,34%</b>
		25%	-8,43%	0,38%	27,71%	<b>6,55%</b>
	EV/EBITDA	Top 3	23,25%	-6,65%	39,53%	<b>18,71%</b>
		25%	17,26%	-8,18%	36,26%	<b>15,12%</b>
Profitability	Return on assets	Top 3	18,85%	-9,72%	64,28%	<b>24,47%</b>
		25%	22,95%	-9,05%	64,28%	<b>26,06%</b>
	Return on revenue	Top 3	28,70%	7,46%	54,48%	<b>30,21%</b>
		25%	28,70%	7,46%	73,39%	<b>36,52%</b>
Risk and return rate	Return rate		-15,97%	-7,24%	76,18%	<b>17,66%</b>
	Risk rate		9,13%	16,46%	53,78%	<b>26,46%</b>
	Risk and return comparison		1,38%	7,51%	39,80%	<b>16,23%</b>
Base	Index		8,05%	11,69%	50,48%	<b>23,41%</b>
	Average		1,28%	8,60%	35,80%	<b>15,23%</b>

In Table 16, you should pay attention to the significant difference between the return rate of the index and the average return level for all companies. When considering the return rate of individual portfolios, a distinctive feature of this industry is the high efficiency of revenue profitability. Among the undervaluation/overvaluation indicators, the majority allows you to exceed the average yield level, but none makes it possible to beat the index yield. Also, the situation when it is more effective to use risk and return rates indicators separately becomes visible again. In order to determine which of the portfolio formation models is the most effective, we calculated the average per sector yield for each year.

**Table 17.** Average portfolio yield for 2017-2020

Group	Portfolio		2017-2018	2018-2019	2019-2020	Average
Undervaluation / Overvaluation	P/E	Top 3	-0,85%	22,93%	27,08%	<b>16,39%</b>
		25%	5,26%	28,04%	15,64%	<b>16,31%</b>
	P/S	Top 3	1,55%	30,79%	4,91%	<b>12,42%</b>
		25%	1,79%	22,31%	8,09%	<b>10,73%</b>
	EV/EBITDA	Top 3	12,49%	18,75%	11,27%	<b>14,17%</b>
		25%	14,72%	23,75%	8,24%	<b>15,57%</b>
Profitability	Return on assets	Top 3	18,45%	6,98%	17,63%	<b>14,35%</b>
		25%	21,31%	0,67%	16,00%	<b>12,66%</b>
	Return on revenue	Top 3	13,52%	12,27%	16,74%	<b>14,18%</b>
		25%	17,02%	14,16%	22,07%	<b>17,75%</b>
Risk and return rate	Return rate		11,81%	15,74%	20,47%	<b>16,01%</b>
	Risk rate		5,08%	18,63%	20,35%	<b>14,69%</b>
	Risk and return comparison		9,52%	23,59%	7,18%	<b>13,43%</b>
Base	Index		9,89%	22,15%	15,70%	<b>15,91%</b>
	Average		6,41%	22,70%	11,95%	<b>13,69%</b>

While analyzing Table 17, we note that the best result was acquired by the profitability of revenue application together with the 25% criteria. However, when applying the "top three" method, we get a yield below the index level. The P/E indicator gives a high yield in both cases, which is second only to the previously described portfolio. P/S gives the worst result of all the parameters of overestimation/underestimation. It is also important to note that the use of return rate level provides an opportunity to beat the market, and its joint application with risk leads to a worse result than a separate one.

For better consideration, we also checked a system where the selected portfolios are held for more than one year. The decision to maintain or hold a position can be made on the basis of the fundamental undervaluation indicator, provided that a fair or relatively fair revaluation of price by the market did not occur in the first period. For this reason, only the first two groups of indicators (without risk and return rates levels) were taken into account.

In the Table 18 below, model A is the repacking of portfolios (the model we used earlier), model B is the absence of repacking (holding the same instruments for 2 years). Since both models have the same returns for the first years, it is reasonable to compare only the returns for the next year. Therefore, we compared the return rates of the periods 2018-2019 and 2019-2020 from the previously calculated results with the return rates that would have been obtained in the absence of a new stocks selection (the yield of the group "2017-2018" for the period 2018-2019 and the yield of group "2018-2019" for the period 2019-2020). It makes sense to check the reasonability of holding positions for a longer time (3 years or more) only if the results of Model B are superior to Model A. As can be seen in the Table 18, no such results were obtained.

**Table 18.** Asset retention and portfolio repackaging models comparison

Group	Portfolio		Model A		Model B	
			2018-2019	2019-2020	2018-2019	2019-2020
Undervaluation / Overvaluation	P/E	Top 3	22,93%	27,08%	21,52%	11,02%
		25%	28,04%	15,64%	26,78%	11,62%
	P/S	Top 3	30,79%	4,91%	30,39%	4,75%
		25%	22,31%	8,09%	26,15%	3,78%
	EV/EBITDA	Top 3	18,75%	11,27%	17,99%	8,09%
		25%	23,75%	8,24%	22,65%	7,95%
Profitability	Return on assets	Top 3	6,98%	17,63%	7,77%	6,02%
		25%	0,67%	16,00%	4,03%	8,57%
	Return on revenue	Top 3	12,27%	16,74%	14,56%	10,20%
		25%	14,16%	22,07%	14,56%	17,03%
Portfolio average			18,06%	14,77%	18,64%	8,90%
Total average			<b>16,41%</b>		<b>13,77%</b>	

We also had to check what the all previously specified indicators application would

lead to at the current stage (the first half of 2021). The results are presented in Table 19 (EU – Electric Utilities, O&G – Oil and Gas, M&M – Metals and Mining).

**Table 19.** Average portfolio yield for the first half of 2021

Group	Portfolio		EU	O&G	M&M	Average
Undervaluation / Overvaluation	P/E	Top 3	-0,60%	6,19%	30,53%	<b>12,04%</b>
		25%	-3,40%	11,70%	30,53%	<b>12,94%</b>
	P/S	Top 3	-7,25%	23,84%	23,28%	<b>13,29%</b>
		25%	-8,80%	17,33%	23,28%	<b>10,60%</b>
	EV/EBITDA	Top 3	-12,29%	11,63%	15,38%	<b>4,91%</b>
		25%	-9,10%	19,93%	49,77%	<b>20,20%</b>
Profitability	Return on assets	Top 3	-3,51%	5,19%	-7,45%	<b>-1,92%</b>
		25%	-3,51%	5,19%	-7,45%	<b>-1,92%</b>
	Return on revenue	Top 3	0,77%	13,38%	11,32%	<b>8,49%</b>
		25%	0,77%	11,62%	11,32%	<b>7,90%</b>
Risk and return rate	Return rate		-8,86%	22,89%	-7,45%	<b>2,19%</b>
	Risk rate		-3,22%	17,44%	9,27%	<b>7,83%</b>
	Risk and return comparison		-5,62%	20,03%	-0,92%	<b>4,50%</b>
Base	Index		-5,89%	15,85%	2,20%	<b>4,05%</b>
	Average		-6,02%	13,81%	14,65%	<b>7,48%</b>

The results obtained allow us to make conclusions similar to the previous ones. P/E ratio still allows investors to exceed the average yield, while also being the most stable indicator. P/S and EV/EBITDA indicators also show higher returns than average ones, but their performance is significantly lower. It is also worth noting that the profitability of revenue turns out to be a more important signal when choosing stocks in than the profitability of assets.

Better results can be obtained by using not one, but a set of the fundamental assessment indicators. In order to do this, we used the five previously mentioned coefficients (P/E, P/S, EV/EBITDA, return on assets, return on revenue). For their combined application, we employed a parametric estimate. For each period, all issuers were assigned rank values for all five indicators (the issuer with the best fundamental indicator value gets rank 1, next one – 2, and so on). After that, the estimates (ranks) for all five fundamental parameters were added up. All calculations were carried out separately for each sector. At the final stage, three issuers with the best (lowest) rating were selected for each period in every sector. If several issuers got the same score, then they all were taken into portfolio.

This method is illustrated on the example of the electric utilities sector in Table 20, the issuers included in the portfolio are marked in green.

**Table 20.** Parametric assessment of the Electric Utilities issuers

Ticker	Year		
	2017	2018	2019
HYDR	31	26	27
FEES	24	24	20
IRAO	29	27	22
RSTI/RSTIP	14	24	22
UPRO	22	33	32
MSNG	19	23	38
OGKB	40	32	24
TGKA	31	22	29
ENRU	30	30	36
LSNGP	35	34	25

The portfolio yield obtained in this way is presented in Table 21.

**Table 21.** The average return rates on the aggregate fundamental assessment portfolio for 2017-2020

Portfolio		2017-2018	2018-2019	2019-2020	Average
Combination of parameters		12,74%	18,83%	22,59%	<b>18,05%</b>
Base	Index	9,89%	22,15%	15,70%	<b>15,91%</b>
	Average	6,41%	22,70%	11,95%	<b>13,69%</b>

The table allows us to conclude that this method makes it possible to significantly exceed the average or index yield. It should also be noted that the average yield obtained by this method (18.05%) exceeds the highest among all methods that consider only one parameter (17.75%) and has a more stable result over the entire time period.

## 5 CONCLUSIONS

Thus, we can conclude that most of the fundamental indicators allow us to exceed the average level of profitability. However, each of them has its own specifics and can give different results depending on the application method. For this reason, we considered each parameter separately.

The P/E ratio is one of the most effective fundamental indicators. It allows investors to consistently get high returns and rarely leads to errors. It is also worth noting that it can be effectively used in various industries, as well as the fact that the final result practically does not vary depending on the method of its application.

P/S has a significantly lower efficiency when used separately compared to P/E. Its application method also does not play a significant role in the efficiency level. However, it is worth noting that this indicator can give high profitability when used to compare companies that coincide not only by the sector, but also provide similar services or produce similar goods. As an example, we can consider the high efficiency of this

coefficient in the Electric Utilities sector.

The result of EV/EBITDA application can vary significantly. It is advisable to use this coefficient according to the "percentage border" method. It is also worth noting that its application has a certain limitation caused by the possibility of a negative EV (enterprise value). In addition, a thorough check of each company should be carried out before EV/EBITDA usage, since, unlike capitalization, EV does not completely depend on the market valuation.

The profitability levels usage as a stock selection parameter can lead to highly varying levels of yield. At the same time, the return on revenue in most cases is a far more effective coefficient than the return on assets. However, the results show that these parameters should not be used as the only ones during the process of a stock selection.

The study also revealed that levels of return and risk application can be an effective way to obtain additional return. At the same time, investing in stocks that show the highest levels of return turns out to be a more effective way than taking into account return together with risk, or considering only the risk level. However, in this scenario, we completely ignore the current trends, and in the case of sudden changes in the market, there is a high probability of obtaining a reduced yield or a loss.

We also proved that combined usage of different parameters is more effective than application of a single one, even if it is the most accurate indicator. However, it is important to note that the effectiveness of parameters combinations varies depending on the sector to which the issuers in question belong. Therefore, it is useful to separately test such models on the different sectors of the stock market.

Thus, the conducted research has shown that the application of fundamental analysis on the Russian market allows effective investments if following conditions are met:

- investing in sufficiently liquid stocks (checking stocks for primary suitability by the previously mentioned method);
- following the time horizon (from six months to a year);
- applying the most effective indicators;
- using a wide range of indicators.

At the same time, the effectiveness of individual indicators analysis showed that the most effective indicator is P/E. When using other indicators, it is logical to combine them with P/E to increase accuracy. If you are using a method based on risk and return rates calculations, it is advisable to choose in advance what type of portfolio are you

expecting to create (for example, in relation to risk), since an attempt to create an average portfolio in practice turns out to be ineffective.

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