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The Role of Fundamental Information for Trading Strategy Creation

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Abstract

The fundamental information, in the current world, is one of the main elements for decision making among governments, banks and individual investors. The paper discusses use of basic fundamental indicators in the trading strategy creation. The main goal and research idea is to test the ability, sensitivity and reaction rate of markets on the information. The idea was to research how quickly market absorbs an announced value of the fundamental information and converse them into the desired changes in the price movements. Research offers an unconventional look at the instrument price movement, taking into consideration compared value changes of fundamental information and different time delays applied to the entry positions. The approach is applied to the major stock index S&P 500 representing the widest scope of the market. The length of the time series, on which the strategies could be tested, together with the impact of information, served us as determinants of the stock indexes selection. In the development phase the maximum possible combinations of strategies for decision-making algorithm, were tested. The results were used for the selection of the most efficient strategies taking into account the smallest drawdown. At the end of the paper the results and strategies are discussed, and selected strategies are back-tested on the underlying assets ETF, SPDR S&P 500 (SPY).

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Keywords: Fundamental Information; Trading; ETF; DJIA30; S&P500; Decision Making

1. Introduction

When we look at the personal money management, in Slovak republic, it is still common to prefer passive investing or “invest” savings only into the simple banking products. Recent situation in the banking sector

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confirmed the increasing importance of active self-management of personal savings. Due to fact that people have been increasingly investing into e.g. the mutual funds, the trend of investing and trading is on the ascending curve. In the process of investing or trading, active investor can use several analysis of individual asset or market as a whole. Of course, the active investor has to concern on the risk of selected asset and several authors discuss about determination of these risks e.g. systematic risks in the stock trading (Glova, 2013), or political risks in the pension system, which is in the Slovak republic expanded and presented as a suitable form of investment (Šebo and Virdzek, 2012). One of the mentioned analyses is fundamental analysis. According to InvestoWords.com: "Fundamental analysis is a method of security valuation which involves examining the company's financials and operations, especially sales, earnings, growth potential, assets, debt, management, products, and competition. Fundamental analysis takes into consideration only those variables that are directly related to the company itself, rather than the overall state of the market or technical analysis data". On the other hand, according to McClure (2010), from the broader scope, we can perform fundamental analysis on industries or the economy as a whole. According to Grimm (2012), primary objective of a stock analyst is to gain a thorough understanding of the object firm and the environment in which it operates. This requires an assessment of management capabilities, anticipating outside forces that may impact the firm, and anticipating changes in economic, regulatory, natural, and geopolitical environments that could affect a firm's performance. The more complete the analyst's understanding of the firm and its operating and competitive environments, the more effective he should be at anticipating its future prospects. The Bonenkamp et al. (2011) underlined, if past price changes only reflect temporary pricing pressure, then they have no predictive power for future returns, and technical trading strategies are doomed to failure. Looking only at technical trading information does not allow the investor to distinguish between these two cases. They suggest solving this problem by taking fundamental information into account.

In the research we use fundamental analysis approach to indicate performance of the strategy, according to comparison of fundamental value development together with value of the ETF development combined with simple indicators of technical analysis.

2. Methodology

For the research purpose, the data from the Yahoo finance about prices of financial instruments were used. For the fundamental macro information, the MS Excel Add-on – "FRED Add-In for Microsoft Excel" was used. Each announced economic fundament represents potential impact which may affect the prices of financial instruments. In our research therefore we focus on the fundaments that have the greatest impact on changing the prices of these instruments. Since in this section we discuss macro level we choose a financial instrument (index) comprising the largest possible share of the market, on which we will test trading strategies. Geographically, we discuss only the U.S. financial markets so the financial instrument for testing will be index S&P500. However, the results have explanatory value, the final testing of developed strategies will be performed to the easy tradable financial instrument, which is the underlying S&P500 and this instrument is the SPY (ETF for the S&P500).

Most data are announced on a monthly basis. Therefore, the fundaments will be used also on a monthly basis. As the availability of data (in used add-on) is always up to the end of the month in which they were announced, we will use close prices of SPY for testing. Slippage of the information will not interfere testing, whereas our strategy will be important to have information on each of the fundamental information on the same time, at the end of the month.

2.1. Macroeconomic fundamental testing

The main idea on which we developed a trading system is built on the premise, that the announced economic information data affects the price of the financial instrument. However, we had to consider different time delays in reflecting the price change of the instrument. On this basis, we developed essentially very simple trading strategies, which were based on the decision-making algorithms described below. These strategies were thus divided into four groups:

- Strategies group A: Enter the trade position, when the price of the ETF decrease and also decrease the value of announced fundament compared to the previous period (buy financial instrument SPY)
- Strategies group B: Enter the trade position, when the price of the ETF decrease and the value of announced fundament increase compared to the previous period (buy financial instrument SPY)
- Strategies group C: Enter the trade position, when the price of the ETF increase and also increase the value of announced fundament compared to the previous period (buy financial instrument SPY)
- Strategies group D: Enter the trade position, when the price of the ETF increase and the value of announced fundament decrease compared to the previous period (buy financial instrument SPY)

In each of these groups, the periods were modified according to the logic: "Enter the trade position (buy financial instrument SPY) in the same period, when the price of the ETF increase/decrease and the value of announced fundament decrease/decrease; or in the two periods; three periods; four periods; five periods later after the entering signal. These strategies were then applied to all economic fundaments for all of the available historical data. For the interpretation purpose we used fundaments with highest impact (according to www.bloomberg.com and www.forexfactory.com) on the monthly basis. The performance of each group of strategies and periods delays is shown in the Table 1 – 4. For the comparability of the results in the development stage on the S&P500 and subsequent back-test on financial instruments SPY we have chosen the time period since 1993. The reason was that the ETF began to emerge at a later stage and SPY, itself, was for the first time traded in 1993. Results back-test for SPY, are shown below the tables of all developed and tested strategies.

Table 1. Performance of the strategies in a group A

	SPY – price decrease; Fundament - value decrease					
	1M delay	2M delay	3M delay	4M delay	5M delay	Average
Housing Starts	29.38%	3.38%	1.65%	-8.65%	13.01%	7.75%
Building Permits	-8.72%	42.89%	-11.55%	5.54%	47.43%	15.12%
PMI Composite Index	-7.53%	31.04%	-22.72%	79.20%	18.77%	19.75%
Non-Farm Employment Change	-10.12%	0.69%	-54.05%	-41.44%	15.66%	-17.85%
Unemployment Rate	76.44%	56.34%	11.72%	51.76%	3.20%	39.89%
Retail Sales	32.62%	-13.63%	-48.55%	21.23%	2.50%	-1.17%
Consumer Price Index	-10.80%	38.07%	16.54%	48.67%	-4.31%	17.64%
Producer Price Index	21.84%	-2.66%	-4.33%	126.44%	22.75%	32.81%
Average	15.39%	19.52%	-13.91%	35.34%	14.88%	

Table 2. Performance of the strategies in a group B

	SPY – price decrease; Fundament - value increase					
	1M delay	2M delay	3M delay	4M delay	5M delay	Average
Housing Starts	21.15%	45.32%	-18.07%	78.68%	32.94%	32.00%

Building Permits	71.72%	5.14%	-5.84%	54.65%	1.90%	25.52%
PMI Composite Index	89.43%	25.07%	25.77%	32.24%	13.26%	37.16%
Non-Farm Employment Change	74.38%	49.21%	81.24%	178.69%	29.90%	82.69%
Unemployment Rate	-35.52%	13.73%	-3.60%	-2.15%	50.42%	4.58%
Retail Sales	18.19%	73.94%	61.88%	34.63%	46.58%	47.04%
Consumer Price Index	75.71%	8.81%	-28.54%	9.78%	57.01%	24.55%
Producer Price Index	24.61%	48.68%	-10.13%	-29.91%	27.47%	12.14%
Average	42.46%	33.74%	12.84%	44.58%	32.44%	

Table 3. Performance of the strategies in a group C

	SPY – price increase; Fundament - value increase					
	1M delay	2M delay	3M delay	4M delay	5M delay	Average
Housing Starts	58.56%	77.62%	66.90%	27.46%	5.68%	47.24%
Building Permits	34.81%	27.68%	142.68%	85.69%	4.81%	59.13%
PMI Composite Index	60.43%	-3.30%	49.86%	30.75%	15.39%	30.63%
Non-Farm Employment Change	83.60%	137.41%	192.65%	80.77%	169.28%	132.74%
Unemployment Rate	63.30%	-23.62%	62.53%	42.26%	28.84%	34.66%
Retail Sales	39.38%	98.76%	179.76%	31.73%	56.36%	81.20%
Consumer Price Index	27.73%	33.32%	42.31%	84.99%	21.92%	42.05%
Producer Price Index	42.55%	80.43%	62.38%	7.94%	122.55%	63.17%
Average	51.30%	53.54%	99.88%	48.95%	53.10%	

Table 4. Performance of the strategies in a group D

	SPY – price increase; Fundament - value decrease					
	1M delay	2M delay	3M delay	4M delay	5M delay	Average
Housing Starts	27.80%	12.96%	124.63%	49.43%	88.91%	60.75%
Building Permits	47.83%	67.13%	54.45%	3.36%	99.92%	54.54%
PMI Composite Index	15.80%	114.22%	137.04%	55.06%	51.69%	74.76%
Non-Farm Employment Change	6.35%	-8.77%	21.57%	5.03%	-25.56%	-0.28%
Unemployment Rate	44.73%	120.57%	31.52%	40.12%	18.68%	51.12%
Retail Sales	46.57%	3.37%	31.99%	43.86%	25.32%	30.22%
Consumer Price Index	54.94%	57.23%	158.06%	5.30%	63.13%	67.73%
Producer Price Index	39.80%	18.27%	130.83%	77.83%	-5.85%	52.18%
Average	35.48%	48.12%	86.26%	35.00%	39.53%	

According to the results, trend-based strategies achieved the best performances (Table 3). We can also see that the best overall averages for the group strategies are centered precisely in the above-mentioned strategies. From the perspective of time delay, it is interesting, that the best results performed that strategy, which had entering position in the third time period after the inception of the signal. Contrarian approach used in strategies in the group A was, with a few exceptions, accompanied by many failures. From those results, we chose two strategies with high performance to make the comparison. We compared them to the financial instrument SPY that served us as a benchmark. The results of an equity curves can be seen in the Fig. 1 below.

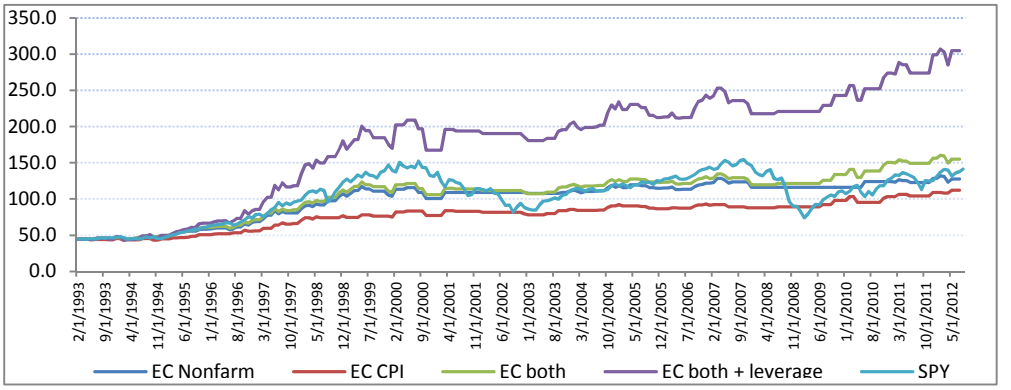

Fig. 1. Equity curves

The best strategy was based on the indicator Nonfarm payrolls with a lag of two time periods. The second tested, was the strategy that was based on the Consumer Price Index, with the entering position in the third period after the signal. As we can see, the both strategies have slightly lower performance than SPY, which reached performance at the level of 217.86% within the same period. On the other hand, both strategies avoided a huge drop that started in 2000 and 2007. When we used a combination of these strategies, the profit reached the level of 256.51% without running high risk. The green curve on a Fig. 1 represents combination of these strategies. Combination means the entering into the market according to signal of first or second strategy. For signals that arose simultaneously in both strategies, we have always entered only one position. The trade accounts among brokers allow trading securities with the leverage 1:2, so we can trade both strategies at the same time simultaneously. Thanks to the leverage we can reach higher profit as we can see at the Fig. 1. Since both of these strategies, in the testing phase, could avoid major drops, there was no need to undergo a much higher risk. In this case, we reached profit at the level of 586.47%, which is more than double that, the market itself represented by only SPY.

2.2. Development of the "Switcher"

In testing phase we have focused mostly on macroeconomic indicators. Fundamentals are also important at the micro level. According to Tay (2010) Micro-Fundamental Analysis starts with considering the current price of a stock and compares it to measures of value. Hence the current price of a stock is compared to its dividend, its earnings, and to its assets resulting in valuation ratios such as its dividend yield, price to earnings ratio and its price to asset ratio. The principle of "Switcher" development was the usage of fundamental information – Screener (www.stockscreen123.com) whereby we analyzed 68 fundamental information. List of analyzed fundamentals can be seen in Annex A.

Each of individually analyzed fundamentals provides an overview of how many shares we have to include to the portfolio at a given period. For comparability, we again used the S&P500. From the results of the screener, on a monthly basis, we determined the weight for subsequent testing positions in the trading with ETF. The crosses of the moving averages (MA) with parameter 20 and 50 were used as signals for entering the position. If MA 20 crosses MA 50 upward it gives a signal to buy riskier assets, in our case SPY. If MA 20 crosses MA 50 downward it gives a signal to sell all risky assets. In the Fig.2 we can see the performance of trading on the basis of the signals generated by fundamental information. As the base we determined performance of SPY itself. The performance of fundamental information was tested by the following procedure:

- According to the fundamental information, Screener evaluates and recommends the number of companies whose shares should be held. However, it does not indicate any other specific details.
- Subsequently, the weights for the given time periods were calculated as the proportion of recommended number of companies to the total number of companies in the index.
- The difference in SPY price, in a given period, was multiplied by the calculated weight for the same period.
- At the same time we calculated MA 20 and MA 50, and on the basis of their crosses we defined, if the conditions in the period were good enough to buy or hold the specified % of SPY.

When “Switcher” announced that the position is too risky, we did not consider alternative investments and in the testing phase we have left available funds at the account without additional profit. As can be seen from the Fig. 2 below, some of the fundamental information generates higher some lower performance than SPY itself (as a base).

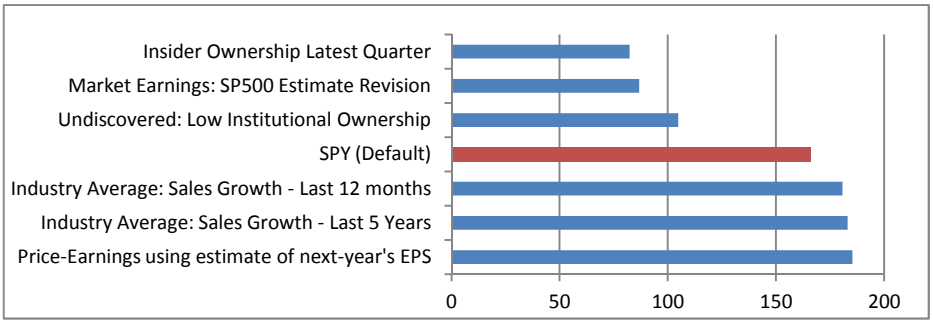

Fig. 2. Performance according to selected fundaments

The proposed procedure was applied to all 68 fundamental information in a given period and subsequently, based on the simple average, a robust system was created for determining the entry to the positions or sell all assets. The Fig. 3 shows the equity curve when using "Switcher" methodology.

Even though the created and tested strategies were without significant drawdowns, when using “switcher”, the tested strategies showed smoother equity curve. However, the total profit at the end of testing was similar to the previous one, and so we were able to avoid periods with a huge decline at the market. This is particularly important because of the leverage, when any significant downward movement can cause substantial damage to our account. Ultimately, we were able to increase final profit, which climbed at the level of 608.66%. Therefore, it is very positive that the application had such an impact on the equity curve and allows us to take advantage of the leverage to maximize profits. Horizontal parts on the equity curves (Fig.3) represent time periods, when “Switcher” evaluates situation as too risky for trading.

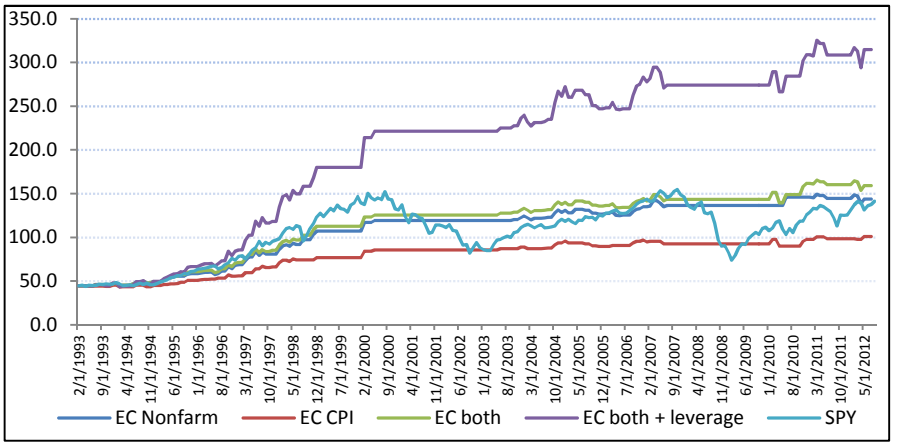

Fig. 3. Equity curves with "Switcher"

3. Conclusion

In the paper we present several methods and approaches before using tools of fundamental analysis in the construction of a sufficiently powerful trading strategy. No matter how powerful or profitable strategies were developed during their tests in the terms of historical data, the simulated performance will be not a guarantee of the performance in the future. Both, theory and practice of trading show that successful strategies are often a "temporary" functional. Thus, it is expected that necessary changes at the financial market will influence the developed trading strategy or system. Trading system will be successful only for a limited time, when it suits "discovered" right combination of fundamental or technical conditions, or selected combinations of instruments. Preventing action against potential trading strategy "deactivation" in the trading practice is achieved by application of the moving averages calculated from the actual equity curve. We could use MA because the underlying asset, that in our case was the equity curve, was in a clear and unambiguous trend. The problem occurs at significantly volatile or long sideways movement of EC, when the strategy generates a large number of "false" signals. Also, when using the screener for the stock selection, it may happen that the system generates too many shares that an investor should buy or sell. In this case, the question is which of the shares investor should choose as a prior. The ranking system, or screen based on Piotroski (2000) should help to select "right" and appropriate shares and this part of the process will be subject of the further research.

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www.stockscreen123.com

Appendix A. List of fundamental information

List of used fundamental information			
Insider Ownership Latest Quarter	Sharpe: The Ratio of Reward to Risk	Return on Equity 5 years	Sales Growth Last 12 months
Market Earnings: SP500 Estimate Revision	Short Covering In Latest Month	Accrual Ratio Last 12 Months	Asset Turnover Last 12 Months
Undiscovered: Low Institutional Ownership	Revision: Quarterly Estimate vs. Estimate 13 Weeks ago	Little Short Interest	Return on Equity Last 12 Months
Industry Average: Sales Growth - Last Quarter	Can Pay Debt: Interest Coverage	Little Short Interest	Enough Cash: Current Ratio
Insider Buying Latest Quarter	Revision: Quarterly Estimate vs. Estimate 4 Weeks ago	Return on Investment 12 Months	Significant Short Interest
Insider Selling Latest Quarter	Sales Growth Last Quarter	Yield	Sales Growth Last 5 Years
Following The Big Guys: Institutional Buying	Industry Average: Share Price Performance - 13 Weeks	Reasonable Payout Ratio	Operating Margin Last 12 Months
Revision: Next Year Est. vs. Est. 4 Weeks ago	Industry Average: Earnings Growth - Last 5 Years	Operating Margin Last 5 years	Industry Average: Share Price Performance - 4 Weeks
PEG Ratio	Industry Average: Return on Investment - Last 5 Years	Pretax Margin Last 5 years	Price-Earnings using estimate of current-year EPS
Revision: Next Year Est. vs. Est. 13 Weeks ago	Analyst Recommendations	Inventory Turnover Last 12 Months	Earnings Growth Last 5 Years
Beta: Stock Volatility Compared to SP500 Volatility	Earnings Growth Last Q vs. Q 1Y ago	Reasonable Debt: Total Debt to Equity	Earnings Growth Last Q vs. prior Q
Upgrade: Change in Analyst Recommendations - 4 Weeks	Earnings Growth Last 12 months	Industry Average: Earnings Growth - Last 12 Months	Price-Earnings using reported EPS
Company Repurchasing Its Shares	Gross Margin Last 5 years	Net Margin Last 5 years	Volatility of EPS Trend
Revision: Cur Year Est. vs. Est. 4 Weeks ago	Return on Investment 5 years	Industry Average: Earnings Growth - Last Quarter	Pre-tax Margin Last 12 Months
Revision: Cur. Year Est. vs. Est. 13 Weeks ago	Gross Margin Last 12 Months	Price to Book Value	Industry Average: Sales Growth - Last 12 months
Surprise: Beat Estimates	Price-Sales	Price to Book Value	Industry Average: Sales Growth - Last 5 Years
Market Valuation: SP 500 Risk Premium	Good Dividend Growth Rate	Net Margin Last 12 Months	Price-Earnings using estimate of next-year's EPS