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BUBBLES IN THE EUROPEAN STOCK MARKET¹

***Abstract:** Changes in the increase and decrease in the stock market are an ordinary part of financial markets. In previous periods, bubbles manifested themselves sporadically in the stock markets and they led to significant problems, but at the same time, they were also an instrument of establishing balance in the capital markets. The ex-post identification of bubbles in the stock markets is a relatively easy matter nowadays. It is more complicated to identify the formation of bubbles ex-ante, so that it is possible to prevent catastrophic losses. The aim of this working paper is to search for main indicators that have a signalling function and warn of an approaching new bubble. At the same time, based on a quantitative analysis, we will try to demonstrate to which extent bubbles worked or how much they are tolerable in the European stock market.*

***Keywords:** stocks bubble, stock index, volatility of stock market, indicators of bubble*

JEL: G 01, G 15, G 18

Introduction

In the past, the issue of stock market bubbles has been dealt with extensively in the financial theory. It is connected with the fact that historically the occurrence of bubbles was only sporadic or their low frequency (a bubble occurred only once in a century) did not lead to the increased interest of their research.

We observe the more detailed processing of this issue only after the burst of the bubble in 1929, which was followed by the Great Economic Crisis. Gareth Garrett [3] analysed the causes and anatomy of this bubble and he aptly called it “The Bubble that broke the World.”

The attention of economists started to focus especially after the outbreak of technological bubble and, subsequently, the so-called mortgage bubble in 2007.

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There are famous publications by Reinhart, C.M., and Rogoff, K.S. [8], who in their work “This time is Different” connect bubbles with the financial crisis and analyse its individual stages in detail. In the centre of attention are authors such as G. Chakrabarti and CH. Sen [6], who focused in their publication “Anatomy of Global Stock Market Crashes” on the analysis of the recent two bubbles of this century. A few publications are connected with these last bubbles, e.g. the work of Peter D. Schiff [11], who is often referred to as an economic visionary with a great amount of pessimism and his book “Crash Proof, How to Profit from the Coming Economic Collapse” aroused interest all around the world. The bubbles issue is also analysed in the work “Stocks Long Run” by the famous economist Jeremy Siegel [12], who specifically deals with anatomy of the last bubbles and their characteristic features. In Europe the work of Stefan Palan [7] called “Bubbles and Crashes in Experimental Asset Markets is well-known. In this work the author concentrates on the prediction of bubbles and subsequent collapses by using different quantitative methods.

In the last years, owing to increased intensity of bubbles, the attention has been paid mostly to the bubbles prediction issue by using the warning signals. The works of Roubini Nouriel [9] are well-known and they are referred to by Forbes. His publication “Crisis Economics and Crash Course in the Future of Finance” brought attention also to investors. Jeremy Grantham [4] in his articles published by the magazine Fortuna (2007) predicted the burst of a bubble and subsequently the crisis in 2008.

In this paper we will try to demonstrate and analyse individual signals which accompany the formation of a bubble in detail, based on the current knowledge and statistical data. Thanks to that it is possible to prevent the unwanted effects after the outbreak of bubbles. We will aim the practical application at the European stock market, which is evolving differently compared to the American market. We have deliberately chosen the DJ Eurostoxx 50 index as an indicator of the stock market as it represents the most significant stocks of the unified European market.

1 Bubbles in the Stock Market and their Indicators

A bubble in the stock market is defined as a rapid market growth followed by a sharp decline – bursting. It is very easy to identify a bubble ex post. It is far more difficult to predict the bubble. If we stick to the theory of fundamental analysis, then the bubble starts when the share price greatly exceeds its intrinsic value. Also according to A. Damodaran [2] the bubble can be recognized also by using some asset pricing models based on discounted cash flows. According to this leading economist, following parameter can be used:

- *Price-to-earnings ratio (P/E)* – the real level of P/E can be easily quantified by dividing the current stock price by the profits realized during the last year. In this procedure, however, it is necessary to identify the extra profits, or frequently occurring accounting machinations, which may lead to significant profit growth. From an objective point of view, this indicator is often used for a longer period, for example ten years. Some authors, including Nobel Prize laureate P. Shiller, even use inflation adjusted earnings.

To what extent the P/E indicator is capable to predict future earnings or market failures, can be shown only when we calculate the correlation of individual P/E of the equity index for one year, two years and then three years. Based on the calculations, we can come to following conclusions:

1. If the correlation of P/E and stock index is negative, it means that the higher present P/E predicts lower future profits.
 2. If there is a low correlation in one year, in the next two-and three-year horizon it is gradually increasing.
- *E/P indicator and interest rates* – it is the inverted value of P/E in relation to interest rates. Low interest rates may be transferred to calculations of high stock prices, which also leads to a high P/E ratio and can lead to erroneous conclusions. Therefore, it is necessary to examine the ratio of E/P in relation to interest rates. Yields of treasury bonds are used most often. On this basis it can be concluded that the E/P achieves a high level when interest rates are high and vice versa. In other words, stocks are expensive when the P/E ratio is lower than the level of T-Bond yields and cheap stocks have the E/P ratio over the level of T-Bond yields.

Another important economist Hulbert, M. [5] identified five essential characteristics, which may lead to the formation of bubbles. His research is related to the behaviour of investors, with their optimism or pessimism. It states the following indicators:

- *IPO volume* – the volume of IPOs grows at the beginning of a bubble. He demonstrates this phenomenon on the technological bubble.
- *Income from IPO* – the stocks reach huge gains as soon as during their first trading day, although the typical gains were significantly smaller during IPOs in previous years.
- *Dividend bonus* – the onset of the bubble can be indicated also by a comparison of two groups of stocks, namely: stable stocks with dividend payments and speculative stocks. Studies show that during this period, speculative stocks have significantly higher valuations than stable stocks.
- *Turnover of shares* – during bubbles the share turnover increases significantly, which is a sign of growth of trading.
- *Growth in the share of cash on the equity* – increases with the growth of market speculation. During times of high speculation, the effort of each company is to get the most cash resources possible.

Rob Russell [10] in his article “Unusual Signs, Stocks Are in a Bubble” also lists the current problems in identifying bubbles and he talks about the four basic signals:

- *Shares are actually more expensive* as foreseen by the investor. As Damodaran points out, the most common indicator is the size of the P/E ratio. It also suggests that it is necessary to monitor this indicator in the longer term 8-10 years. According to him, from a historical perspective, P/E exceeding value of 16.5 signals that the shares are expensive. If this ratio exceeds level of 25 for a prolonged period of time, it means that the stocks are not only overpriced but possibly a bubble starts to develop.

- *Return to irrational behaviour and huge expenditure growth.* We see that people are often willing to pay astronomical prices for virtually everything. Consumer optimism leads to non-rational dealing with funds. Businesses behave similarly and spend enormous resources on irrational activities. Investors buy and invest their resources even at considerably high profit margins, which may be reversed in the near future.
- *The current view* and a retro look, or the analysis of historical bubbles is an important moment, because all these bubbles have common features, even if they have some unique characteristics. Share prices were significantly higher during formation of bubbles in the twenties of the last century, or the Internet bubble and the mortgage bubble, compared to present. For example, the price of Microsoft during the dot-com bubble (2000) reached a level that is higher than at present.
- *So-called Jaw-Dropping Deals* – There is a number of mergers and acquisitions in which investors are willing to pay a high price. Current examples are WhatsApp acquired by Facebook or Jim Beam bought by the Japanese company Suntory Holding. These may signal a creation of another bubble on the U.S. stock markets.

1.1 The Merits of Bubbles in the Stock Market

Today there is no consensus on the existence, or the merits of bubbles in stock markets. We agree with A. Damodaran that bubbles are an integral part of the financial markets and will always exist. The reason is that investors are only people and they are affected by their emotions.

It is very easy to follow bubbles “in the rear view mirror,” where everything is immediately apparent. Another situation is in the present where it is difficult to define at which stage of the bubble we are.

It is not necessary to label each significant growth in the share price as a bubble. A bullish trend, which we have characterized, may or may not create conditions for a bubble. It means that bubbles are less common and also have their rational substance. Bursting of the bubble corrects the stock market to a level better reflecting the real economic development.

Bubbles cannot be perceived solely negatively. Many bubbles have positively affected people’s lives. For example, the Internet bubble has changed the way of life and the direction of the business.

From the perspective of an investor, the most sensible way of response to a bubble is to change the way of investing – the investment philosophy. Generally, a waiting tactics is advised, i.e. to do nothing during the bubble.

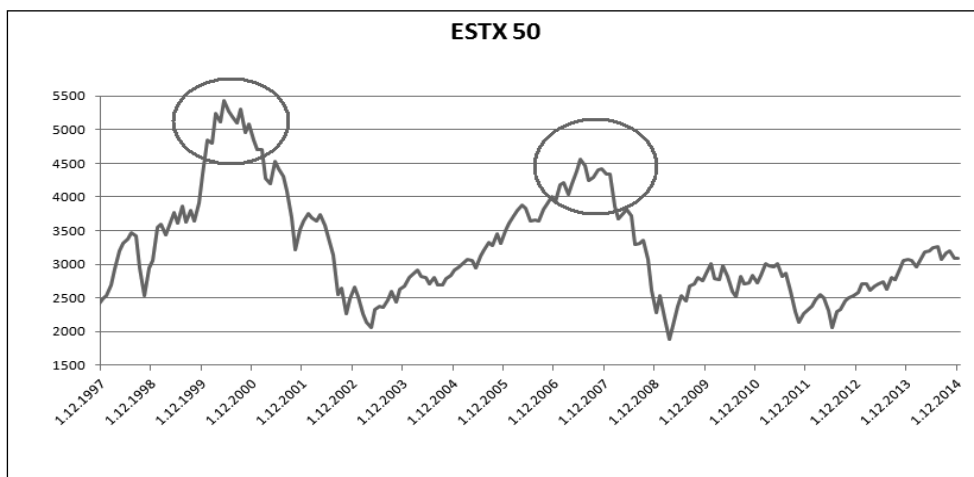
2 Analysis of the Bull Trend and Bubbles on the European Stock Market

Identifying bull trends and bubbles in the stock market of Europe is a much more complex problem than in the USA. This is related to the shorter tradition and history of the functioning of stock indices in Europe. The first stock index, FTSE, was created in 1984, the German stock index DAX only in 1988. This fact causes problems for analysts trying to make long-term analyses. The situation is even more complicated when analysing European stock markets as a whole. As an indicator of the European stock market is mostly used the Eurostoxx 50, which was created in 1997. In the index are included large European companies such as Volkswagen, Henkel, Intesa San Paolo, L'Oreal, Unilever, Philips, Telefonica and others. Development of the index since its inception is shown in Figure 1.

As can be observed from the graph, the European stock market largely copied the American stock market at the turn of the century. This was reflected in a strong bull trend in the nineties and the formation of the internet bubble in the year 2000, which then burst and all the stock market experienced a significant decline. A new bull market of European stock markets started in 2003. Its development is shown in Figure 2 where we try to interpret the onset of the bull trend and its corrections that occurred within the primary trend during three years' period.

Graph 1

Price development DJ Eurostoxx index 50 in the period 1997-2014



Source: Own processing based on data from Yahoo Finance (2014).

A strong bull trend in 2003 is associated with a significant growth, although it was gradually attenuated. Another strong growth came in 2006. This rapid growth was signalling the formation of a bubble. The declines in this bull trend did not reach even the level, which is accepted by authors quoted in the previous section.

In this bull trend, the stock market grew 85.73% from 1.4.2003 – 1.5.2006. This value even increased in 2007. Prediction and signals of the bull trend of the European stock market were confirmed. Investor optimism is also shown in Figure 2.

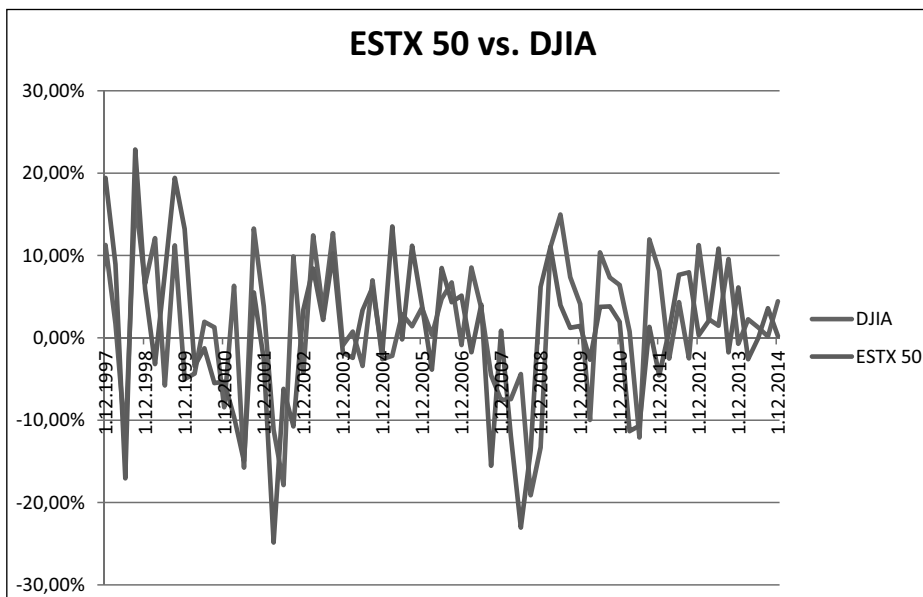
The figure also shows that an important market correction took place during the second half of year. It could signal the potential arrival of a bear market. It was reflected in an increased carefulness of some investors. Another relatively strong growth of stock markets resulted in a bubble. Impacts of this bubble can be seen on the development of EUROSTOXX 50 even by now.

2.1 Bubbles on the European Stock Market

Similar to the U.S. stock market in Europe there occurred two bubbles corresponding to the time course in the USA. But there are some differences. In the USA, the second bubble was bigger than the first one (dot com bubble). DJIA reached more than 11,700 points in 2000 but it surpassed the 14,165 points level in 2007. In comparison with the U.S. market, some differences can be observed. Currently it is over 16,000 points and a lot of analytics talk about the coming of another bubble.

Graph 2

Volatility stock indices ESTX50 and DJIA in the period 1997- 2014



Source: Own processing based on data from Yahoo Finance (2014).

On the European markets, the second bubble did not beat the highest levels of the technology bubble, when the ESTX 50 crossed 5,460 points. During the second

bubble, it climbed only to 4,557 points. The second bubble on the European market was weaker and it is arguable whether it really was a bubble, or only a classical bull trend that gradually turned into a bear trend.

The following tables show the maximum point values of growth and decline as well as the percentage change in the time of culmination, respectively bursting of the bubbles. Table 2 shows that the stock index ESTX 50 showed a higher increase in the time of the technology bubble, but also a higher subsequent percentage decrease. Investors on the European stock markets achieved high profits at the time of forming of bubbles, but they also suffered bigger losses than the investor on American stock markets at the time of their bursting.

Table 1

Creating and bursting bubble in 2000, American and European markets

| Creating bubbles – growth | | | | Bursting bubbles – decline | | |
|---------------------------|----------|------------|----------|----------------------------|------------|----------|
| Index | Value | Max. value | % change | Value | Min. value | % change |
| DJIA | 1.1.1997 | 18.1.2000 | 181.74% | 18.1.2000 | 10.10.2002 | -37.83% |
| | 6448,30 | 11719,21 | | 11719,21 | 7286,34 | |
| ESTX | 1.1.1997 | 6.3.2000 | 294.77% | 6.3.2000 | 12.3.2003 | -66.15% |
| | 1853,78 | 5464,43 | | 5464,43 | 1849,64 | |

Source: Own processing based on data from Yahoo Finance (2014).

The values from the time period of the mortgage bubble are captured in Table 3. Although the index did not reach the level of the previous bubble, there were some similar features. A large decline of index ESTX 50 in 2003, gave a real chance for achieving high profits after the revival of the markets. The further developments again showed higher appreciation of stock index in Europe in comparison with the DJIA index in the United States. A pessimistic tone had also the market slump of 2009, when the percentage change was higher than in the USA once again.

Table 2

Creating and bursting bubble in 2007, American and European markets

| Creating bubbles – growth | | | | Bursting bubbles – decline | | |
|---------------------------|------------|------------|----------|----------------------------|------------|----------|
| Index | Value | Max. value | % change | Value | Min. value | % change |
| DJIA | 10.10.2002 | 10.10.2007 | 194.40% | 10.10.2007 | 10.3.2009 | -53.78% |
| | 7286,34 | 14165,00 | | 14165,00 | 6547,01 | |
| ESTX | 12.3.2003 | 16.7.2007 | 246.40% | 16.7.2007 | 9.3.2009 | -60.29% |
| | 1849,64 | 4557,57 | | 4557,57 | 1809,98 | |

Source: Own processing based on data from Yahoo Finance (2014).

The aforementioned relations are in accordance with the present situation when the European and U.S. stock markets behave quite differently. While the DJIA reached above 16,000 points, the European stock market has not surpassed the 2007 levels yet. A couple of technical analysts warn against another bubble on the U.S. stock markets. Their claims are supported by the double top formation that can signal further declines. Conversely, index ESTX 50 shows only slight signs of recovery. It is caused by different economic policies applied in Europe and in the USA.

After 2009, the policies of the USA were directed to the measures that could start the stock markets and revive the economic growth in the shortest possible time. The most important roles in this process were fulfilled by:

- low interest rate policy, a policy of cheap money and credits, focusing mainly on the business sector;
- increase in money supply (quantitative easing), which also contributed to the decline in interest rates and the possibility for the state to get rid of expensive emissions especially of the long-term government bonds;
- fiscal policy, whose role was to stimulate production, also using the tax policies;
- growth and support of speculative trades through leverage effect and financial derivatives.

In this context, it should be noted that the financial sector in the USA operates in more liberal terms than in Europe and financial services have a high representation in the stock indices. The present massive stock market growth was significantly supported by the derivatives and various new forms of speculative trades. Trades the type of short selling, which in the past have been covered by various reserves, today went into naked short selling, which represents the most risky type of trading without any coverage. This is often reflected in the growth of volatility of the stock indices. As reported by P. Árendáš [1] the monitoring of stock market volatility through a special index of volatility, which binds to a given index (e.g. VIX is tied to the S&P 500) allows with a certain probability to predict a significant drop in the stock market.

After the slump of 2009, there were various measures applied on the European as well as on the national levels. The most important measures in the area of monetary and fiscal policy were:

- support of the economy and the stock market through policy of cheap money - gradual reduction of interest rates;
- fiscal incentives had different forms, for example “scrappage”, which significantly contributed to the recovery of the automotive industry in Europe, various forms of incentives in the form of increased spending from national budgets of EU countries;
- prohibition of speculative transactions for financial institutions in the form of short selling, credit default swaps; with specific emphasis on the requirements of factual and financial coverage of transactions;
- the negative development of the ESTX 50 was caused mainly by the European debt crisis. That relationship is quantified also by J. Sipko [13], who calls for

structural changes of the European economies. Their subsequent positive impacts should later positively affect also the stock markets.

For stabilising the European financial sector it is inevitable to regulate the financial institutions. The implementation of Basel III has set clear rules of securities trading as well as maximum allowed shares of particular asset classes in portfolios of commercial banks.

Conclusions and Policy Implications

Stock markets of the USA and Europe have shown the same development since 1997. It was characterised by two similar bull and bear trends and two huge bubbles that negatively affected both the continents. Some specific differences have appeared during the last five years. The U.S. stock market is directed to another bubble, while the European stock market shows only slow signs of growth. It is caused by different monetary policies adopted by the European Central Bank as well as by the limitation of various speculative trades. Now, the greatest emphasis is placed on solving problems of the debt crisis in Europe, which negatively affected the further development of the stock market. The need for reforms and structural changes in individual EU countries seems to be an objective necessity now.

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