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# Presenting a Synthesis-weighted Index for Selecting the Portfolio on Stock Market

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**Abstract:** One way for prediction the behavior of a share price in the Stock Market is utilizing the technical analysis method. Using indices is the main instrument for technical analysis. Every index in this analysis has some defects which cause sending wrong signals, for reducing this error in the market; we proposed a new consolidated index by weighting indices based on the profit and loss in capital market. The dealing according to new index is more reliable. Over the time, change in weighting the new index is possible and it cause changing prices flow in capital market.

**Keywords:** technical analysis; index; stock price; weighting

## 1 INTRODUCTION

Study on past price behavior in order to predict next price behavior is technical analysis. "Price reflects everything about a share" is the most important principle in technical analysis. A technical analyst believes that current price includes all information about one share, because all data already affect on price chart. The second principle of technical analysis is that price movement is not accidental and the movements usually happen in flows. The third principle includes two questions, 1) what is the current price? And 2) what is the history of price movements? (In this principle, we hope that the history repeated and that's why we study on price history). In fact "Why" is not important in technical analysis. In this viewpoint, price is the result of war between supply and demand forces and technical analysis predict future by study on price and its history. Technical analysis includes different items such as indices, price patterns and etc. Indices can be considered as the most extensive item in technical analysis.

At the beginning of the 90th decade, researches focused on moving average rules which is one of the most applicable indices in technical analysis. Brock, et al (1992) were studied on moving average rules of daily data in a century of Dow Jones industrial index. They concluded that these rules have profitable result and warnings created by these rules are able to identify abnormal in compare average return of buy and hold approach. Hudson, et al (1994) repeated Brock and others research from 1935-1994 in England stock market, they also considered transaction cost. They concluded that moving average rules strategy has profitable result but when you considered transaction cost, the profit disappeared. Levich, et al (1993) and Kho, B. C. (1996) also studied on moving average rules strategy but in other asset not in stock it means that in future exchange transaction. Both researches concluded that this strategy is profitable. Fama, et al (1988), Lo, et al (1988), Poterba, et al (1988), Brock, et al (1992), Bessembinder, et al(1998),

Allen, et al(1999), done various empirical studies that each of them contains strong evidence of predictability the return investment.

Yamawaki, et al (2007) studied on the current indices performance of the technical analysis and its different combination using genetic algorithm in NYSE-TAQ and creates a strategy which is able to predict stock changes in the market by the average of 66%. Fang, et al. (2003) combined technical analysis and prediction of time series and tested for the first 100 years of Dow Jones. This studied shows that new method works better than both methods; technical analysis method and conventional time series.

## 2 IITERATURES REVIEW

Amiri Henzeki, H. (2000) tested efficiency of Tehran Stock Exchange and prove its inefficiency and he concluded that technical analysis method can be used in this market for analyzing the stock.

Mohamad Khanloo, N. (1996) tested two methods on the 5 years data of stock index, one of the methods was moving average and the other one was explosion of trading range. He concluded that technical analysis instruments affected on Tehran Stock Exchange.

Agha Mohamadian, R. (1997) studied on the Relative Strength (RS) that is one of the methods of technical analysis and concluded that a stock whose has more partial power has more returns.

Mohamadi, S.(2004) in his research concluded that we can use in Tehran Stock Exchange several techniques of technical analysis methods which applicable in the world market. Noravesh, et al (2003) have done a research about time series application for review, description, explain, prediction and financial data control, and the result shows that the process of creating an annual profit of Iranian companies was under study of Moving Average (M.A.) method. Mehrani, et al (2004) used the history of financial and nonfinancial data in order to separation of successful and unsuccessful companies for prediction the stock returns. In this regard the researchers look for variables and indices which have a significant correlation with stock returns. In his research the relationship between six financial and nonfinancial variables with stock returns was studied, the result shows that there is a correlated between financial and nonfinancial variables and stock returns. Also successful companies have more returns in compare unsuccessful companies. Sadeghi Sharif, et al (2007) express that created returns by technical analysis rules is significant. Also they concluded that utilizing technical analysis methods

in Tehran Stock Exchange is beneficial. In other hand, Hélène Harasty and Jacques Rouledevelop modeling stock market return with a two-step econometric model to explain and forecast stock market movements in seventeen countries.( Hélène Harasty, et al 2000).

Technical indices to buy and sell decisions are used by many investors. However scientific community is not enough attention to them. The reason behind this is its lack of comprehensiveness. For example, no indices are able to predict market completely and if the market conditions change, the used indices should be changed. In other word, indices should be used under adaptive framework (Yamawaki, et al - 2007). These indices at the same market conditions send different signals for one stock that confused investors for decision making.

In this current research, according to the application of technical analysis in stock market and proof the efficiency of this method in the Tehran Stock Exchange in last researches, tried to present an index which is more reliable and sTable by weighting 6 well-known indices.

The indices examined in this study are:

Aroon, Rate of Change, Relative Strength Index, Stochastic, Momentum, Moving Average Convergence / Divergence (MACD). We used “technical indices” book written by Latifi, A. (2006) for calculating these indices.

In the second part of this research we introduce the new index and its calculation methods. And in the last part the result of using this new index in stock market and its advantages will be discussed.

## 3 INTRODUCED A NEW INDEX

Each of above indices has drawbacks which cause sending wrong signal when you are dealing. For example an index does not work well in the flow market or an index issue many signals that some of them may be wrong. It seems that be necessary to use the combination of all mentioned indices for solving this problem. For combining these indices we use stock price changes for different companies in a specific period of time. – This information gain according to 12 companies in Tehran Stock Exchange on 2010 – the companies divided to 4 groups because of the wide variety of companies in stock market and also for the option of following the same trend in the stock price change. The 4 groups are: Metal industry, Mineral & chemical industry, Paper & cellulous industry, Food & services industry. Now we assume that the trend of price changes are the same and it follows a specific flow. In this way the stock prices of the metal

industries strongly depends on metals prices and cellulous industry depends on wood price. Some companies were chosen from each group randomly that show in Table 1.

Table 1: Companies studied

Metal industry	Mineral & chemical industry	Paper & cellulous industry	Food & services industry
Iran Khodro	AlborzDaro	Pars Packaging	Mellat Bank
Teraktor Sazi	Pars Seram	Kaveh Paper industry	Behnoush
Pars Electric	Pars Metal	Production of synthetic fiber raw materials	Gorji Biscuits

For calculating new index, we passed below stages:

**3.1 Calculating the profits or losses of sell and buy using each index per companies**

For calculation process, first the stock price of each company put in Excel file and the calculation of each index done using 2 software, Excel and Matlab, according to the signals of each index, number 1 was chosen as buy signal, -1 as sell signal and 0 for no signal. Every index according to price changes issue several signals per day, the daily average of these signals assume as base for buy and sell that cause profit and loss for stockholder. Profit or loss is the base for an index influence in a specific industry. For calculation the performance of each index in every group we assume a budget for purchase and sell of each company then according to signals and price all Budgets spend for purchase and sell. Finally the

probably remained stocks according to price become a budget again. The ratio of over plus or rebate money to initial budget is the base of weighting each index in every group.

**3.2 Every index calculation in each industrial group**

We obtained the weighted average of each index in every group by averaging the company’s profit of every index in each industrial group. For normalizing the weight of each index, we considered zero for those indices which their weight is less than zero and shows their bad performance on that industrial group and for the rest of them, the weight of every index divided to total weight of all indices. Whatever the calculated weight be more, it means that index influence on that industrial group will be higher. We reached a number between -1 to 1, when we are calculating the weight of every 4 separated groups.

Below, one calculation for determining the weight of MACD index explained as sample:

The amount of funds allocated for the purchase and sale 100,000 Rials<sup>1</sup>

Funds rate at the end:

IranKhodro	100,000 Rials
TeraktorSazi	100,369 Rials
ParsElectric	128,078 Rials

Table 2: The average of profit and loss of each index

Group	Metal industry					
Index	Stochastic	RSI	ROC	Momentum	MACD	Aroon
Index effectiveness	0.1912	0.1365	0.1324	0.0228	0.0948	0.00481
Normalized effectiveness	0.3282	0.2343	0.2272	0.0392	0.1626	0.00826
Group	Mineral & chemical industry					
Index	Stochastic	RSI	ROC	Momentum	MACD	Aroon
Index effectiveness	-0.0651	0.1288	0.2354	0.147	0.2249	0.0353
Normalized effectiveness	0	0.167	0.3051	0.1905	0.2915	0.0457
Group	Paper & cellulous industry					
Index	Stochastic	RSI	ROC	Momentum	MACD	Aroon
Index effectiveness	0.1961	0.0988	0.1362	0.0403	-0.339	0.0025
Normalized effectiveness	0.416	0.2095	0.2889	0.0854	0	0
Group	Food & services industry					
Index	Stochastic	RSI	ROC	Momentum	MACD	Aroon
Index effectiveness	0.0097	0.078	0.3591	-0.2392	0.3512	0.0524
Normalized effectiveness	0	0.0927	0.427	0	0.4177	0.624

<sup>1</sup> Iranian currency

Table 3: The average of indices profit and lost in compare new index

Company	Indices %						
	New index	RSI	ROC	MACD	Momentum	Stochastic	Aroon
Iran Khodro	11.19	16.85	33.46	0	-15.29	0.73	0.14
TeraktorSazi	2.7	0	2.09	0.37	-22.23	9.23	1.1
Pars Electric	27.18	24.12	4.18	28.08	11.14	47.43	0.2
Average	13.69	13.66	13.24	9.48	-8.7	19.13	0.48
AlborzDaro	19.44	-4.39	7.81	47.6	18.02	-9.56	10.59
Pars Seram	23.13	0	59.8	14.27	3.81	28.29	0
Pars Metal	10.81	24.38	3.03	5.63	22.27	19.94	0
Average	17.82	6.66	23.55	22.5	14.7	12.89	3.53
Pars Packaging	22.79	0.12	77.38	0	-13.42	3.74	0
Kaveh Paper industry	32.83	29.53	6.19	-95.9	22.6	55.1	0.3
Production of synthetic fiber raw materials	0.56	0	-42.7	-5.83	2.91	0	0.45
Average	18.72	9.88	13.62	-33.91	4.03	19.61	0.25
Mellat Bank	31.18	0.19	72.97	0	-13.42	7.73	0
Behnoush	39.89	-0.02	27.09	68.17	-45.05	4.99	0.27
Gorji Biscuits	22.13	25.24	7.68	37.22	-26.76	9.83	15.27
Average	31.36	7.8	35.91	15.13	-28.41	0.96	5.25

Table 4: The average profit and standard deviation of indices in compare new index

	New Index	RSI	ROC	MACD	Momentum	Stochastic	Aroon
Total average	20.39	9.5	21.58	8.3	-4.6	13.15	2.37
Standard deviation	12.05	13.02	34.59	40.87	21.76	19.61	5.9

**3.3 Comparison new index and common indices**

The new index was calculated for companies in each industrial group. In Table 3 we can see the percentage of each index - including common indices and new one that made by combination of them - profit after sell and buy.

The profit and loss percentage at the end:  
 IranKhodro  $(100,000 - 100,000) / 100,000 = 0$   
 TeraktorSazi  $(100,369 - 100,000) / 100,000 = 0.00369$   
 Pars Electric  $(128,078 - 100,000) / 100,000 = 0.28078$

The average profit of this index in this industrial group:  $(0.28078 + 0.00369 + 0) / 3 = 0.0948$  below Table shows the percentage of profit and normalize profit after buy and sell.

As seen in Table 3, the stochastic index works better than all indices in the first group, in the second group ROC & MACD work better and as we seen, the new presented index is among the top 3 indices in all groups. Buyers can reduce investment risk and probable loss by using this more reliable index. The most important advantage of this new index is that the weighting of last indices can be changed over the time and coefficient of profitable indices goes up.

**4 CONCLUSION**

In Table 4 we can see the average and standard deviation of each index's profit that we discuss about it in Table 3 for 12 companies separately. Presented index create the maximum profit average except ROC. The average profit of ROC is 21.58 and for the new presented index are 20.39. The standard deviation of ROC is 34.59 but the standard deviation of new index is 12.05. It means that although the average profit of new index by a little difference is less than ROC, but because of less standard deviation in compare ROC, creates less investment risk for investors in compare ROC.

**4.1. Other advantages of new presented index are as follow:**

\*Synthesis-weighted index has more profit in compare other indices.

The presented index has high dependence to the best practical indices in industrial group and on the other hand it is not depended to those indices which they are not works well, so the stock holders can gain a good profit if they use new index in their portfolio.

\*The risk percentage of Synthesis-weighted index is less than the other indices.

We use other indices for calculating this index and study on the performance of each index in specific group carefully, therefore the shareholders more safely will be trusted to guarantee their profits if they use new index.

\*Coefficients change possibility over the time  
According to price fluctuations possibilities, we can put new prices and change the indices coefficient in Synthesis-weighted index.

\*The possibility of uses in Tehran Stock Exchange  
The coefficients gained by calculating profit and loss of indices in Tehran Stock Exchange so we can use it in Tehran Forum.

\*The possibility of uses in foreign bourse  
In this case we can study on existed companies in foreign bourse and presented new coefficients for Synthesis-weighted index and then use it to establish portfolio.

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