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# 11. Fundamental Analysis – Portfolio Management Tool

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*The complex process of selecting a portfolio of financial instruments takes into account a particular investment objective, risk aversion of the investor, but also the impact of endogenous and exogenous factors on the evolution and return of the financial instruments.*

*The central point of this paper is the selection of a portfolio of financial instruments based only on financial descriptors for the insurer's financial status In the first phase, we proposed and tested a statistical model aimed at the connections between the financial statements descriptors of issuers and the market values return of stocks issued by them. Thus, we identified those descriptors, which in the period under review (2010-2013), had a direct impact on the dynamics of stock prices traded on the capital market in Europe and USA. We analyze companies that are part from the structure of Down Jones Industrial Average, WIG 20 and Euro Stoxx50. In the second stage, we calculated the return of the selected companies on the selected period by using investment signals based on fundamental analysis. The main results support the idea that an investor can have a portfolio that generates returns by using exclusively financial descriptors.*

*Keywords: financial descriptors, investment portfolio, fundamental analysis, investors*

## 1. Introduction

The objective of the paper is to illustrate that the use of fundamental analysis is useful in its depiction of the business environment and in guiding the selection of financial asset portfolio structure decisions. In order to illustrate the possibilities of application of fundamental analysis in the construction and management of financial assets portfolios, we propose a methodology capable, on the one hand, to reflect the current financial status of the issuer and, on the other hand, allow evaluation of the impact of this status of the transaction value of financial assets issued.

Fundamental analysis reveals its usefulness especially for passive trading strategies involving "long" trading horizons. To implement active trading strategies on "short" trading horizons it is necessary to take into account additional information generated by technical analysis, possibly as part of a mixed approach such as "environment/trigger". Moreover, such an approach should be complemented by a detailed analysis of the sector characteristics and macroeconomic situation.

## 2. Fundamental analysis – literature

Fundamental analysis origins may be dated from Graham and Dodd's (1934) work, in which the authors claimed the importance of fundamental factors in shares' price evaluation. In theory, the value of a company, and as a result, the price of shares, is given by the sum of the present value of future cash flows discounted by the risk adjusted discount rate. This conceptual assessment framework is based on dividend discount model developed by Gordon (1962). However this model assumes estimation of future dividends, which is rather difficult to implement due to changes that may occur in the dividend policy of companies. Thus, further studies along this line of literature focused on the cash flows, which are not affected by the dividend policy and can be obtained in the financial statements.

Ou and Penman (1989) use financial statements analysis and analysis of ratios deriving from the statements in order to estimate future revenues. The main motivation for this research is to identify wrongfully valued shares. These authors demonstrate that the information from the revenue signals estimates are helpful in generating abnormal gains on shares.

Fama and French (1992) show that value stocks (high book/market) significantly outperform growth stocks (low book/market). The average return of the highest book/market decile is reported go be one percent per month higher than the average return for the lowest book/market decile.

Jagadeesh and Titman (1993) show in their work that in a three-twelve months timeframe, investors who have previously earned still exceed, on average, investors who lost in the past, by 1% per month.

Lev and Thiagarajan (1993) use conceptual arguments to study their ratios. They demonstrate that the earnings prediction signals in variables like growth in accounts receivables relative to sales growth and gross margin rate are incrementally associated with contemporaneous stock returns and are significant in predicting future earnings.

Joseph. D. Piotroski (2000) examines whether a simple accounting based Fundamental Analysis strategy, when applied to a broad portfolio of high Book to Market firms, can shift the distribution of returns earned by an investor. The research shows that the mean returns earned by a high Book to Market investor can be increased by at least 7.5% annually through the selection of financially strong high Book to Market firms.

Pascal Nguyen, (2003) constructs a simple financial score designed to capture short term changes in firm operating efficiency, profitability and financial policy. The scores

exhibit a strong correlation with market adjusted returns in the Current fiscal period and the same continues in the following period also.

The unique nature of the instruments of the capital market force investors to depend to a large extent on fundamental factors in their investment decisions. These fundamental factors relate to the economy as a whole, or a particular industry or a company. One can say that the shares' performance depends on the issuing company's performance. However, since companies are a part of an industrial sector, which in turn are part of national/global economy, it may also be noted that macroeconomic or industrial factors are likely to affect investment decisions. Selecting an investment will begin with fundamental analysis, which analyzes the economic environment, industry and company's performance.

Fundamental analysis involves examining the factors influencing the evolution of the economy, industry or company. The purpose of fundamental analysis is to predict stock price developments for making investment decisions. At the company level, fundamental analysis may involve examination of financial data, of management, business concept and competition. At the industry level, there could be an analysis of demand and supply of the products in that specific industry. With regards to the national economy, fundamental analysis might focus on economic data for evaluating that economy.

To estimate the evolution of stock prices, fundamental analysis combines the analysis of the economy, industry, and the company to determine the intrinsic value of the share. If the intrinsic value is not equal to the current market price, it is assumed that the shares are either overvalued or undervalued. Because the share's market price at one moment tends to be around its intrinsic value, then the latter should underpin the decision to invest or not, the investor seeking to exploit discrepancies between the market price and the intrinsic value.

Conducting fundamental analysis involves 3 phases:

- Analysis of the companies' macroeconomic environment
- Analysis of the evolution of companies' industry
- Analysis of the companies based on financial statements and future financial performance

Investors assess the evolutions of the economies, and taking into account the results they evaluate the industries. Based on both analysis (economy and industry), investors conduct microeconomic analysis of companies. Also, this approach allows comparisons between different groups of industries, namely comparisons between different companies in the same group.

The general idea of fundamental analysis is to identify undervalued companies by analyzing the intrinsic value based on the financial statements of the company. These financial statements are used to calculate a number of financial indicators to reach some conclusions about the company's liquidity, leverage, profitability, etc. Financial indicators help interpret the results and allow comparisons of present evolution of a company with previous years, other companies or with other sectors.

## 3. Methodological framework

The methodology that we propose involves the following steps:

1. evaluation of economic and financial position and performance of issuers;
2. testing the connections between a synthetic describer of financial status of the issuers and the development of the market value of financial assets issued by them and traded on the capital market, respectively,
3. using the results generated by this analysis in generating trading signals and proper management of portfolios of financial assets.

1. The first stage involves illustrating the financial status of the issuers, which involves choosing the describers that capture all the various defining dimensions of this status. These describers can be reflected in ratios which are specific to financial statements analysis of issuers. In selecting these ratios it is necessary to take into account the business environment particularities and global macroeconomic situation. Also, sector-specific features, production and commercial processes cycles, the degree of access to borrowed financial resources, specific business strategies and economic and financial performance of the issuing companies should be reflected in an appropriate manner by the chosen ratio system. Another problem is linked to locating the information used in the construction of a synthetic estimator of the overall financial status, therefore we can distinguish between: a) endogenous information located within companies, respectively, b) exogenous information that allow connecting the results from the activity of companies and the development of the transactional value (market price) of these companies. To answer such requirements, even partially, we have considered the following ratio system mentioned in table 1.

*Table 1* Expected effects of financial ratios

| No. | Financial ratios | Expected effect | Observations |
|---|---|---|---|
| **1** | Long-term liabilities ratio | +/- | It signifies the issuer's ability to attract stable financial resources |
| **2** | Debt ratio | - | It reflects a decrease of financial autonomy |
| **3** | ROA | + | It reflects the issuer's financial and economic performance, its ability to generate positive results of the work |
| **4** | ROE | + | |
| **5** | EPS | + | |
| **6** | Dividend/share | + | It reflects the remuneration of investors |
| **7** | Financial leverage | - | It reflects the issuer's capital structure and its dependence on financial resources attracted from third parties |

*Source*: own construction

In order to build a synthetic describer of financial status we appeal to the methodological framework provided by the "principal component analysis". This factor analysis technique reduces the number of variables by identifying the structure correlations between them. Building "principal components" is made in such a way that they are able to explain a large fraction of the total variance of the variables considered. The construction algorithm starts from the assumption of a single "principal component" and tests the level of discrepancies between the observed correlation matrix and the one estimated by linear model involved. If these discrepancies are too large, one should proceed iteratively estimating a "principal component" until the discrepancy tests show that differences between the observed correlation matrix and the estimated one are at a palatable level in statistical terms. The first "principal component" extracted explains most of the total variance observed. This component will be used in the construction of the financial status synthetic describer (financial).

2. The next step is to test connections between the financial assets' price dynamics and the synthetic describer constructed in the previous step. The model we consider is non-linear, specifically we argue that the effects of the financial status improvement on price dynamics is not linear: such improvement leads to an increase in the interest shown by investors for holding financial assets until achieving a "critical threshold". Beyond this threshold investors may consider that the anticipated growth potential of the issuer's financial and economic performance is "decreasing". Therefore it is possible that the overall effect observed to be one of "inverted U curve", in summary:

$$p_{i,t} = \alpha_{0_i} + \alpha_{1i} * financial_{i,t} + \alpha_{2_i} * fianancial_{i,t}^{\ 2} + \varepsilon_{i,t},\ \alpha_{1i} \geq 0, \alpha_{2_i} \leq 0 \quad (1)$$

$p_{i,t}$ - represents the price variation of asset *i* at moment *t*

*financial* – represents the synthetic describer of financial status

$\alpha_{0_i}$ - reflects a “long term” trend induced by the economic and financial situation of the issuers in previous periods

$\varepsilon_{i,t}$ - represents the “short-term” transitory shocks that lead to a price deviation from the given level of “fundamental” variables

3. The last stage refers to the results obtained in the previous step that can be used in generating trading signals based on fundamental analysis. The actual generating technique can be synthesized by the following rule: if the current period t financial status indicator reflects a positive evolution, a buy signal is generated (buy long), reflecting investors' expectations regarding the positive potential of financial assets’ price increase. Correspondingly, if the synthetic describer shows a negative situation, a signal of "early sell" is generated (sell short) reflecting investors' expectations of a downward trend of prices.

To test this rule we shall consider a pre-determined trading horizon of one year. This range reflects the period required for the information on the financial statements of issuers, once arrived on the market, to exert the effects of "structural adjustment portfolios" and putting the prices of financial assets on the appropriate trend. It is to be noted that the speed of adjustment may be different for individual markets depending on a number of factors such as the degree of information asymmetry, the severity of "moral hazard", market liquidity, trading mechanisms efficiency, data processing algorithms and their effectiveness, investors’ taxonomy and their 'risk profile', etc. The assessment of the results is linked to the efficiency of the financial resources used in the portfolio construction:

$$\eta_{usedresources} = \frac{\prod_{assets}}{Expenses_{assets}} \quad (2)$$

$\eta_{usedresources}$ - efficiency of used financial resources

$\prod_{assets}$ - result of traded assets

$Expenses_{assets}$ - expenses of traded assets

The simulation in tables 6-16 is performed considering pre-determined holding horizon of the financial asset of one year. It does not take into account brokerage commissions and other possible costs of owning and trading the asset. This testing method allows displaying the accuracy of signals generated without considering the potential impact on trading results which can be associated with the use of different methods of asset allocation in the portfolio,

specifically it considers equal weighted allocation method. The aim is to highlight the ability of fundamental analysis to identify conditions of entry / exit to / from the market.

## 4. International data

Next we consider a data set consisting of financial information and, respectively, the variation of share prices of issuers from the American and European market. The issuers considered (tables 3-5) are part of indexes of those markets. Hence, on the American market we considered the DJIA index (Dow Jones Industrial Average) and on the European market we selected two indices: a) ESX (Euro Stoxx) to highlight developed capital markets (Western Europe); b) WIG20 to highlight emerging capital markets (Eastern Europe). All this information has been retrieved and processed from Teletrader Professional platform from Teletrader (2014). Both the financial statements and variations in the share prices of issuing companies have a yearly frequency and a period of four years (01.01.2010-31.12.2013) was considered. Based on financial statements a series of financial describers were computed (long term liability ratio, debt ratio, ROA, ROE, EPS, dividend / share, financial leverage), which may have an influence on the evolution of the share prices. The share prices variations refer to the change in the closing prices. All such information is provided in tables 6-16.

Analysis is performed on a total of 59 companies that are split for each zone according to the sectors from which they belong: a) "consumer goods"; b) "goods, industry, energy"; c) "financial"; d) "telecommunications". Based on all the information for each issuer a series of signals were identified, specifically buying shares depending on the evolution of the financial status synthetic describer (financial).

In order to assess the relevance of such a synthetic describer, we proceed with preliminary testing of the impact on the financial asset price dynamics in a Generalized Estimating Equation (GEE) model. It is used to estimate parameters of GLM model when the structure of correlations is not known exactly. The specific advantage of this type of models lies in their focus on average data behaviour ("Population-averaged" effects). GEE models are usually used together with estimator such as *Huber - White* of standard errors ("Robust standard errors" or “sandwich” variance estimators). GEE model belong to a class of semi-parametric regression techniques and are alternatives to models based on "likelihood function", models which show a more pronounced sensitivity to the specific structure of the variance. The results of this type of differentiated models on the markets are reported in table 2.

*Table 2* GEE model - results

| | DJI | EUR | WIG |
|---|---|---|---|
| **Financial** | 0,007<br>(0,008) | 0,011<br>(0,018) | 0,068***<br>(0,019) |
| **Financial$^2$** | -0,010***<br>(0,004) | -0,013*<br>(0,007) | -0,007**<br>(0,003) |
| **Constant** | 0,157***<br>(0,019) | 0,154**<br>(0,061) | 0,029<br>(0,044) |
| **Wald $\chi^2$** | 6,88<br>(p=0,032) | 9,28<br>(p=0,010) | 15,96<br>(p=0,000) |

***, **, * - significance level 1%, 5%, 10%
*Note*: GEE model type „population-averaged"; *Link*: Gaussian; Correlation: stationary (type 1); In () robust standard errors.
*Source*: own construction

One can observe that for all the results obtained, the mentioned effect of "inverted U curve" can be identified, the non-linear component being statistically significant for a significance level of 5% (10%).

## 5. Results and comments

Based on the results from table 2, we further generate trading signals. Results are reported in tables 6-16. From the comparative analysis of sectors taken into consideration on the US market, it can be seen that good performance was recorded by the "consumer goods" with a return on used resources of 6.24% and the "telecommunications" with a return on used resources of 4.74%. Although the "goods, industry, energy" sector recorded a positive trading result, the profitability of used resources is relatively low (0.81%). The only sector that recorded losses was the "financial". It is worth noting that within the sector with a high percentage of BL signals, the result was the highest and return on used resources was the best. SS signals have a negative influence within each sector under consideration.

Similar to the US market, on Western Europe market, very good performance was recorded by the "consumer goods" sector with a return on used resources of 18.67%, followed by the "telecommunications" sector with a return on used resources consumed by of 7.72% and the "goods, industry, energy" sector with a return on used resources of 6.64%. The only sector that recorded losses was the "financial". As in the US market, within the sector with only BL signals or a high percentage of them, the result per sector was the highest and profitability of used resources was the best.

In Eastern Europe markets, represented by the capital market in Poland, it can be seen

that the best performance was recorded by the "financial" sector with a return of 18.24% on used resources. Although the "telecommunications" sector records a positive trading result, the profitability of used resources is relatively low (0.20%). The only sector that recorded losses was the "goods, industry, energy". It is noted that positive results were generated by both BL and SS signals. It can be seen that using fundamental analysis on developed markets, "sell short" signals generated especially losses compared to emerging markets, represented by the capital market in Poland, where for both "buy long" and "sell short " signals, mixed results are obtained.

Considering the equal weighted allocation, we may state that an investor in the US market would record average results compared to market opportunities in Europe, namely Poland. On the European market well above average results are reported for the "consumer goods" sector and well above average results in Poland are reported for the "financial" sector. It is interesting to note that on an emerging market the best performance are registered in the "financial" sector while on developed markets trading based on fundamental analysis in this sector generates only losses.

The results provide empirical results on the relevance of using fundamental analysis as a methodology for determining the conditions of entry / exit to / from the market for both mature and emerging financial markets. According to these results it can be noted that there is an asymmetry between the efficiency of "buy long" and "sell short" trading signals.

The developed methodology allows synthesizing various describers of financial status of issuers within a global indicator, testing the existing connection between it and the variation of prices and also actual generation of trading signals.

The proposed methodology was applied on a set of 59 companies from the US, Western Europe and Eastern Europe markets. The generated results allowed estimation of efficiency of financial resources allocated in the construction of a managed portfolio, under a predetermined temporary horizon. These results are different within sectors, depending on the specifics of activities undertaken by issuers (the nature and duration of production cycle, the sector sensitivity to various types of endogenous and exogenous shocks, the level of technological development, the degree of integration of the sector within real and financial international flows, etc.).

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## *Appendix*

*Table 3* Companies from DJI structure

| Symbol | US - Companies | Sector |
|---|---|---|
| **Sector - consumer goods** | | |
| 1 | 3M Company | consumer goods |
| 10 | Coca-Cola Company | consumer goods |
| 15 | Home Depot, Inc. | consumer goods |
| 18 | Johnson & Johnson | consumer goods |
| 20 | McDonald's Corporation | consumer goods |
| 24 | Procter & Gamble Co. | consumer goods |
| 29 | Wal-Mart Stores, Inc. | consumer goods |
| 30 | Walt Disney Company | consumer goods |
| **Sector – goods, industry, energy** | | |
| 2 | Alcoa Inc. | goods |
| 6 | Boeing Company | industry |
| 7 | Caterpillar, Inc. | industry |
| 8 | Chevron Corporation | energy |
| 11 | Du Pont (E.I.) de Nemours & Co | goods |
| 12 | Exxon Mobil Corporation | energy |
| 13 | General Electric Company | industry |
| 26 | United Technologies Corporation | industry |
| **Sector – financial** | | |
| 3 | American Express Company | financial |
| 5 | Bank of America Corporation | financial |
| 19 | JPMorgan Chase & Co. | financial |
| 21 | Merck & Co., Inc | financial |
| 23 | Pfizer, Inc. | financial |
| 25 | The Travelers Companies, Inc. | financial |
| 27 | United Group Incorporated | financial |
| **Sector – telecommunications** | | |
| 4 | AT&T Inc | telecommunications |
| 9 | Cisco Systems, Inc. | telecommunications |
| 14 | Hewlett-Packard Company | telecommunications |
| 16 | Intel Corporation | telecommunications |
| 17 | Int. Business Machines Corp. | telecommunications |
| 22 | Microsoft Corporation | telecommunications |
| 28 | Verizon Communications Inc. | telecommunications |

*Source*: own construction

*Table 4* Companies from Euro Stoxx structure

| Symbol | Western Europe companies | Sector |
|---|---|---|
| **Sector - consumer goods** | | |
| 3 | Bay. Motoren Werke AG ST | consumer goods |
| 5 | Daimler AG | consumer goods |
| 16 | Volkswagen AG | consumer goods |
| **Sector – goods, industry, energy** | | |
| 2 | Basf Se Na O.N | goods |
| 4 | Bayer AG | goods |
| 8 | Eon | energy |
| 9 | Europ.Aeron.Def | industry |
| 11 | Rwe AG | energy |
| 13 | Siemens AG | industry |
| 15 | Total S.A. | energy |
| **Sector – financial** | | |
| 1 | Allianz Se Vna O.N. | financial |
| 6 | Deutsche Bank AG | financial |
| 10 | Muench.Rueckvers. | financial |
| **Sector – telecommunications** | | |
| 7 | Deutsche Telekom AG | telecommunications |
| 12 | Sap AG | telecommunications |
| 14 | Telefonica | telecommunications |

*Source*: own construction

*Table 5* Companies from WIG structure

| Simbol | Polish companies | Sector |
|---|---|---|
| **Sector – goods, industry, energy** | | |
| 2 | BORYSZEW | industry |
| 6 | KGHM | industry |
| 7 | LOTOS | energy |
| 9 | PGNIG | energy |
| 10 | PKNORLEN | energy |
| **Sector – financial** | | |
| 3 | BRE | financial |
| 4 | GTC | financial |
| 5 | HANDLOWY | financial |
| 8 | PEKAO | financial |
| 11 | PKOBP | financial |
| **Sector – telecommunications** | | |
| 1 | ASSECOPOL | telecommunications |
| 12 | TPSA | telecommunications |
| 13 | TVN | telecommunications |

*Source*: own construction

*Table 6* Signals/ Results of traded assets from US - sector consumer goods

| DJI - consumer goods | | | | | | | |
|---|---|---|---|---|---|---|---|
| **Company** | **Year** | **Share Price (USD)** | ***Financial*** | **Signal** | **Result/ transaction (USD)** | **Result/ traded asset (USD)** | **Expenses (USD)** |
| 1 | 2010 | 86.3 | 1.6659 | | | | |
| 1 | 2011 | 81.73 | 1.7225 | BL | -4.57 | | 86.3 |
| 1 | 2012 | 92.85 | 1.8500 | BL | 11.12 | | 81.73 |
| 1 | 2013 | 140.25 | 2.0897 | BL | 47.4 | 53.95 | 92.85 |
| 10 | 2010 | 32.88 | 0.8844 | | | | |
| 10 | 2011 | 34.99 | -0.0123 | BL | 2.11 | | 32.88 |
| 10 | 2012 | 36.25 | -0.0066 | SS | -1.26 | | 36.25 |
| 10 | 2013 | 41.31 | -0.0699 | SS | -5.06 | -4.21 | 41.31 |
| 15 | 2010 | 35.06 | -0.4897 | | | | |
| 15 | 2011 | 42.04 | -0.1529 | SS | -6.98 | | 42.04 |
| 15 | 2012 | 61.85 | 0.1417 | SS | -19.81 | | 61.85 |
| 15 | 2013 | 82.34 | 0.4300 | BL | 20.49 | -6.3 | 61.85 |
| 18 | 2010 | 61.85 | 1.4372 | | | | |
| 18 | 2011 | 65.58 | 0.6947 | BL | 3.73 | | 61.85 |
| 18 | 2012 | 70.1 | 0.9148 | BL | 4.52 | | 65.58 |
| 18 | 2013 | 91.59 | 1.3975 | BL | 21.49 | 29.74 | 70.1 |
| 20 | 2010 | 76.76 | 2.0400 | | | | |
| 20 | 2011 | 100.33 | 2.4292 | BL | 23.57 | | 76.76 |
| 20 | 2012 | 88.21 | 2.4613 | BL | -12.12 | | 100.33 |
| 20 | 2013 | 97.03 | 2.5987 | BL | 8.82 | 20.27 | 88.21 |
| 24 | 2010 | 64.33 | 0.7884 | | | | |
| 24 | 2011 | 66.71 | 0.6687 | BL | 2.38 | | 64.33 |
| 24 | 2012 | 67.89 | 0.6442 | BL | 1.18 | | 66.71 |
| 24 | 2013 | 81.41 | 0.7404 | BL | 13.52 | 17.08 | 67.89 |
| 29 | 2010 | 53.93 | 0.3226 | | | | |
| 29 | 2011 | 59.76 | 0.3089 | BL | 5.83 | | 53.93 |
| 29 | 2012 | 68.23 | 0.4552 | BL | 8.47 | | 59.76 |
| 29 | 2013 | 78.69 | 0.5165 | BL | 10.46 | 24.76 | 68.23 |
| 30 | 2010 | 37.51 | -0.7580 | | | | |
| 30 | 2011 | 37.5 | -0.5764 | SS | 0.01 | | 37.5 |
| 30 | 2012 | 49.79 | -0.2499 | SS | -12.29 | | 49.79 |
| 30 | 2013 | 76.4 | -0.0642 | SS | -26.61 | -38.89 | 76.4 |
| **General information** | | | **Total** | | | **96.4** | **1544.43** |
| | | | **Return of used resources** | | | **6.24%** | |
| | | | **Number of BL signals** | | | **17** | |
| | | | **Number of SS signals** | | | **7** | |

*Source*: own calculation

*Table 7* Signals/ Results of traded assets from US – sector goods, industry, energy

| DJI - goods, industry, energy | | | | | | | |
|---|---|---|---|---|---|---|---|
| **Company** | **Year** | **Share Price (EUR)** | ***Financial*** | **Signal** | **Result/ transaction (EUR)** | **Result/ traded asset (EUR)** | **Expenses (EUR)** |
| 2 | 2010 | 15.39 | -2.1816 | | | | |
| 2 | 2011 | 8.65 | -2.0168 | SS | 6.74 | | 8.65 |
| 2 | 2012 | 8.68 | -2.2796 | SS | -0.03 | | 8.68 |
| 2 | 2013 | 10.63 | -3.7785 | SS | -1.95 | 4.76 | 10.63 |
| 6 | 2010 | 65.26 | -0.1181 | | | | |
| 6 | 2011 | 73.35 | 0.0410 | SS | -8.09 | | 73.35 |
| 6 | 2012 | 75.36 | -0.4002 | BL | 2.01 | | 73.35 |
| 6 | 2013 | 136.49 | 0.0087 | SS | -61.13 | -67.21 | 136.49 |
| 7 | 2010 | 93.66 | -0.4415 | | | | |
| 7 | 2011 | 90.6 | 0.4504 | SS | 3.06 | | 90.6 |
| 7 | 2012 | 89.61 | 0.7876 | BL | -0.99 | | 90.6 |
| 7 | 2013 | 90.81 | 0.2528 | BL | 1.2 | 3.27 | 89.61 |
| 8 | 2010 | 91.25 | 2.1363 | | | | |
| 8 | 2011 | 106.4 | 3.1698 | BL | 15.15 | | 91.25 |
| 8 | 2012 | 108.14 | 3.1828 | BL | 1.74 | | 106.4 |
| 8 | 2013 | 124.91 | 2.7492 | BL | 16.77 | 33.66 | 108.14 |
| 11 | 2010 | 49.88 | -0.0165 | | | | |
| 11 | 2011 | 45.78 | -0.0357 | SS | 4.1 | | 45.78 |
| 11 | 2012 | 44.98 | -0.4236 | SS | 0.8 | | 44.98 |
| 11 | 2013 | 64.97 | 0.6704 | SS | -19.99 | -15.09 | 64.97 |
| 12 | 2010 | 73.12 | 0.9074 | | | | |
| 12 | 2011 | 84.76 | 1.5609 | BL | 11.64 | | 73.12 |
| 12 | 2012 | 86.55 | 2.0845 | BL | 1.79 | | 84.76 |
| 12 | 2013 | 101.2 | 2.0173 | BL | 14.65 | 28.08 | 86.55 |
| 13 | 2010 | 18.29 | -2.0216 | | | | |
| 13 | 2011 | 17.91 | -1.8533 | SS | 0.38 | | 17.91 |
| 13 | 2012 | 20.99 | -1.7319 | SS | -3.08 | | 20.99 |
| 13 | 2013 | 28.03 | -1.6262 | SS | -7.04 | -9.74 | 28.03 |
| 26 | 2010 | 78.72 | 0.3013 | | | | |
| 26 | 2011 | 73.09 | 0.5627 | BL | -5.63 | | 78.72 |
| 26 | 2012 | 82.01 | 0.2979 | BL | 8.92 | | 73.09 |
| 26 | 2013 | 113.8 | 0.6337 | BL | 31.79 | 35.08 | 82.01 |
| **General information** | | | **Total** | | | **12.81** | **1588.66** |
| | | | **Return of used resources** | | | **0.81%** | |
| | | | **Number of BL signals** | | | **12** | |
| | | | **Number of SS signals** | | | **12** | |

*Source*: own calculation

*Table 8* Signals/ Results of traded assets from US – sector financial

| DJI - financial | | | | | | | |
|---|---|---|---|---|---|---|---|
| **Company** | **Year** | **Share Price (EUR)** | ***Financial*** | **Signal** | **Result/ transaction (EUR)** | **Result/ traded asset (EUR)** | **Expenses (EUR)** |
| 3 | 2010 | 42.92 | -1.4425 | | | | |
| 3 | 2011 | 47.17 | -1.2368 | SS | -4.25 | | 47.17 |
| 3 | 2012 | 57.48 | -1.3001 | SS | -10.31 | | 57.48 |
| 3 | 2013 | 90.73 | -0.9826 | SS | -33.25 | -47.81 | 90.73 |
| 5 | 2010 | 13.34 | -3.3397 | | | | |
| 5 | 2011 | 5.56 | -3.2051 | SS | 7.78 | | 5.56 |
| 5 | 2012 | 11.61 | -3.1793 | SS | -6.05 | | 11.61 |
| 5 | 2013 | 15.57 | -2.9716 | SS | -3.96 | -2.23 | 15.57 |
| 19 | 2010 | 42.42 | -2.5188 | | | | |
| 19 | 2011 | 33.25 | -2.0527 | SS | 9.17 | | 33.25 |
| 19 | 2012 | 43.97 | -1.7890 | SS | -10.72 | | 43.97 |
| 19 | 2013 | 58.48 | -1.8260 | SS | -14.51 | -16.06 | 58.48 |
| 21 | 2010 | 36.04 | -1.1190 | | | | |
| 21 | 2011 | 37.7 | -0.1687 | SS | -1.66 | | 37.7 |
| 21 | 2012 | 40.94 | -0.1368 | SS | -3.24 | | 40.94 |
| 21 | 2013 | 50.05 | -0.4156 | SS | -9.11 | -14.01 | 50.05 |
| 23 | 2010 | 17.51 | -1.0416 | | | | |
| 23 | 2011 | 21.64 | -0.8519 | SS | -4.13 | | 21.64 |
| 23 | 2012 | 25.08 | -0.3831 | SS | -3.44 | | 25.08 |
| 23 | 2013 | 30.63 | 0.5529 | SS | -5.55 | -13.12 | 30.63 |
| 25 | 2010 | 55.71 | -0.5724 | | | | |
| 25 | 2011 | 59.17 | -1.2631 | SS | -3.46 | | 59.17 |
| 25 | 2012 | 71.82 | -0.5464 | SS | -12.65 | | 71.82 |
| 25 | 2013 | 90.54 | 0.2497 | SS | -18.72 | -34.83 | 90.54 |
| 27 | 2010 | 36.11 | -0.4609 | | | | |
| 27 | 2011 | 50.68 | -0.1943 | SS | -14.57 | | 50.68 |
| 27 | 2012 | 54.24 | -0.1698 | SS | -3.56 | | 54.24 |
| 27 | 2013 | 75.3 | 0.0262 | SS | -21.06 | -39.19 | 75.3 |
| **General information** | | | **Total** | | | **-167.25** | **971.61** |
| | | | **Return of used resources** | | | **-17.21%** | |
| | | | **Number of BL signals** | | | **0** | |
| | | | **Number of SS signals** | | | **21** | |

*Source*: own calculation

*Table 9* Signals/ Results of traded assets from US – sector telecommunications

| DJI - telecommunications | | | | | | | |
|---|---|---|---|---|---|---|---|
| **Company** | **Year** | **Share Price (EUR)** | ***Financial*** | **Signal** | **Result/ transaction (EUR)** | **Result/ traded asset (EUR)** | **Expenses (EUR)** |
| 4 | 2010 | 29.38 | 0.1947 | | | | |
| 4 | 2011 | 30.24 | -1.0604 | BL | 0.86 | | 29.38 |
| 4 | 2012 | 33.71 | -0.8688 | SS | -3.47 | | 33.71 |
| 4 | 2013 | 35.16 | 0.0366 | SS | -1.45 | -4.06 | 35.16 |
| 9 | 2010 | 20.23 | -0.4011 | | | | |
| 9 | 2011 | 18.08 | -0.7292 | SS | 2.15 | | 18.08 |
| 9 | 2012 | 19.64 | -0.4054 | SS | -1.56 | | 19.64 |
| 9 | 2013 | 22.43 | -0.0586 | SS | -2.79 | -2.2 | 22.43 |
| 14 | 2010 | 41.1 | -0.7401 | | | | |
| 14 | 2011 | 25.76 | -0.9885 | SS | 15.34 | | 25.76 |
| 14 | 2012 | 14.25 | -5.6046 | SS | 11.51 | | 14.25 |
| 14 | 2013 | 27.98 | -1.1933 | SS | -13.73 | 13.12 | 27.98 |
| 16 | 2010 | 21.03 | 1.1645 | | | | |
| 16 | 2011 | 24.25 | 1.2289 | BL | 3.22 | | 21.03 |
| 16 | 2012 | 20.62 | 0.6161 | BL | -3.63 | | 24.25 |
| 16 | 2013 | 25.955 | 0.2846 | BL | 5.335 | 4.925 | 20.62 |
| 17 | 2010 | 146.76 | 2.8229 | | | | |
| 17 | 2011 | 183.88 | 3.4732 | BL | 37.12 | | 146.76 |
| 17 | 2012 | 191.55 | 4.0068 | BL | 7.67 | | 183.88 |
| 17 | 2013 | 187.57 | 4.0428 | BL | -3.98 | 40.81 | 191.55 |
| 22 | 2010 | 27.91 | 1.3096 | | | | |
| 22 | 2011 | 25.96 | 1.4587 | BL | -1.95 | | 27.91 |
| 22 | 2012 | 26.7097 | 0.4746 | BL | 0.7497 | | 25.96 |
| 22 | 2013 | 37.41 | 0.8087 | BL | 10.7003 | 9.5 | 26.7097 |
| 28 | 2010 | 35.78 | -1.5228 | | | | |
| 28 | 2011 | 40.12 | -1.5807 | SS | -4.34 | | 40.12 |
| 28 | 2012 | 43.27 | -1.8132 | SS | -3.15 | | 43.27 |
| 28 | 2013 | 49.14 | -0.3289 | SS | -5.87 | -13.36 | 49.14 |
| **General information** | | | **Total** | | | **48.735** | **1027.5897** |
| | | | **Return of used resources** | | | **4.74%** | |
| | | | **Number of BL signals** | | | **10** | |
| | | | **Number of SS signals** | | | **11** | |

*Source*: own calculation

*Table 10* Signals/ Results of traded assets from Western Europe – sector consumer goods

| **EUR - consumer goods** | | | | | | | |
|---|---|---|---|---|---|---|---|
| **Company** | **Year** | **Share Price (EUR)** | ***Financial*** | **Signal** | **Result/ transaction (EUR)** | **Result/ traded asset (EUR)** | **Expenses (EUR)** |
| 3 | 2010 | 58.71 | 0.4673 | | | | |
| 3 | 2011 | 51.54 | 0.7380 | BL | -7.17 | | 58.71 |
| 3 | 2012 | 73.09 | 0.6990 | BL | 21.55 | | 51.54 |
| 3 | 2013 | 85.22 | 0.7229 | BL | 12.13 | 26.51 | 73.09 |
| 5 | 2010 | 50.92 | 0.3432 | | | | |
| 5 | 2011 | 33.768 | 0.6043 | BL | -17.152 | | 50.92 |
| 5 | 2012 | 41.424 | 0.6784 | BL | 7.656 | | 33.768 |
| 5 | 2013 | 62.9 | 0.7254 | BL | 21.476 | 11.98 | 41.424 |
| 16 | 2010 | 121.81 | 0.2666 | | | | |
| 16 | 2011 | 115.15 | 1.1953 | BL | -6.66 | | 121.81 |
| 16 | 2012 | 172.26 | 1.6912 | BL | 57.11 | | 115.15 |
| 16 | 2013 | 196.9 | 0.1358 | BL | 24.64 | 75.09 | 172.26 |
| **General information** | | | **Total** | | | **113.58** | **608.422** |
| | | | **Return of used resources** | | | **18.67%** | |
| | | | **Number of BL signals** | | | **9** | |
| | | | **Number of SS signals** | | | **0** | |

*Source*: own calculation

*Table 11* Signals/ Results of traded assets from Western Europe – sector goods, industry, energy

| EUR - goods, industry, energy | | | | | | | |
|---|---|---|---|---|---|---|---|
| **Company** | **Year** | **Share Price (EUR)** | ***Financial*** | **Signal** | **Result/ transaction (EUR)** | **Result/ traded asset (EUR)** | **Expenses (EUR)** |
| 2 | 2010 | 60.01 | 1.7588 | | | | |
| 2 | 2011 | 53.63 | 2.3219 | BL | -6.38 | | 60.01 |
| 2 | 2012 | 71.3 | 1.6096 | BL | 17.67 | | 53.63 |
| 2 | 2013 | 77.49 | 1.8273 | BL | 6.19 | 17.48 | 71.3 |
| 4 | 2010 | 55.05 | 0.4673 | | | | |
| 4 | 2011 | 49.2 | 0.7380 | BL | -5.85 | | 55.05 |
| 4 | 2012 | 71.86 | 0.6990 | BL | 22.66 | | 49.2 |
| 4 | 2013 | 101.95 | 0.7229 | BL | 30.09 | 46.9 | 71.86 |
| 8 | 2010 | 22.865 | 0.4693 | | | | |
| 8 | 2011 | 16.53 | -1.4750 | BL | -6.335 | | 22.865 |
| 8 | 2012 | 14.087 | -0.4126 | SS | 2.443 | | 14.087 |
| 8 | 2013 | 13.415 | -0.3924 | SS | 0.672 | -3.22 | 13.415 |
| 9 | 2010 | 17.785 | -1.7404 | | | | |
| 9 | 2011 | 24.115 | -1.4821 | SS | -6.33 | | 24.115 |
| 9 | 2012 | 29.425 | -1.3593 | SS | -5.31 | | 29.425 |
| 9 | 2013 | 55.81 | -1.2152 | SS | -26.385 | -38.025 | 55.81 |
| 11 | 2010 | 50.01 | -0.1878 | | | | |
| 11 | 2011 | 26.923 | -0.7417 | SS | 23.087 | | 26.923 |
| 11 | 2012 | 31.2 | -0.9975 | SS | -4.277 | | 31.2 |
| 11 | 2013 | 26.605 | -3.2709 | SS | 4.595 | 23.405 | 26.605 |
| 13 | 2010 | 93.17 | 0.3466 | | | | |
| 13 | 2011 | 73.83 | 0.9186 | BL | -19.34 | | 93.17 |
| 13 | 2012 | 82.06 | 0.4124 | BL | 8.23 | | 73.83 |
| 13 | 2013 | 99.29 | 0.4969 | BL | 17.23 | 6.12 | 82.06 |
| 15 | 2010 | 40.145 | 1.6933 | | | | |
| 15 | 2011 | 39.468 | 1.6814 | BL | -0.677 | | 40.145 |
| 15 | 2012 | 39.08 | 1.3607 | BL | -0.388 | | 39.468 |
| 15 | 2013 | 44.53 | 1.0597 | BL | 5.45 | 4.385 | 39.08 |
| **General information** | | | **Total** | | | **57.045** | **859.608** |
| | | | **Return of used resources** | | | **6.64%** | |
| | | | **Number of BL signals** | | | **13** | |
| | | | **Number of SS signals** | | | **8** | |

Source: own calculation

*Table 12* Signals/ Results of traded assets from Western Europe – sector financial

| EUR - financial | | | | | | | |
|---|---|---|---|---|---|---|---|
| **Company** | **Year** | **Share Price (EUR)** | ***Financial*** | **Signal** | **Result/ transaction (EUR)** | **Result/ traded asset (EUR)** | **Expenses (EUR)** |
| 1 | 2010 | 88.96 | -1.9622 | | | | |
| 1 | 2011 | 73.43 | -2.3177 | SS | 15.53 | | 73.43 |
| 1 | 2012 | 104.58 | -2.0780 | SS | -31.15 | | 104.58 |
| 1 | 2013 | 130.35 | -2.0257 | SS | -25.77 | -41.39 | 130.35 |
| 6 | 2010 | 39.06 | -3.5758 | | | | |
| 6 | 2011 | 29.319 | -3.5420 | SS | 9.741 | | 29.319 |
| 6 | 2012 | 33.012 | -3.7069 | SS | -3.693 | | 33.012 |
| 6 | 2013 | 36.675 | -3.2158 | SS | -3.663 | 2.385 | 36.675 |
| 10 | 2010 | 113.39 | -1.8702 | | | | |
| 10 | 2011 | 94.59 | -2.4078 | SS | 18.8 | | 94.59 |
| 10 | 2012 | 136.08 | -1.7154 | SS | -41.49 | | 136.08 |
| 10 | 2013 | 160.15 | -1.7109 | SS | -24.07 | -46.76 | 160.15 |
| **General information** | | | **Total** | | | **-85.765** | **620.176** |
| | | | **Return of used resources** | | | **-13.83%** | |
| | | | **Number of BL signals** | | | **0** | |
| | | | **Number of SS signals** | | | **9** | |

*Source*: own calculation

*Table 13* Signals/ Results of traded assets from Western Europe – sector telecommunication

| EUR - telecommunications | | | | | | | |
|---|---|---|---|---|---|---|---|
| **Company** | **Year** | **Share Price (EUR)** | ***Financial*** | **Signal** | **Result/ transaction (EUR)** | **Result/ traded asset (EUR)** | **Expenses (EUR)** |
| 7 | 2010 | 9.623 | 0.2328 | | | | |
| 7 | 2011 | 8.85 | -0.0398 | BL | -0.773 | | 9.623 |
| 7 | 2012 | 8.603 | -1.8227 | SS | 0.247 | | 8.603 |
| 7 | 2013 | 12.43 | -0.2282 | SS | -3.827 | -4.353 | 12.43 |
| 12 | 2010 | 37.92 | 2.5867 | | | | |
| 12 | 2011 | 40.92 | 3.8076 | BL | 3 | | 37.92 |
| 12 | 2012 | 60.79 | 3.0022 | BL | 19.87 | | 40.92 |
| 12 | 2013 | 62.31 | 3.5109 | BL | 1.52 | 24.39 | 60.79 |
| 14 | 2010 | 17.02 | 2.3962 | | | | |
| 14 | 2011 | 13.28 | 1.0930 | BL | -3.74 | | 17.02 |
| 14 | 2012 | 10.115 | 0.6730 | BL | -3.165 | | 13.28 |
| 14 | 2013 | 11.835 | 1.3402 | BL | 1.72 | -5.185 | 10.115 |
| **General information** | | | **Total** | | | **14.852** | **192.475** |
| | | | **Return of used resources** | | | **7.72%** | |
| | | | **Number of BL signals** | | | **7** | |
| | | | **Number of SS signals** | | | **2** | |

Source: own calculation

*Table 14* Signals/ Results of traded assets from Eastern Europe – sector goods, industry, energy

| WIG - goods, industry, energy | | | | | | | |
|---|---|---|---|---|---|---|---|
| **Company** | **Year** | **Share Price (EUR)** | ***Financial*** | **Signal** | **Result/ transaction (EUR)** | **Result/ traded asset (EUR)** | **Expenses (EUR)** |
| 2 | 2010 | 20 | -0.8805 | | | | |
| 2 | 2011 | 6.3 | 0.1202 | SS | 13.7 | | 6.3 |
| 2 | 2012 | 6.2 | -0.6186 | BL | -0.1 | | 6.3 |
| 2 | 2013 | 5 | -0.8196 | SS | 1.2 | 14.8 | 5 |
| 6 | 2010 | 173 | 4.3296 | | | | |
| 6 | 2011 | 110.6 | 8.6020 | BL | -62.4 | | 173 |
| 6 | 2012 | 190 | 2.9228 | BL | 79.4 | | 110.6 |
| 6 | 2013 | 118 | 1.4362 | BL | -72 | -55 | 190 |
| 7 | 2010 | 36.35 | -0.4750 | | | | |
| 7 | 2011 | 23.3 | -0.5495 | SS | 13.05 | | 23.3 |
| 7 | 2012 | 41.2 | -0.2563 | SS | -17.9 | | 41.2 |
| 7 | 2013 | 35.45 | -1.1882 | SS | 5.75 | 0.9 | 35.45 |
| 9 | 2010 | 3.57 | 0.1795 | | | | |
| 9 | 2011 | 4.08 | -0.2010 | BL | 0.51 | | 3.57 |
| 9 | 2012 | 5.21 | -0.3759 | SS | -1.13 | | 5.21 |
| 9 | 2013 | 5.15 | -0.4628 | SS | 0.06 | -0.56 | 5.15 |
| 10 | 2010 | 45.8 | -0.1690 | | | | |
| 10 | 2011 | 33.9 | -0.3746 | SS | 11.9 | | 33.9 |
| 10 | 2012 | 49.5 | -0.1251 | SS | -15.6 | | 49.5 |
| 10 | 2013 | 41 | -0.8438 | SS | 8.5 | 4.8 | 41 |
| **General information** | | | **Total** | | | **-35.06** | **716.88** |
| | | | **Return of used resources** | | | **-4.89%** | |
| | | | **Number of BL signals** | | | **5** | |
| | | | **Number of SS signals** | | | **10** | |

*Source*: own calculation

*Table 15* Signals/ Results of traded assets from Eastern Europe – sector financial

| WIG - financial | | | | | | | |
|---|---|---|---|---|---|---|---|
| **Company** | **Year** | **Share Price (EUR)** | ***Financial*** | **Signal** | **Result/ transaction (EUR)** | **Result/ traded asset (EUR)** | **Expenses (EUR)** |
| 3 | 2010 | 304 | 0.3632 | | | | |
| 3 | 2011 | 246 | 0.9555 | BL | -58 | | 304 |
| 3 | 2012 | 326 | 0.8964 | BL | 80 | | 246 |
| 3 | 2013 | 500 | 1.7892 | BL | 174 | 196 | 326 |
| 4 | 2010 | 24.5 | -1.4422 | | | | |
| 4 | 2011 | 9.3 | -3.7072 | SS | 15.2 | | 9.3 |
| 4 | 2012 | 9.9 | -2.3426 | SS | -0.6 | | 9.9 |
| 4 | 2013 | 7.45 | -3.0858 | SS | 2.45 | 17.05 | 7.45 |
| 5 | 2010 | 93.5 | 0.4870 | | | | |
| 5 | 2011 | 67.9 | 0.1862 | BL | -25.6 | | 93.5 |
| 5 | 2012 | 98.3 | 0.6309 | BL | 30.4 | | 67.9 |
| 5 | 2013 | 105 | 0.7621 | BL | 6.7 | 11.5 | 98.3 |
| 8 | 2010 | 179 | 0.7718 | | | | |
| 8 | 2011 | 141.2 | 0.7316 | BL | -37.8 | | 179 |

| WIG - financial | | | | | | | |
|---|---|---|---|---|---|---|---|
| **Company** | **Year** | **Share Price (EUR)** | ***Financial*** | **Signal** | **Result/ transaction (EUR)** | **Result/ traded asset (EUR)** | **Expenses (EUR)** |
| 8 | 2012 | 167.5 | 1.0050 | BL | 26.3 | | 141.2 |
| 8 | 2013 | 179.5 | 1.0876 | BL | 12 | 0.5 | 167.5 |
| 11 | 2010 | 43.35 | 0.0562 | | | | |
| 11 | 2011 | 32.12 | 0.0859 | BL | -11.23 | | 43.35 |
| 11 | 2012 | 36.9 | 0.0480 | BL | 4.78 | | 32.12 |
| 11 | 2013 | 39.42 | -0.1724 | BL | 2.52 | -3.93 | 36.9 |
| **General information** | | | **Total** | | | **221.12** | **1212.42** |
| | | | **Return of used resources** | | | **18.24%** | |
| | | | **Number of BL signals** | | | **12** | |
| | | | **Number of SS signals** | | | **3** | |

*Source*: own calculation

*Table 16* Signals/ Results of traded assets from Eastern Europe – sector telecommunications

| WIG - telecommunications | | | | | | | |
|---|---|---|---|---|---|---|---|
| **Company** | **Year** | **Share Price (EUR)** | ***Financial*** | **Signal** | **Result/ transaction (EUR)** | **Result/ traded asset (EUR)** | **Expenses (EUR)** |
| 1 | 2010 | 53 | 0.1419 | | | | |
| 1 | 2011 | 48.5 | 0.0425 | BL | -4.5 | | 53 |
| 1 | 2012 | 45.35 | -0.0026 | BL | -3.15 | | 48.5 |
| 1 | 2013 | 45.97 | 0.0399 | SS | -0.62 | -8.27 | 45.97 |
| 12 | 2010 | 16.35 | -0.8927 | | | | |
| 12 | 2011 | 17.23 | 0.0575 | SS | -0.88 | | 17.23 |
| 12 | 2012 | 12.23 | -0.4703 | BL | -5 | | 17.23 |
| 12 | 2013 | 9.8 | -0.6047 | SS | 2.43 | -3.45 | 9.8 |
| 13 | 2010 | 17.1 | -1.5338 | | | | |
| 13 | 2011 | 10.3 | -3.3484 | SS | 6.8 | | 10.3 |
| 13 | 2012 | 9.92 | 0.0555 | SS | 0.38 | | 9.92 |
| 13 | 2013 | 14.7 | -2.8415 | BL | 4.78 | 11.96 | 9.92 |
| **General information** | | | **Total** | | | **0.24** | **120.37** |
| | | | **Return of used resources** | | | **0.20%** | |
| | | | **Number of BL signals** | | | **4** | |
| | | | **Number of SS signals** | | | **5** | |

*Source*: own calculation