Technical Analysis and Mutual Funds. Testing Trading Rules

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ABSTRACT: This paper attempts to develop strategies that enable portfolio managers to improve market timing by learning to recognize leading indications of forthcoming changes. The aim of this study is the testing, in a Mutual Fund series, of the predicting ability of a popular technical exchange tool, the Moving Average Rule. A short-term and a long-term moving average are used for the creation of "buy" and "sell" signals of mutual funds. 2891 predictions were made, for the same time-series, for different values of short-term and long-term moving averages and the profitability of this method was calculated. The method was proved profitable, if no buy and sell cost was counted. The Two Moving Average Rule by itself is efficient only for the companies that administrate the respective mutual fund and not for the single investor. It is presented the triple moving average rule, which possibly can be a solution for this problem.

KEYWORDS: Technical Analysis, Mutual Funds, Moving Average Rule, Decision Making

INTRODUCTION

The decision-making process could break down into two separate stages-analysis and timing. Because of the high leverage factor in the future markets, timing is especially crucial to successful trading. It is quite possible to be correct on the general trend of the market and still lose money. Because margin requirements are so low in future trading, a relatively small price move in the wrong direction can force the trader out of the market with the resulting loss of all or most of that margin. In stock market trading, by contrast, a trader who finds him or herself on the wrong side of the market can simply decide to hold onto the stock, hoping that it will stage a comeback at some point in the future. This is how many traders stop being traders and become investors.

Technical analysts attempt to forecast prices by the study of past prices and a few other related summary statistics about security trading. They believe that shifts in supply and demand can be detected in charts of market action. Technical analysis is considered by many to be the original form of investment analysis, dating back to the 1800s. (Brock-Lakonishok – Baron 1992)

Chartist, or Technical analysis of financial markets involves providing forecasts of asset prices or trading advice on the basis of visual examination of the past history of price movements (Edwards and Magee, 1967). Perhaps with the aid of certain quantitative summary measures of past price movements such as 'momentum' indicators ('oscillators') or moving averages (Murphy, 1986), but without regard to any underlying economic, or 'fundamental' analysis.

Technical analysis is the study of market action, primarily through the use of charts, for the purpose of forecasting future price trends. The term "market action" includes the three principal sources of information available to the technician-price, volume, and open interest. The term "price action", which is often used, seems too narrow because most commodity technicians include volume and open interest as an integral part of their market analysis. With this distinction made, the terms "price action" and "market action" are used interchangeably throughout the remainder of this discussion.

A question often asked is whether technical analysis as applied to commodity futures is the same as the stock market. The answer is both yes and no. The basic principles are the same, but there are some significant differences. The principles of technical analysis were first applied to stock market forecasting and only later adapted to commodities. Most of the basic tools-bar charts point and figure charts, price patterns, volume, trendlines, moving averages, and oscillators, for example-are used in both areas. Anyone who has learned these concepts in either stocks or commodities wouldn't have too much trouble making the adjustment to the other side. However, there are some general areas of difference having more to do with the different, nature of stocks and commodity futures than with the actual tools themselves.

The trend today in technical analysis is a "return to basics'. The polyphony from advanced technologies like neural networks and chaos theory guide back to indicators and analytical methods. With the abundance of trading tools that have emerged over the years, the average trader can get lost in a maze of mathematical formulas and chart patterns,

wandering farther and farther from his ultimate goal: making trading decisions. There are too many analysis trees to see the trading forest. It is possible to identify and isolate those indicators that have performed consistently over time.

This study attempts to develop strategies that enable portfolio managers to improve market timing by learning to recognize leading indications of forthcoming changes. With technical analysis, changes in price trends could filter and help the investment planning process.

MUTUAL FUNDS

The field of Mutual Funds, as an investing option, constantly grows in the global financial market, as well as in the Greek one. In the last years, which were characterized by the limiting of the performance of various alternative investments, mutual funds were established as one of the first choices of investors. Not only of those already keen on this type of investment, but also of new investors, which try for the first time their luck on a form of investment of less stable performance and with bigger percentage of risk.

A mutual fund is a pool of commingled funds invested by different investors. Most mutual funds investors do not know each other and never have contact with each other (Francis, 32-1).

The investment management of such a pool of funds is usually performed by a professional money management firm for a fee of around 1- percent of the market value of all the assets managed each year. Such managers invest the funds in a diversified portfolio of securities they research and analyze and expect to perform well. The owners of shares of the mutual fund may either invest more money or withdraw their money at any time. When a mutual fund investor withdraws funds, the action is called the redemption of shares. As soon as investors realize that a mutual fund is poorly managed, they should redeem their shares. The size of the total assets invested in a mutual fund changes continuously; the size shrinks with redemption and grows as more shares are sold (Francis, 1988).

The investment procedure on a mutual fund is a simple and quick matter and this explains why it is so popular and accessible way of investing internationally. Filling in a simple application and deposing the amount that we wish to invest in the bank account of the mutual fund we chose, names us automatically shareholder. The biggest, perhaps, advantage of the investment on mutual funds is that the invested amounts are not tied up. There is the choice of partial or total liquidation at any moment, with the filling in of a simple purchase application and after having paid the proper, according to the invested amount, fee.

Depending on where they invest, the mutual funds can be divided in 4 categories:
- Growth funds seek high rates of return from capital gains undertake significant risks in order to earn these gains. Emerging growth stocks are sought.
- Growth and income funds seek both cash dividend income and capital gains and, as a result, are less risky than growth funds. Blue-chip stocks are common investments.
- Income and growth funds want to earn primarily cash dividends and, to a lesser extent, capital gains. Conservative blue-chip stocks, public utility stocks, and preferred stock are typical investments.
- Balanced funds claim to be in pursuit of income, growth and stability. Conservation of principal is placed above earning high returns. Public utility common stocks, preferred stocks, and high-grade corporate bonds are common investments.

Mutual funds are today one of the most popular tools in modern saving. Their main advantage, is the chance of each investor to follow every day at which point his investments are and to which direction their prices are moving when they change. Each mutual fund is described by three different values. The net value, which is the value of each share of the fund and derives from the division of the assets of the mutual fund with the number of shares which currently circulate. The disposition value, is the value that someone pays in order to buy shares of a fund. In other words, the price at which the company that is administrating the mutual fund sells its shares. This value, in most cases, is higher than the net value of the share. The difference between the net value and the disposition value, is the selling commission that receive the firms who are in administration of the mutual funds.

The purchase value shows how much money will someone receive if he decides to liquid one or more shares of a mutual fund. It is the price that the administrating firm pays for buying a share of the fund. The purchase value is usually lower than the net value and in no case higher. The difference between the two values- net and purchase- corresponds to the commission that receive the administrating firms during the liquidation of shares.

DATA AND TECHNICAL TRADING RULES

The moving average is one of the most versatile and widely used of all technical indicators. Because of the way it is constructed and the fact that it can be so easily quantified and tested, it is the basis for most mechanical trend – following systems in use today. A moving average, as the second word implies, it is an average of a certain body of data. If a 10-day average of closing prices is desired, the prices for the last ten days are added up and ten divides the total sum. Each new day is added to the total and the close 11 days is subtracted. The number 10, for this example then

divide the new total. The above example deals with a simple 10-day moving average of closing prices. There are, however, other types of moving averages that are not simple.

There are also many questions as to the best way to employ the moving average. For example, how many days should be averaged? Should a short- term or a long –term average be used? Is there a best moving average for all markets or for each individual market? Is the closing price the best price to average? Would it be better to use more than one average? Are there times when moving averages work well than at others?

The data used here are daily closing value on the Greek Mutual Funds. Following (Brock, Lakonishock &LeBarok 1992), the moving average- oscillator is examined. The moving average- oscillator involves two moving averages (MAs) of the level of the index, Ks_t: a 'short' moving average of order n,

$$s_t(n) = \frac{1}{n}\sum_{i=0}^{n-1} x_{t-i}$$

and Kl_t: a 'long' moving average of order m (m>n)

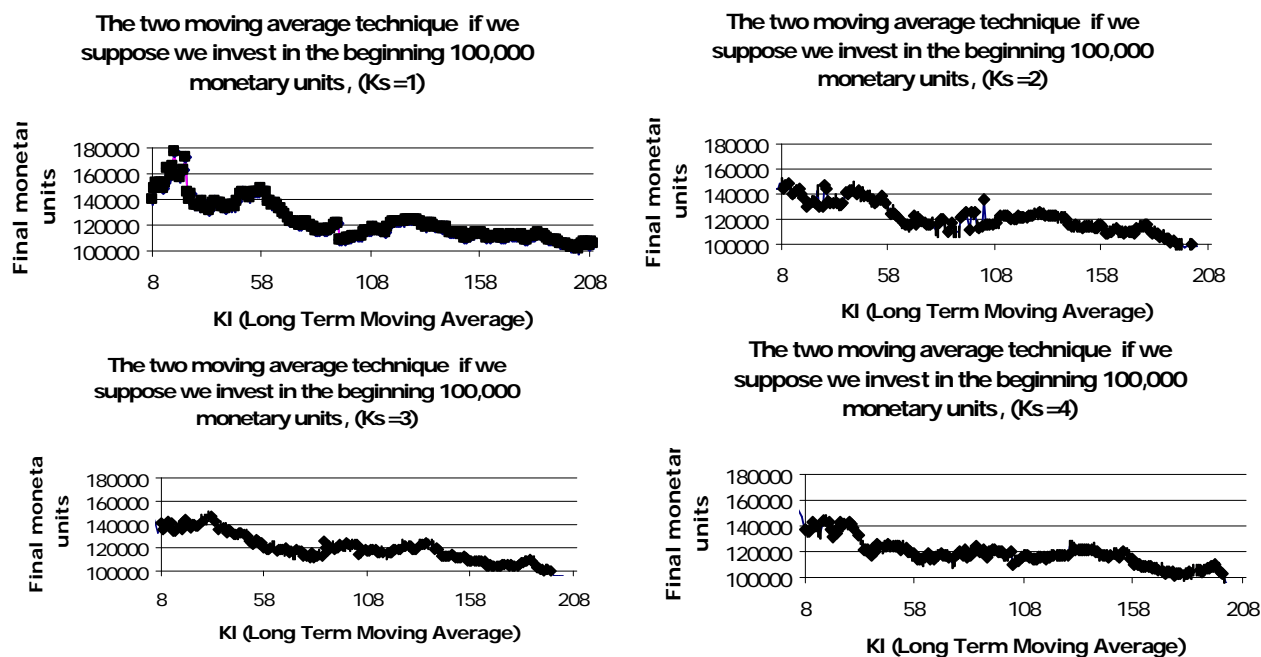$$l_t(m) = \frac{1}{m}\sum_{i=0}^{m-1} x_{t-i}$$

In its simplest form, this rules generates a buy (sell) signal when $s_t(n)$ rises above (falls below) $l_t(m)$ and when this happens, a 'trend' is said to be initiated.
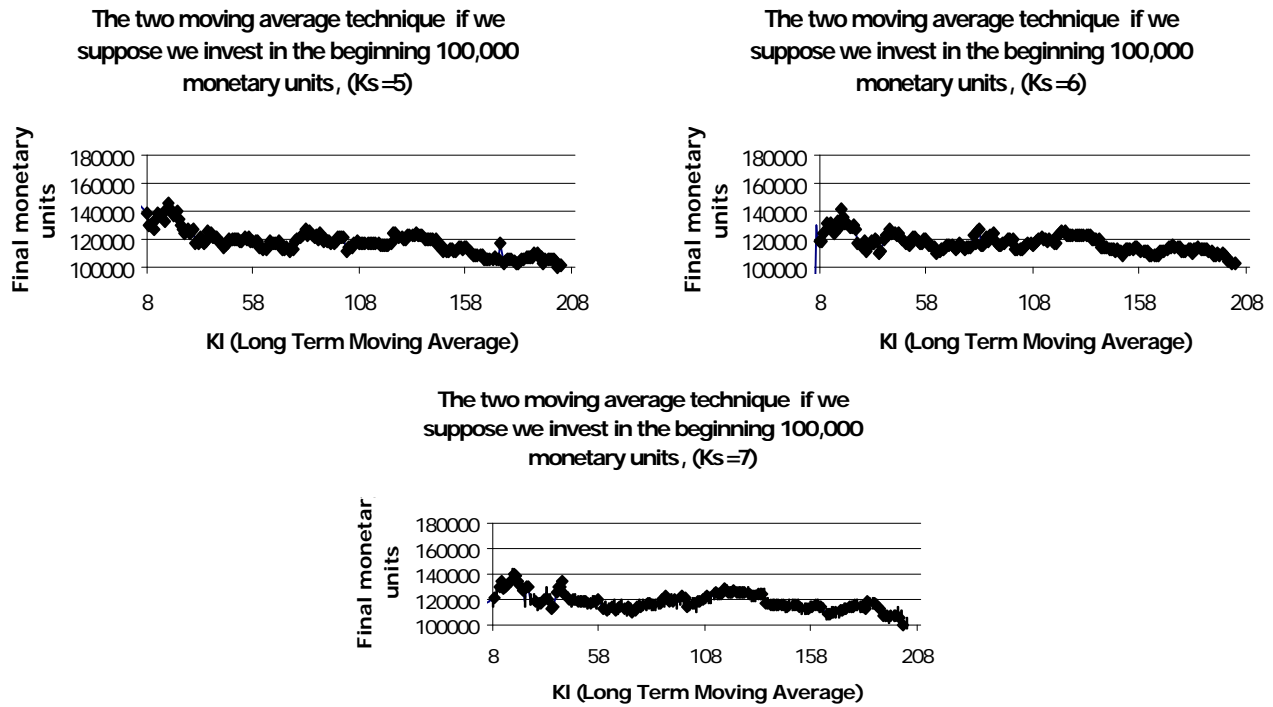
The moving average rule is used to divide the entire sample into either buy or sell periods depending on the relative position of the moving averages. If the short moving- average is above (below) the long, the day is classified as a buy (sell). This rule is designed replicate returns from a trading rule where the trader buys when the short moving average penetrates the long from below and stays in the market until the short moving average penetrates the long moving average from above. (Brock, Lakonishock &LeBarok 1992).

We investigate the MA rule when $s_t(n) \in \{1,2,...,7\}$ and $l_t(m) \in \{8,9,...,210\}$. We calculate the profit for each time using the buy- and – hold strategy. The series we are examining is the daily prices of the Mutual Funds "Alfa External Stock Fund" from 1/1/1993 until 9/11/1998. The examination strategies start from 12/10/1993 until 9/11/1998. In the cases that there were no daily prices –apart from weekends- for example due to national holidays, the daily price was considered to be the same of the day before. According to the policy of the Moving Average Rule, we buy every time that the rule gives the first "buy" signal after the last "sell" signal and we sell every time that the rule gives the first "sell" signal after the last "buy" signal.

EMPIRICAL RESULTS

If we don't consider the rest of the expenses, the moving average policy gives greater total profit than the "buy and hold" strategy. In the following 7 diagrams, it is presented the amount with which we conclude, if we suppose we invest in the beginning 100,000 monetary units. The short-term moving average varies from 1 to 7, while the long-term moving average from 8 to 210.

The two moving average technique if we suppose we invest in the beginning 100,000 monetary units, (Ks=1)

The two moving average technique if we suppose we invest in the beginning 100,000 monetary units, (Ks=2)

The two moving average technique if we suppose we invest in the beginning 100,000 monetary units, (Ks=3)

The two moving average technique if we suppose we invest in the beginning 100,000 monetary units, (Ks=4)

The two moving average technique if we suppose we invest in the beginning 100,000 monetary units, (Ks=5)

The two moving average technique if we suppose we invest in the beginning 100,000 monetary units, (Ks=6)

The two moving average technique if we suppose we invest in the beginning 100,000 monetary units, (Ks=7)

During the examination of the double moving average technique, 2842 simulations took place with different values of the parameters Ks and Kl. The first 1421 simulations were made without calculating the exchange cost. The results of these simulations are compared regarding their profitability.

Table 1

Ks (203 predictions)	Situations where the result is positive and greater than 100,000 units	Situations where the result is bigger than the buy-hold policy
1	202 (202/203, 99.51%)	32
2	195 (195/203, 96.06%)	27
3	196 (196/203, 96.55%)	23
4	200 (200/203, 98.52%)	19
5	203 (203/203, 100%)	9
6	202 (202/203, 99.51%)	2
7	203 (203/203, 100%)	2
Total 1421(=7x203)	1401 (1401/1421, 98.59%)	114

In the previous table, on the first column it is given the value of the short-term moving average. For each price of the short-term average Ks, 203 different simulations took place where the value of the long-term Kl varies between 8 and 210 ($8 \leq Kl \leq 210$). On the second column the profitability percentage is given. How many times, that is, in the end of the exchanges the total capital was greater than the initial amount of 100,000 units that we invested. It can be observed that for the 98% of the cases the moving average technique gives positive results. On the third column there are given the results of the technique under examination compared to the buy-hold policy. Following this policy, we buy in the beginning of the examined time-period a mutual fund such as the "Alfa External Stock Fund" and we sell it in the end of the examined period. We observe that as the short-term moving average Ks increases , the success percentage decreases. In case Ks=1 and $8 \leq Kl \leq 210$ we have 15,7% of success. For all the simulations, the best result is given for the values: Ks=1 and Kl=18 and it is 176,921.9. For this reason in the following table we examine the possibility that the technique of the 2 moving averages is better than the buy-sell policy, for a smaller period of the parameters.

Table 2

1≤ Ks≤ 8 and 10≤ Kl≤ 26	63/119, 52.9%
1≤ Ks≤ 2 and 8≤ Kl≤ 26	34/38, 89.4%
Ks=1 and 8≤ Kl≤ 26	19/19, 100%

The results are impressive, when the long-term Kl has values in the range {8,9,…,26} and when the short-term moving average is Ks=1. Then always the technique surpasses the buy-hold policy.

The next 1421 predictions took place calculating the buy and sell cost of the mutual fund. In this case, the results were disappointing. In no case the double moving average technique gives satisfactory results. This happens because the buy and sell signals are too frequent. There are –in all simulations- cases that one day we buy a fund, the following we sell it and the day after we buy again. Our perspective is correct, the buy and sell signals that come up from the technique of the two moving averages are correct. But the profit we earn from this buy-sell process is, in too many situations, smaller than the exchange cost.

For this reason, if we want to implement the two moving averages technique, with a real exchange cost, in a series of mutual funds such as the "Alfa External Stock Fund", we will have to use at the same time another rule. Which will function as a filter for the rejection of those exchanges where the cost is bigger than the profit. Possibly it will be needed to be implemented the channel technique of the technical analysis, or even the use of a third or fourth moving average.

At this point we applied the three moving averages technique, for few though simulations, for values close to the best value of the two moving averages technique. Again without calculating the exchange cost. The simulations which took place were for the parameters Ks=1 (short-term), $15\leq Kl_1 \leq 21$ (first long-term) and $22\leq Kl_2 \leq 28$ (second long-term). For the values Ks=1, Kl_1=18, Kl_2=27 (where the best value for the two moving averages was observed) the final amount increases to 190,263 units.

Finally, from those 49 simulations, the best value is given for the parameters Ks=1, Kl_1=21, Kl_2=23 and the final amount is 200,824. We observe that the use of a third moving average improves the results and maybe this can be a solution to the problem of the frequent exchanges.

CONCLUSIONS

In the present essay, we examined a simple and popular technical exchange rule. The moving average rule, with two different methods. The first method consists of two moving averages where the second of three moving averages. We analyzed the results that came out of 2891 applications in the series of the daily prices of the mutual fund "Alfa External Stock Fund". The comparison of the profitability of the Moving Averages with the Buy-Hold Strategy, showed that the policies with short long-term moving average are more efficient. When, specifically, we defined the short-term average Ks=1 and the long-term to be in the range 8≤ Kl≤ 26 then always the moving average technique is better than the buy-hold strategy.

A problem arises when in the applications it is calculated the exchange cost, where the results are extremely disappointing. For this reason, the Moving Average Rule by itself is efficient only for the companies that administrate the respective mutual fund and not for the single investor. But even in this case, it is presented the triple moving average rule, who possibly can be a solution for this problem. Certainly, though, for single investors it should be used, apart from the Moving Average Rule, another technique which will function as a filter, for the rejection of the those exchanges where the cost is bigger than the profit of the exchange.

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