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Uncertainty and fluctuations on the stock markets

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Abstract. The financial world is under different stress, caused by the evolutions of many relevant economic and financial indicators. The stock market provides us a direct and updated reaction of investors to the evolution of the global economy. The analysis of different indicators can show us a relevant correlation between stock indexes. The purpose of our paper is to see the relation between stock indexes and indexes that track the worldwide shipping prices, or the relation with measures of implied volatility, between 2005 and 2010. Throughout this analysis we can verify the gap or the link between stock markets and economic reality. The findings could show us how economic phenomena react at changes in stock markets, and how the perceptions of investors can influence the stock market.

Keywords: stock market, economic uncertainty, financial fluctuations

1. Introduction

1.1. Research Objectives

In order to develop the research we stated the research objectives:

- Verifying the correlation between stock indexes and relevant indicators: index that track the worldwide shipping prices and implied volatility indexes
- Presenting the indirect relation between the indicators

1.2. Research Methodology

In order to develop the analysis where:

- Selection of the relevant stock market to prepare the comparison and to calculate the level of correlation
- Applying the correlation between the stock market indicators and two indicators for shipping prices and implied volatility between 2005 and 2010
- Developing conclusions based on the results

1.3. Literature Review

The level of correlation between indexes from the stock market and other relevant information was studied by many authors, in order to develop some quantifiable influences. Correlations between stock indexes can be found in the work of Geamasu and Stancu (2010), from the perspective of liquidity and correlation between the variations of the share prices. Other authors, like Sol, In Joon and Seung (2009) search the relation and correlation between options and the stock market, while Zoicas and Fat (2008), followed the evolution of BET index (Bucharest Exchange Trading – the main stock index from the Bucharest Stock Exchange Romania) and the macroeconomic variables in Romania: interest rate, inflation rate and unemployment rate. The link between the evolution of stock indexes and exchange rate where developed by Horobet and Ilie in a study between 1999 and 2007. The practical approach of these studies is uncountable, providing important information for investors and companies for the analysis of the financial and economic context. The importance for research is that it opens new ideas to analyse in the future.

2. Correlation between indexes

The level of correlation between stock indexes and economic indexes can show the way in which the financial markets influence the economic activities. The economic and financial sectors are facing new challenges after the financial crisis. Uncertainty is the new used word in the economic sector, while

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fluctuation is the new one in the financial sector. Is the level of correlation between indexes important? We ask the question in order to start our research. Depending on the indexes chosen, some relevant results can be found that can reflect the relation between indexes.

We have chosen relevant international stock indexes, which are used by analysts, media and investors to assess the evolution of the markets.

Thus, the indexes chosen are:

- S&P 500 – was developed by Standard & Poor's, being one of the most used stock indexes together with DJIA. The index includes the prices of 500 large companies that are traded in USA.
- DJIA (Dow Jones Industrial Average) – also known as Dow Jones, Dow 30 or Dow is a well-known index. It was created by Charles Dow, the editor of Wall Street journal and founder of the company Dow Jones & company. This index follows the evolution of 30 large companies traded in USA. The index is calculated since 1896.
- FTSE 100 – is the index of the most liquid 100 companies, with the highest capitalization at the London Stock Exchange, having a capitalization of 81% from the capital market in United Kingdom.
- DAX (Deutscher Aktien IndeX) – is the main index of the German stock exchange from Frankfurt and includes 30 large companies traded in this market.
- Nikkei 225 – is the index of the stock exchange from Tokyo, including 225 Japanese companies, calculated from 1950.

Due to the uncertainty in the market we cannot neglect other indicators that can be compared to analyze the evolution of the global economy and capital market.

One of these indexes is the Baltic Dry Index, which measure the evolution of shipping price of goods. It represents the price paid by the end-consumer for shipping the goods. The index is calculated daily by the Baltic Exchange with headquarter in London, being the global marketplace for trading shipping contracts. Thus, as the analysis emphasize, when the index has high values this could be a sign that the demand of sipping services is high, and the global trade is increasing. Another important index is VIX – also called the implied volatility index. This is calculated by the Chicago Board of Options Exchange based on the evolution of option prices for the shares included in S&P500. A high value of this index expresses high variation of prices, and a high probability that new variation could appear. This index is also known as the "investor fear gauge", showing the relaxation the investors when the value is low.

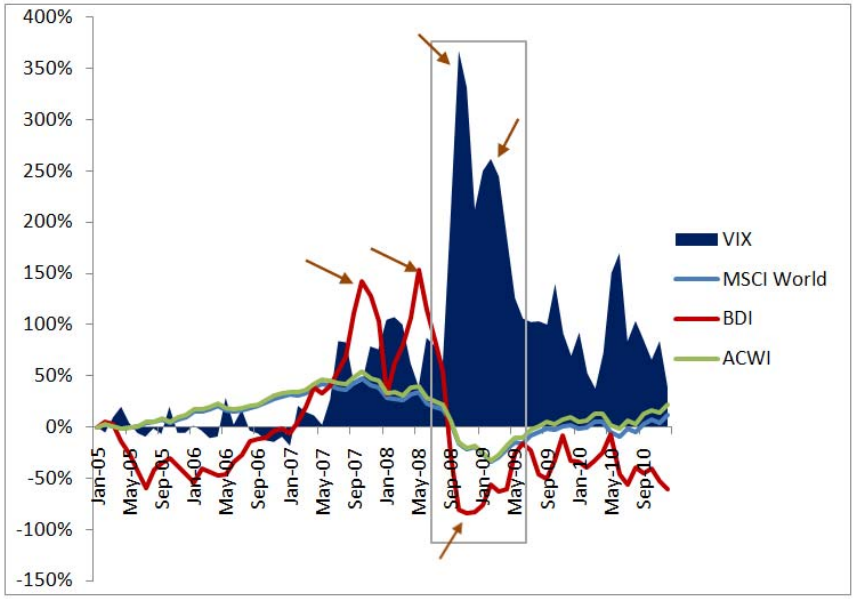

Fig. 1: Evolution of the variation of the volatility index VIX, global indexes MSCI World and ACWI, and Baltic Dry Index between 2005 and 2010, calculated as percentages from the value in January 2005.

In figure 1 we compared the evolution BDI and VIX with two global indexes: MSC World (Morgan Stanley Capital International World) and MSCI ACWI IMI (MSCI All Country World Investable Market Index). MSCI World follows 1500 shares from 24 developed countries. MSCI ACWI IMI follows 8500 of shares from 45 developed and emerging markets. In figure 1 we can see the evolution between September 2008 and May 2009, when the maximum of VIX was registered (59, 89 points), and the values of the compared index decrease.

We can see from the chart an indirect relation between the VIX and the other indexes presented. When the value of value of the implied volatility index is decreasing, the values from the other compared indexes are increasing. There can be observed a high increase during January 2008 and December 2010, as a reaction of investors to the financial crisis.

During this period, Baltic Dry Index decrease, as the shipping prices decrease, especially due to the decrease of demand in the markets. When demand decrease, the financial markets becomes an economic one, which affects production, commerce and services world-wide.

The degree of correlation between indexes is analysed through the correlation coefficient. This indicator measures the intensity of linear relation between two analyzed indexes. The correlation coefficient is a measure without dimensions, which make the variables being expressed in any measuring unit.

The correlation coefficient (ryx) can take value from -1 to +1, the sign indicating the type of relation: direct or indirect.
The correlation coefficient is calculated through the formula:

$$ryx = \frac{\sum(x_i - \bar{x})(y_i - \bar{y})}{n\sigma_x\sigma_y}$$

Where:
ryx - correlation coefficient
$\bar{x}$ – Average of variable x
$\bar{y}$ – Average of variable y
n – Number of pair observations
σ_x- Standard deviation of x
σ_y- Standard deviation of variable y

Developing our research through the comparison between VIX, BDI and the stock indexes resulted in interesting numbers. The implied volatility index had an indirect relation with most of the indexes. The highest correlation coefficient for BDI is between MSCI ACWI IMI (0,7589). The lowest correlation coefficient for Baltic Dry Index was for Nikkei 225 at a value of 0.4387. We can observe that indexes from USA and Germany have a good correlation. The indirect correlation for VIX is at the highest value for Nikkei 225 and S&P500. The lowest correlation is registered between VIX and DAX index.

	S&P	**FTSE**	**DJIA**	**DAX**	**Nikkei 225**	**MSCI**	**ACWI**	**VIX**	**BDI**
VIX	-0.6758	-0.6427	-0.5608	-0.3151	-0.6947	-0.5963	-0.5623	1	
BDI	0.6796	0.6033	0.7315	0.6541	0.4387	0.7502	0.7589	-0.2338	1

Table 1: The correlation between VIX, BDI and stock market indexes between 2005 and 2010

Comparing both BDI and VIX, we can observe that S&P500 has the highest correlation coefficient for both of the indexes, directly or indirectly. The evolution of S&P500 strongly reflects the financial crisis, being one of the most important stock indexes in USA. The relation with Baltic Dry Index is relavant, mainly because the shipping prices are listed on the Baltic Exchange.

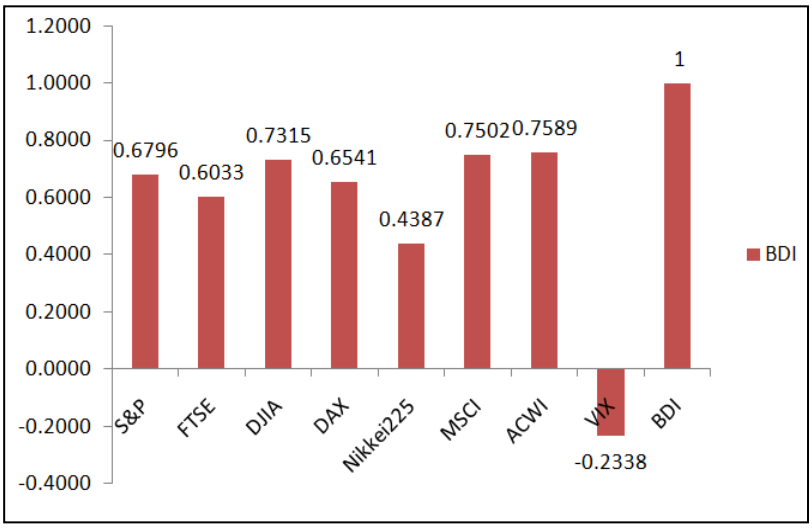

Fig. 2: The correlation between BDI and stock indexes

The results for the correlation coefficients between VIX and stock indexes can be observed from the figure 1. There is a low degree of correlation between VIX and Baltic Dry index, suggesting that there isn't a strong relation between their evolutions. A strong relation could have suggested that when investors fear uncertainty this leads to low value of the Baltic Dry Index.

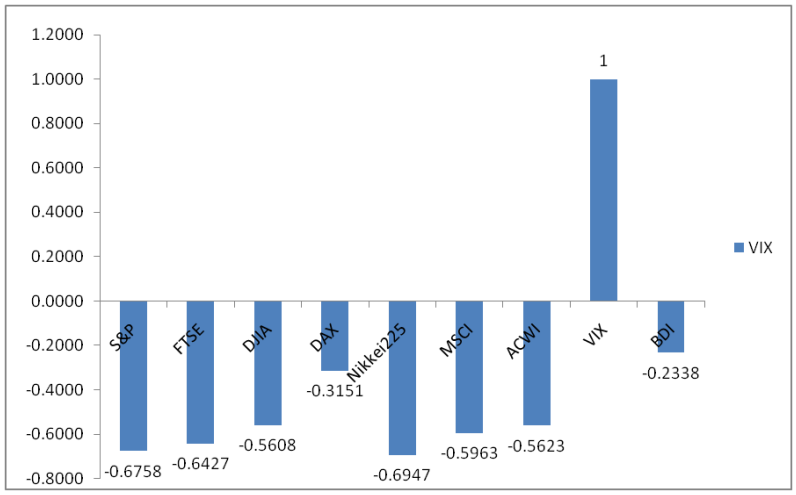

Fig. 3: The correlation between BDI and stock indexes

3. Conclusions

A period of increase and development was between 2005 and 2007, period in which the majority of the analyzed indexes increased, as a signal of positive reactions from the market. From the end of 2007, through the start of the financial crisis until the first two quarters of 2009, the evolution of stock exchanges reflected the pessimism and uncertainty in the capital markets. In this article, we analyzed the evolution of 7 stock market indexes and 2 related indexes: Baltic Dry Index and VIX (implied volatility). The findings showed us an acceptable level of correlation, thus an acceptable level of explaining the fluctuation in an index through another one. The perception of investors, or the "fear gauge" reflected through VIX, suggested us the evolution of the context during 2005 and 2010. Until 2008, VIX had low variations, which increase with the development of the financial crisis. The level of the correlation coefficient can be seen both from

numbers and figures. Baltic Dry Index has also an acceptable level of correlation with the stock markets, but a low correlation with VIX.

In uncertainty and financial fluctuations, analyzing different implications and information in the world could be the best solution. Having solutions to problems can create opportunities in the market and investors can monetize through their decisions in the market.

Underpinning, the degree of correlation expresses relevant supporting data for future decision. Future research in this field is needed, to assess the influence and relationship between stock market and other phenomena.

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