Efficiency of Use of Technical Analysis: Evidences from Russian Stock Market

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Introduction

It is hardly possible that someone can pronounce the exact date of birth of stock markets. Nevertheless, we can conclude for sure that it is not a yesterday creation. There are evidences showing some features of stock market in the sense of its modern interpretation as early as in the XII century (France) [8]. During next nine centuries the centre of gravity in the development of stock market phenomena moves from France to Italy, from Italy to Netherlands and England, from Europe to the USA, from the USA to somewhere else, mostly likely to Asia, with China at the head of it. At the same time it is important to notice that besides centers there is a worldwide expansion of stock markets on the fringes. It is probable, but indeed unrealistic to imagine a country with more or less developed economy without stock market.

The Russian stock market is a relatively new formation of the world “stock markets’ family”. It has became to develop or better to say to recover in the 1990s after the collapse of the USSR; it had a really high rate of development in pre-USSR period, so, for instance, the volume of trade on the biggest Russian stock exchange (Moscow Interbank Currency Exchange) in stock market section grow from $ 0.273 billion in 1993 to $ 618.9 billion in 2009; MICEX index rose from 100 points beginning with 22.09.19971 to 1687.99 points on 30.12.2010 [5].

Today one of the most commonly adopted tools, methods for a working at world stock markets is technical analysis; the Russian stock market is not exclusion. Piotr Zielonka writes that “when the keyword “technical analysis” is put into the Internet seek engine Google, 326,000 URLs are located as opposed to only 49,700 URLs for “portfolio theory.”” [11]. His work refers to 2004. Today, in 2011, these numbers are about 58,300,000 for “technical analysis” vs. 7,180,000 for “portfolio theory” or 11,800,000 for “fundamental analysis”. Based on these figures we can even conclude that its popularity just rocketed in 179 times during last 8 years. Undoubtedly there are as many advocators (basically so-called technicians) of this method as opponents (mainly random walk theory’s “propagandists” and fundamentalists). But at any case first of all it is crucial for every participant of a stock market somehow to measure the efficiency of technical analysis and only then take somebody’s side.

“Technical Analysis involves searching for recurrent and predictable patterns in stock prices” [10]. In other words technical analysis can be determined as a method of evaluating the statistics, historical data (e.g. past price and volume.) to establish “specific rules for buying and selling securities with the objective of maximizing profits and minimizing risk of loss” [9].

This type of analysis “dates back to the Japanese rice traders trading on the Dojima Rice Exchange in Osaka as early as in the 1600s” [10]. The author shares an opinion that the real evolution of technical analysis began with the publications of Dow’s theory in the Wall Street Journal at the beginning of the XX century [8]. Nowadays we can state that technical

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1 Commentary: 22.09.1997 is the date when MICEX index was originated; 30.12.2010 is the last day of trading in 2010.
analysis stays as one of the most widespread methods for an analysis, understanding and forecasting of stock market all over the world.

The author is focusing on the creation and testing of trading systems based on the popular trend following indicator, the moving average, and its combinations in order to measure technical analysis’ efficiency in some way. The main questions which would be stressed during the research are:

1. What is the efficiency of the trading systems based on the selected elements of technical analysis?
2. Which of them do show the greatest efficiency rate?

**Review of Literature**

Mostly in any situation, concerning any question there can be 3 types of opinion: opponents, supporters and neutrals. Undoubtedly it is quite useful to know as many as possible completely different viewpoints so as to build an adequate mirror of situation. Nevertheless, here the author suggests concentrating on supporters’ point of view from all over the world in order to somehow justify and understand prevalence, efficiency and popularity of technical analysis.

One of the pioneers in this sphere - Eugene Fama and Kenneth French examined “autocorrelations of stock returns for increasing holding period. In the results for the 1926-1985 sample period, large negative autocorrelations for return horizons beyond a year are consistent with the hypothesis that mean-reverting price components are important in the variation of returns”. So it can be concluded from their research that about “25-45 percent of the variation of 3-5 year stock returns is predictable from past returns”. [2]

Jeffrey Frankel and Kenneth Froot noted a great prevalence of use of technical analysis in forecasting the market by professionals. The survey by Euromoney shows that there is a great reorientation from fundamental analysis towards technical one during the 1978-1988 periods. They say that “this shift was a natural Bayesian response to the inferior forecasting record of the former group” [4].

A. Antoniou, N. Ergul, P. Holmes and R. Priestley use “daily closing prices for 63 stocks traded on the Istanbul Stock Exchange (ISE) in period January 1988 to December 1993” in order to evaluate the efficiency of returns’ forecast based on seemingly efficient past prices. They found out that technical analysis of past prices plays a significant role in such kind of predictions. Moreover the authors stressed that if this analysis is also accompanied by technical analysis on volume, it can aid the certain credibility to the positive results of these forecasts, especially in case of stocks which have a low level of trading volume. “The rationale for this is based on the premise that volume contains information regarding the quality and arrival of information which is not contained in prices” [1].

Wing-Keung Wong, Meher Manzur, Boat-Kiat Chew investigated the performance of the most established of trend followers, the moving average (single, dual, tripe), and the most frequently used counter-trend indicator, the relative strength index on basis of Singapore Stock Exchange (SES) data. The authors concluded that “single moving average produce the best results, followed by the dual moving average and the relative strength index using ’50 crossover’ method”. This research can serve as the strong verification of use of technical indicators “in the timing of stock market entry and exists”[10].
In spite of fact that “an extensive body of research examining the efficiency of technical analysis on the Polish stock market has shown negative results and no efficient technical analysis tools were found”, Piotr Zielonka presents a justification for the popularity of the technical analysis within professional actors of Polish market. The author does not test the historical data (one of the most famous methods to justify or refute the efficiency of technical analysis), but uses the interviews of 24 financial analysts or dealers employed by banks or Polish capital market institutions. The author finds the great correlation between the popularity of the technical analysis and psychological heuristics [11].

Dimitrios Vassilou, Nykolaos Eriotis, Spyros Papathanasiou examined the popular dual moving averages rules (1-9, 1-15, 1-30, 1-90, and 1-130) on the 20 stocks (basis for the FTSE/ASE-20 Index) of Athens Stock Exchange with the largest capitalization during eleven-year period. The results showed abnormal returns of dual moving average strategy in comparison with buy-hold strategy. There is a basic assumption of the technical analysis models in that research: “the company’s fundamentals, along with broader economic factors and market psychology, are all priced into the stock, removing the need to actually consider these factors separately and the repetitive nature of price movements is attributed to market psychology”. In such way the authors found some doubts about individual rationality assumption of traders and investors and deduced the behavioral phenomenon’s impact on prices justifying the use of technical analysis [9].

So as we can see there are a lot of empirical, theoretical evidences from stock exchanges all over the world, which talk in support of technical analysis use, or at least justify its popularity.

Testing of trading systems
Methodology

The foundation of this paper is the analysis of securities on the Russian Stock Exchange (basis: biggest Russian stock exchange - MICEX) with help of one of the most popular technical instruments – moving average, in order to create a trading system which would show the higher efficiency rate than simple B&H (buy and hold) strategy (if it is possible).

Jack Treynor argues that “people confuse the stock-holding game with the stock-trading game. The stock-holding game is a positive-sum game; buyers of stocks can expect to receive, on average, more than they spend. The stock-trading game, however, is a negative-sum game” [7]. So, basically this statement, this hypothesis will be stressed in this paper.

Firstly let’s determine what moving average is and what its combinations will be used for purposes of this paper. Moving average is widely used indicator within trend followers. On the other hand it means that such type of indicator can be poorly applied during a sideways market (or “flat”). Basically, simple moving average can be determined as “the average close of the past n days, ending in the current day”. “The terms moving average refers to the fact that the set of numbers being averaged is continuously moving through time” [6].

For purposes of this analysis the author is using exponential moving average (or exponentially weighted moving averages). This type of moving average puts more weight on recent prices, so it reacts quicker to recent price changes than a simple moving average
Three basic strategies will be stressed according the use of EMA:

1. *Single moving average:*
   a) Buy order (buy to cover order, in case of short sales) is generated when the closing price crosses above EMA of \( n \)-periods;
   b) Sell order (sell short order, in case of short sales) is generated when the closing price crosses below EMA of \( n \)-periods; \( n \in [10] \).

2. *Dual moving average:*
   a) Buy order (buy to cover order, in case of short sales) is generated when short EMA of \( n_1 \)-periods crosses above long EMA of \( n_2 \)-periods;
   b) Sell order (sell short order, in case of short sales) is generated when the closing price crosses below EMA of \( n \)-periods; \( n_1 \in [9], n_2 \in [0;100] \).

3. *Triple moving average:*
   a) Buy order (buy to cover order, in case of short sales) is generated when short EMA of \( n_1 \)-periods crosses medium EMA of \( n_2 \)-periods and medium EMA goes above long EMA of \( n_3 \)-periods;
   b) Sell order (sell short order, in case of short sales) is generated when short EMA of \( n_1 \)-periods crosses above medium EMA of \( n_2 \)-periods and medium EMA goes above long EMA of \( n_3 \)-periods; \( n_1 \in [9], n_2 \in [0.25] , n_3 \in [6;100] \).

So called “golden cross” and “dead cross” appear in case of dual and triple moving average signals for buying and selling. L. Tvede writes that the best method of use of single moving average is to forget and never use it [8]. Therefore this hypothesis will be investigated during our research as well.

The analysis was accomplished on basis of daily frame, so \( n_i \) means the number of days which was took for the calculation of different EMAs. The optimal value of \( n_i \) for different situation is established from indicated intervals.

Also it is significant to notice that strategic delay for 1 day was included into this trading system; it means that the signal to buy or sell will be implemented only if it was proofed during 1 day. It is some kind of insurance (filter) against sudden turns, fluctuations of market in order to somehow to overcome noise on the market.

The initial equity was determined at 30,000 Rubles level or about $1000 (f.e. 10,000 Rubles is a minimum amount of money needed on balance for opening an account in one of the biggest brokerage in Russia – Finam [3]). Commissions for positions’ opening and closing were also taken into consideration; its amount is 41.3 Rub or $ 1.3 per transaction (on the basis of one of the Finam’s tariff plans).

The period of observation was from 09.01.2007 to 30.12.2010, analyzing issuers listed on the MICEX (one of the biggest stock exchange in Russia).

- **2007 year** - It is important to notice that in 2007 year Russian Federation had the highest GDP growth rate (8.1 %) beginning with 2001, the stock market growth was about 20 % with strongly progressive tendency – really “optimistic season” or “bull year”.
- **2008 year** was marked by the Global Finance Crisis and also Russian-Georgian conflict, which severely influenced the Russian stock market; the fall was about 67.5 % – mainly “bear year”.
- **2009 year** – despite 106 % growth on the market this year can be called as “ambiguous” year, because one half of traders/investors was waiting for the 2nd wave of the Crisis, other

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\[Note: \] Russian stock markets began its operation on 09.01.2007 after New Year holidays.
part had an optimistic point of view about situation on world markets – 23 % and 10 % slumps in July and October; almost 3 month (October-December) consolidation near 1390-1400 resistance level.

• 2010 year – the market grow by 23 %. Almost 9 months (January-September) the market moves in range between 1270-1450 and only beginning with October it began the real growth or so-called “rally” ending the year on 1687,99 level.

Data

The following criteria were established for the choice of instruments:


b) Instruments should be taken into consideration in calculation of one of the MICEX sector indices. There could not be more than one representative from one sector;

c) Instruments should be within 50 most liquid stocks during at least 2010 year period

Based on these assumptions the following instruments were chosen:

1. Novatek (MICEX O&G) - the exploration, production and processing of natural gas and liquid hydrocarbons (http://www.novatek.ru/eng/);

2. Mosenergo (MICEX PWR) - currently the largest generating company operating on fossil fuel (http://www.mosenergo.ru/eng/);

3. MTS (MICEX TLC) - the largest mobile phone operator in Russia and the CIS (http://www.mtsgsm.com);

4. Severstal (MICEX M&M) - Russia’s largest steel producer (http://www.severstal.com/eng/);

5. Avtovaz (MICEX MNF) - Russia’s largest cars manufacturers (http://www.lada-auto.ru/);

6. Sberbank (MICEX FNL) - the largest credit institution in Russia and CIS, accounting for about a quarter of the aggregate Russian banking assets and a third of banking capital (http://www.sbrf.ru/moscow/en/about/bank_today/);

7. Apteka 36,6 (MICEX CGS) – Russian’s largest reseller of pharmaceutical and cosmetic products (http://www.366.ru/);


Without any doubts traders mostly pay attention to most liquid instruments in order to make money in relatively short period of time with relatively lower risk. The division of representatives accordingly to 8 main sectors of Russian economy will help to observe “characters” of completely different instruments. So such kind of selection seems to be reasonable. The Equis International computer program MetaStock version 10.0 was used for analysis of the selected range of information.

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3 Note: There are 8 sector indices on MICEX: MICEX O&G (MICEX Oil & Gas Index), MICEX PWR (MICEX Power Index), MICEX TLC (MICEX Telecommunication Index), MICEX M&M (MICEX Metals and Mining Index), MICEX MNF (MICEX Manufacturing Index), MICEX FNL (MICEX Financials Index), MICEX CGS (MICEX Consumer Goods and Services Index), and MICEX CHM (MICEX Chemicals Index)

4 $ 140,166,691 based on average annual exchange rate about 31.77 Rubles/US doll in 2009

5 Note: the most liquid instruments on MICEX in 2010
Results

In this part of the paper the author concentrated on the quantitative and comparative analysis of 3 trade systems based on different types of average in case of 8 companies of from different industries. Firstly, the author summarizes the best results of trades concerning different systems. And at the end, we compare the systems between each other.

For that purpose the following indexes and terms were used:

- **Net Profit**: the net profit or loss realized by the test. This includes the closed-out value of the open position (if any) that existed at the end of the test.

- **Percent Gain or Loss**: The percentage net profit or loss (as compared to the initial equity balance) realized by the test. This includes the closed-out value of the open position (if any) that existed at the end of the test. This value is not available for a "points only" test.

- **Buy & Hold Index**: This index shows the percentage of the system's profits as compared to a buy and hold strategy's profits. A value of "-50" means that the system's profits were one-half (i.e., 50%) of the buy/hold's. A value of "25" means that the system's profits were 25% greater than the buy/hold's. A value of "0" means they were equal.

- **Total Trades**: The total number of trades that were generated by the test. This number only shows closed trades and does not include the open position that may have existed at the end of the test. Therefore, it is possible for this value to be zero if there was a single unclosed trade in the test.

- **Winning Trades**: the number of closed trades that resulted in a profit.

- **Losing Trades**: the number of closed trades that resulted in a loss.

- **Average Win/Average Loss**: the ratio of Average Wins to the Average Losses. Average Win is calculated by adding up all winning trade profits and dividing by the total number of winning trades. Average Loss is calculated the same way

- **n** - optimal periods used for calculation of averages.

**Chart 1: Best results of the system based on single moving average**

<table>
<thead>
<tr>
<th>Name</th>
<th>Net Profit, Rub</th>
<th>% Gain</th>
<th>B&amp;H index, %</th>
<th>Trades</th>
<th>Trade Profit/Loss</th>
<th>Average Profit/Average Loss</th>
<th>n</th>
</tr>
</thead>
<tbody>
<tr>
<td>Apteka 36,6</td>
<td>744 948,4</td>
<td>2 483,16</td>
<td>2 892,31</td>
<td>71</td>
<td>24/47</td>
<td>6,82</td>
<td>10</td>
</tr>
<tr>
<td>Mosenergo</td>
<td>427 190,71</td>
<td>1423,47</td>
<td>3 845,19</td>
<td>116</td>
<td>43/73</td>
<td>4,31</td>
<td>5</td>
</tr>
<tr>
<td>Akron</td>
<td>131 850,52</td>
<td>439,5</td>
<td>801,66</td>
<td>109</td>
<td>38/71</td>
<td>2,86</td>
<td>5</td>
</tr>
<tr>
<td>Avtovaz</td>
<td>44 301,9</td>
<td>147,67</td>
<td>67,33</td>
<td>79</td>
<td>31/48</td>
<td>1,97</td>
<td>9</td>
</tr>
<tr>
<td>Novatek</td>
<td>0,00</td>
<td>0,00</td>
<td>-100,00</td>
<td>0</td>
<td>0/0</td>
<td>N/A</td>
<td>1</td>
</tr>
<tr>
<td>Sberbank</td>
<td>0,00</td>
<td>0,00</td>
<td>-100,00</td>
<td>0</td>
<td>0/0</td>
<td>N/A</td>
<td>1</td>
</tr>
<tr>
<td>MTS</td>
<td>0,00</td>
<td>0,00</td>
<td>-100,00</td>
<td>0</td>
<td>0/0</td>
<td>N/A</td>
<td>1</td>
</tr>
</tbody>
</table>

*Note: The definitions of these terms were taken from MetaStock 10 Helper.*
As we can see the trade system based on single moving average shows positive results in case of 4 out of 8 instruments; this system “beats” buy and hold strategy. The best results (super profits) were shown especially by Apteka 36.6 and Mosenergo. At the same time there were only 71 trades (minimum) generated by the system in case of Apteka 36.6. This system generates about 47 trades in average.

**Chart 2: Best results of the system based on dual moving average**

<table>
<thead>
<tr>
<th>Name</th>
<th>Net Profit, Rub</th>
<th>% Gain</th>
<th>B&amp;H index, %</th>
<th>Trades</th>
<th>Trade Profit/Loss</th>
<th>Average Profit/Average Loss</th>
<th>n1</th>
<th>n2</th>
</tr>
</thead>
<tbody>
<tr>
<td>Apteka 36,6</td>
<td>1 918 744,92</td>
<td>6 395,82</td>
<td>7 292,09</td>
<td>20</td>
<td>9/11</td>
<td>17,71</td>
<td>7</td>
<td>20</td>
</tr>
<tr>
<td>Akron</td>
<td>582 288,98</td>
<td>1 940,96</td>
<td>3 881,98</td>
<td>14</td>
<td>7/7</td>
<td>7,94</td>
<td>7</td>
<td>27</td>
</tr>
<tr>
<td>Sberbank</td>
<td>366 054,26</td>
<td>1 220,18</td>
<td>7 741,58</td>
<td>18</td>
<td>7/11</td>
<td>10,59</td>
<td>5</td>
<td>27</td>
</tr>
<tr>
<td>Mosenergo</td>
<td>327 255,78</td>
<td>1 090,85</td>
<td>2 969,06</td>
<td>15</td>
<td>7/8</td>
<td>33,85</td>
<td>5</td>
<td>51</td>
</tr>
<tr>
<td>Novatek</td>
<td>200 313,56</td>
<td>667,71</td>
<td>516,23</td>
<td>3</td>
<td>2/1</td>
<td>165,34</td>
<td>8</td>
<td>88</td>
</tr>
<tr>
<td>Severstal</td>
<td>130 859,07</td>
<td>436,20</td>
<td>506,49</td>
<td>8</td>
<td>4/4</td>
<td>19,90</td>
<td>8</td>
<td>90</td>
</tr>
<tr>
<td>Avtoz</td>
<td>147 388,66</td>
<td>491,30</td>
<td>456,69</td>
<td>38</td>
<td>14/24</td>
<td>3,36</td>
<td>4</td>
<td>17</td>
</tr>
<tr>
<td>MTS</td>
<td>59 876,03</td>
<td>199,59</td>
<td>1 055,88</td>
<td>8</td>
<td>5/3</td>
<td>12,12</td>
<td>5</td>
<td>77</td>
</tr>
</tbody>
</table>

The results show that this system generates positive outcomes in case of 8 out of 8 instruments. The average number of trades is 16 due to dual moving average based system. The best results were shown by Apteka 36.6, if we are talking about percent of gain; Sberbank have the best results if we are talking about b&h index. It is interesting to notice that all companies have extra profits; MTS has a minimum annualized performance – 50.21 %.
**Chart 3: Best results of the system based on triple moving average**

<table>
<thead>
<tr>
<th>Name</th>
<th>Net Profit, Rub</th>
<th>% Gain</th>
<th>B&amp;H index, %</th>
<th>Trades</th>
<th>Trade Profit/Loss</th>
<th>Average Profit/Average Loss</th>
<th>n1</th>
<th>n2</th>
<th>n3</th>
</tr>
</thead>
<tbody>
<tr>
<td>Apteka</td>
<td>365 565,28</td>
<td>1</td>
<td>1470,26</td>
<td>12</td>
<td>9/3</td>
<td>29,61</td>
<td>3</td>
<td>12</td>
<td>28</td>
</tr>
<tr>
<td>Akron</td>
<td>347 025,83</td>
<td>1</td>
<td>273,14</td>
<td>14</td>
<td>8/6</td>
<td>33,88</td>
<td>2</td>
<td>24</td>
<td>29</td>
</tr>
<tr>
<td>Severstal</td>
<td>244 649,88</td>
<td>1</td>
<td>1033,88</td>
<td>9</td>
<td>4/5</td>
<td>53,24</td>
<td>3</td>
<td>14</td>
<td>90</td>
</tr>
<tr>
<td>Avtoz</td>
<td>204 386,45</td>
<td>1</td>
<td>671,98</td>
<td>11</td>
<td>4/7</td>
<td>14,15</td>
<td>5</td>
<td>22</td>
<td>37</td>
</tr>
<tr>
<td>Sberbank</td>
<td>199 880,61</td>
<td>1</td>
<td>4181,82</td>
<td>12</td>
<td>3/9</td>
<td>106</td>
<td>2</td>
<td>25</td>
<td>55</td>
</tr>
<tr>
<td>Mosenergo</td>
<td>142 907,54</td>
<td>1</td>
<td>352,88</td>
<td>13</td>
<td>8/5</td>
<td>3,32</td>
<td>2</td>
<td>16</td>
<td>30</td>
</tr>
<tr>
<td>Novatek</td>
<td>116 496,27</td>
<td>1</td>
<td>258,38</td>
<td>8</td>
<td>4/4</td>
<td>27,29</td>
<td>2</td>
<td>25</td>
<td>56</td>
</tr>
<tr>
<td>MTS</td>
<td>77 083,56</td>
<td>1</td>
<td>387,96</td>
<td>13</td>
<td>5/8</td>
<td>14,54</td>
<td>9</td>
<td>25</td>
<td>41</td>
</tr>
</tbody>
</table>

Source: Own calculation based on MICEX data [http://www.micex.com](http://www.micex.com)

The positive results were demonstrated by all instruments. The average number of trades is 12 due to triple moving average based system. The best results were shown by Apteka, in case of either percent of gain and b&h index.

**Comparison of the systems**

One of the central questions in this part of the paper was to find out which trade system could be regarded as relatively most efficient. For that purpose the author decided to grade these systems accordingly to tests results in case of different instruments: so if single moving average system shows net profit higher than dual and triple moving average systems in case of the same instrument, it will get 1 point, if the worst result within 3 systems, it will get 3 points and 2 points if it shows medium results. At the end the author summarized all points, and accordingly to this method a system with the lowest number of points will be regarded as relatively most efficient.
So as we can see based on such type of analysis, relatively the most efficient trade system is dual moving average trade system; triple moving average trade system gets the 2nd place; and single moving average trade system is regarded as relatively inefficient. Despite such kind of result, we should not forget about some degree of artificiality during our analysis and take these nuances into consideration:

1) The tested period can be characterized as extremely trend development, this fact increases the efficiency of moving averages;
2) 1 day filter was included into the analysis;
3) Only relatively liquid stocks were chosen for the analysis;

Nevertheless we can conclude that based on our analysis Treynor’s hypothesis (“the stock-trading game, however, is a negative-sum game”) was not proofed and Tvede’s one (the best method of use of single moving average is to forget and never use it) could not be fully disregarded.

**Conclusion**

The historical overview shows that technical analysis takes its roots in 17 century; by now it is one of the most frequently used methods by traders all over the world. This fact is justified by great number of empirical data from Singapore, Istanbul, New York and other stock exchanges.

Testing of trading systems based on moving average indicator (single, dual and triple) shows relatively high results on the Russian Stock Exchange (MICEX). The comparison analysis indicated that relatively the most efficient trade system is dual moving average trade system.
system; triple moving average trade system get the 2\textsuperscript{nd} place; and single moving average trade system is regarded as relatively inefficient in comparison with them.

So the statistical results show that technical analysis (particularly different types of moving average) could be used for building trading systems which would generate positive results and beat buy and hold strategy.

References


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ABSTRACT

Technical analysis can be determined as a method of evaluating the statistics, historical data (e.g. past price and volume.) to establish “specific rules for buying and selling securities with the objective of maximizing profits and minimizing risk of loss”.

The historical overview shows that technical analysis takes its roots in 17 century; by now it is one of the most frequently used methods by traders all over the world. This fact is justified by great number of empirical data from Singapore, Istanbul, New York and other stock exchanges.

The main concern of this paper is the focus on the creation, tests of trading systems based on the popular trend following indicator, the moving average, and its combinations.

The main questions which would be stressed during this research are:

1. What is the efficiency of the trading systems based on the selected elements of technical analysis?
2. Which of them do show the greatest efficiency rate?

Testing of trading systems based on moving average indicator (single, dual and triple) shows relatively high results on the Russian Stock Exchange (MICEX). The comparison analysis indicated that relatively the most efficient trade system is dual moving average trade system; triple moving average trade system gets the 2nd place; and single moving average trade system is regarded as relatively inefficient

JEL classification: G11

Key words: Technical analysis, Moving average, Trading systems efficiency