

RELATIONSHIP BETWEEN THE VALUE OF THE P/E RATIO, THE RATE OF INFLATION AND THE MARKET RETURN OF THE BULGARIAN STOCK EXCHANGE MARKET

Petko Iliev Valkov

International Business Department, University of National and World Economy, Sofia, Bulgaria

Abstract

The purpose of the present report is to show to what extent the Price/Earnings (from now on P/E) ratio of the public companies in Bulgaria is related to the so-called Rule of 20 regarding the relationship between the value of the ratio and the inflation rate in the country, as well as the future market return, or in other words – is it possible to use the P/E ratio, by means of the Rule of 20, as an indicator for future inflation rates and market presentation in the short run.

The P/E ratio is a basic measurement, used by the investors for analyzing the stock exchange markets. Its main function is to give an answer to the question whether the shares of the public companies are underestimated or overestimated.

Key words: P/E Ratio, the Rule of 20, Market Return, Required Rate of Return, Rate of Inflation

INTRODUCTION

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The P/E ratio is a basic measurement used by the investors for analyzing the stock exchange markets. Its main function is to give an answer to the question whether the shares of the public companies are underestimated or overestimated.

The indicator generally shows the number of years, in which the investment in the shares of a public company would provide a return in case that the rate of the increase of a company's earnings takes the value of zero. Since various companies develop at different rates, some companies constantly have a higher rate of increase of their net earnings over the years in comparison to others. Due to these faster developments the investors are willing to pay more for the net earnings for such companies unlike others with slower developments. Therefore, it is natural to accept that the companies with higher rate of increase of earnings shall also take higher values of the P/E ratio in comparison with companies with low rate of increase.

The P/E ratio is standardly calculated by dividing the price per share by its earnings per share. The respective value of the indicator for a whole stock index is calculated by the weighted value of the earnings and the prices of the companies' shares, which participate in the index, in accordance with the methodology of calculating the index itself.

When the P/E ratio has high values, it is accepted that the investors offer higher price for the companies' earnings, and when the ratio takes low values, then in such a period the investors, for various reasons, assess the earnings of the public companies at lower prices. From investment point of view it can be concluded that the high value of the indicator can be considered as overestimation of the shares, while its low value warns about their underestimation. Such a statement can be proved by observing the condition of the indicator in the long run. According to the data about the Bulgarian Stock Exchange Market, the average value of the indicator from 2007 takes the value of 10 times.

The Rule of 20 regarding the P/E ratio shows the relationship between the inflation and the value of the indicator. It is based on the hypothesis that the fair value of the indicator has to take values of 20

times minus the inflation rate for the respective period. This means that in periods of high inflation, the P/E ratio should take low value, while in cases of low inflation, the value of the ratio should be close to 20. Values of the ratio over 20 are acceptable. The rule has been derived mainly on the basis of historical data of the stock exchange market in the USA, and it is not possible to give the name of the author.

No researches have been done in Bulgaria about the relation between the value of the indicator and the subsequent market return. Similar researches, however, have been done many times in different countries. For example, Bleiberg (1989) and Good (1991) did a similar research of the stock exchange market in the USA. Their results show that the value of the P/E ratio is in inversely proportional relationship with the market return – the low value of the P/E ratio is related to the high market return, while its high value is usually followed by low market return.

The movements of the stock exchange market over the past years disprove to some extent the results from the earlier researches: the high values of the P/E ratio do not lead to subsequent low return, and the low values are not necessarily related to future market growth. The high value of the indicator is also related to the low inflation, and the low value – to the high inflation.

DETERMINANTS OF THE P/E RATIO

The P/E ratio is most often calculated by dividing the market price per share by the earnings per share from the most recent annual financial statements of the public company. It actually shows the number of years in which the investment in the shares of a company would provide a return, revealing how many times investors are willing to give for a company's earnings.

The determinants of the ratio can easily be deduced by the dividends discount model, which uses constant growth rate of the dividends:

$$(1) P_0 = D_1 / (k - g),$$

in which D_1 is the value of the future dividend, g – growth rate, k – required rate of return, and P_0 – the fair value of one share calculated according to the dividend discount model.

If both sides of equation 1 are divided by the earnings per share (EPS), the following equation is generated:

$$(2) P_0/E = (D_1/E) / (k - g)$$

According to equation 2 the main determinants of the P/E ratio are:

- (D_1/E) – percent of the profit dividends allocation;
- k – required rate of return;
- g – dividends growth rate.

In accordance with the so deduced relations, the P/E ratio takes high values, when the percent of the profit dividends allocation is higher, when the dividends growth rate is higher, and when the required rate of return is lower. The opposite is also true, the P/E ratio takes low values determined by lower percent of the profit allocation as a dividend, little growth of the dividends and high required rate of return.

The inflation influences on the indicator by means of the required rate of return (k). By increasing of inflation, it is expected that the required rate of return by the investors will also get increased. As it has already been presented, the higher the required rate of return is, the lower the value of the P/E ratio is, and vice versa.

The required rate of return is fundamentally defined most often by the Capital Asset Pricing Model (CAPM). As a matter of fact, however, other factors (risks), such as inflation, country risk (traditionally calculated by the Credit Default Swap of the respective country), regional risk, market risk, etc., influence on the final value of the required rate of return of the capital.

Other conditions remaining equal, in accordance with the Rule of 20 for P/E, the ratio should take values close to 20x in a context of zero inflation, and low values in a context of high inflation.

The Rule of 20 is not regarded as an ultimate law, which is the only one defining the dynamics and the direction of the stock exchange trade. Various factors, which have different intensity and direction, influence on the state of the capital market. Also, the value itself of the P/E ratio can change in one way or another depending on the evaluations and the perceptions of the investors. In a context of economic growth, the P/E ratio can go up without the reason for this being an increase of the inflation levels, but due to investors' expectations for significant improvement of the corporative profits in the next years. In such a context, in realizing growth of corporative profits and in maintaining constant exchange rates, the value of the P/E ratio would register decrease. For example, in 2007 the value of the P/E ratio for the SOFIX index companies of the Bulgarian Stock Exchange was 27,90 which shows that at that time the investors had overly optimistic expectations for the corporative profits, which obviously were not met due to the expansion of the global financial and economic crisis.

After all, the following can be indicated as main determinants of the P/E ratio:

- expected growth of the corporative profits;
- required rate of return, which includes various components – inflation rate, investment alternatives, risk level, etc.

DESCRIPTION OF THE USED DATA AND METHODOLOGY OF THE RESEARCH

Weighted averages of annual data about the value of the P/E ratio of the SOFIX index from the Bulgarian Stock Exchange – Sofia AD are used for the purposes of the analysis. The available data about the ratio are dated 11.06.2007. The data about inflation is taken from the National Statistical Institute. The indexes of the Bulgarian Stock Exchange - Sofia include securities issues, traded at some of the organized markets, which meet the general and specific criteria of the respective index and provide exact reflection of the market movements. Only issues of public companies which are not in liquidation or bankruptcy can participate in the indexes. Presently the Bulgarian Stock Exchange - Sofia calculates 4 own indexes - **SOFIX**, **BGBX40**, **BG TR30** and **BG REIT**. The main stock exchange index is **SOFIX**. Its calculation began on 20th October 2000 at a base value of 100 points. **SOFIX** is based on the market capitalization of the included 15 issues of ordinary shares, corrected by the free-float of each of them. It is necessary that the issues in **SOFIX** meet certain requirements for liquidity, market capitalization, free-float and number of shareholders.

The analysis about the Rule of 20 is constituted of the sum of the P/E ratio and the inflation rate for the respective period. According to the theoretical considerations, the sum of the two indicators has to be approximately equal to 20. Results from the period 2007-2015 will be examined, an answer of the question whether the Rule of 20 is valid in the context of the Bulgarian Stock Exchange Market and whether there are any deviations from the rule, will be searched, and the reasons for the observed deviations will also be searched.

Furthermore, the relation between the value of the P/E ratio, the inflation level for the subsequent period, as well as the market return will be searched in the analysis. The purpose is to look for an answer of the question whether the ratio can serve as an indicator about the future inflation rate and market return.

Main working hypotheses:

- The P/E ratio is a main indicator for the fair value of the shares. The low value of the indicator means that the shares are underestimated and a positive market return can be expected in the short run. The high value of the indicator is related to the overestimation of the shares, which allows prognoses about the descending stock exchange movement in the short run to be made.
- The high value of the P/E ratio and high inflation, the sum of which exceeds the Rule of 20 in a certain year can be accepted as a state of overestimation of the market.

- At low inflation rates the value of the P/E ratio is expected to be close to 20, which is not an indicator for overestimation of the market, but rather for expectation for keeping low values of inflation.
- The high inflation levels do not necessarily mean low value of the P/E ratio, and in such levels the Rule 20 is more likely not to be valid, since investors count on this that the shares will turn into an important tool for protection from an inflation risk. Similar higher inflation rates were observed in Bulgaria in the period 2005-2008.
- The low value of the P/E ratio and the low inflation, the sum of which does not exceed the Rule of 20 can be regarded as a state of underestimation of the market.
- The low value of the P/E ratio and the low inflation are commonly found values in a context of a period of economic recession. It also suggests decrease of the corporative profits.
- The reduction of the interest rates and of the inflation rates after 2008 is expected to lead to an increase of the value of the SOFIX stock exchange index P/E ratio.

The P/E ratio can take low values for a positive period of time, i.e. its low values cannot be regarded as a single condition for underestimation of the market and therefore expected positive return and respectively expected increasing inflation. It is expected that the observations of the data about the Bulgarian stock exchange market to report presence of such periods, during which the Rule of 20 does not apply. Other factors which define the market dynamics are present for these periods.

Main reasons for low value of the P/E ratio:

- The economy of the country is in a period of recession, which suggests that the profits of the public companies will decrease, which fundamentally defines the low value of the indicator. The economic recession is often related to the emergence of deflation, too. In such scenario, the low value of the P/E ratio cannot be regarded as an indicator for underestimated market. Similar low values of the indicator were observed in Bulgaria for the period 2009-2014, and a certain increase of the indicator had not been observed until 2015.
- The stock exchange market is depressed by the presence of big share traders, who sell big blocks of shares, regardless of the market prices as a result of a decision for leaving a certain market and/or geographical region. As a result of the strong sales, the prices of the companies decrease, while the profit values remain unchanged. If investors expect the sales to continue in the next year, too, the prices of the companies' shares may remain at low levels, regardless of presenting the corporative results. In equal conditions this leads to an increase of the value of the P/E ratio. This is also a main reason for the low values of the indicator in Bulgaria for the period 2009-2014.
- Presence of a significant risk, defined by the high value of the required rate of return. The risk may be related with expected changes in the government regulations or with the presence of a financial risk of an excessive debt of the public companies.
- The market participants may consider the corporative profits in a certain year to be overestimated, because they include one-time accounting effects, which are not typical for the distinctive activity of the companies. In cases of such one-time effects, reductions of the corporative taxes can be announced which would stimulate the companies to keep and transfer its profit for the year, in which the low taxes come into force. The next year, in case of absence of new one-time positive effects, the companies' profits are expected to go down, which, if the share prices remain unchanged, would lead to an increase of the value of the P/E ratio.

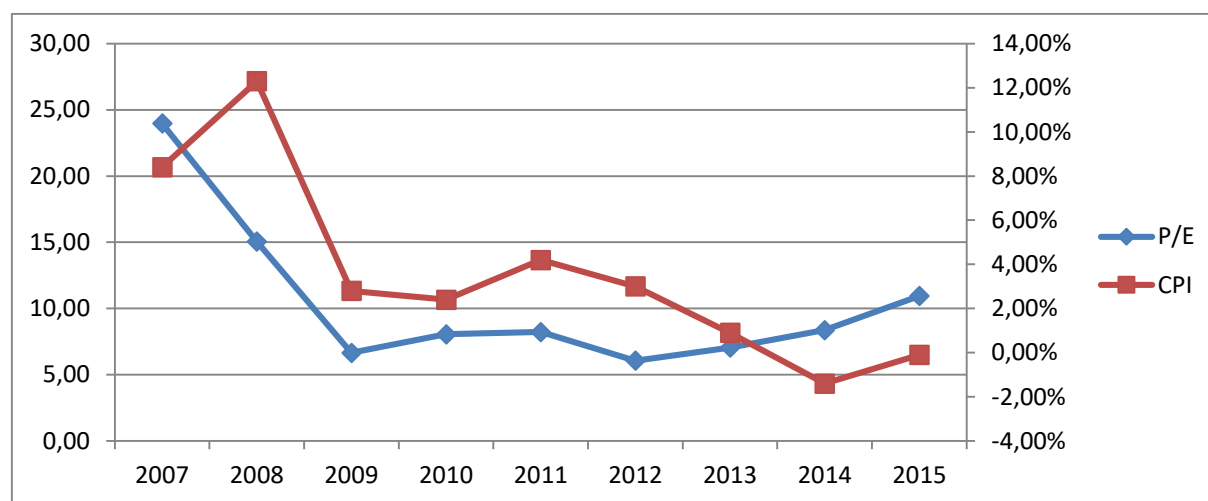
Main reasons for observed high values of the P/E ratio:

- It is possible the sum of the value of the P/E ratio and the inflation rate to exceed the Rule of 20 for a certain period of time without this necessarily indicating for a presence of overestimated market. The high value of the P/E ratio and the high inflation rate may mean that the investors are willing to give a higher evaluation to the corporative profits in anticipation of a new strong increase in the next year. It can be based on a future growth of the activity profits, on introduction

of new technologies, which would contribute to the increase of the companies' market segment, as well as on expectations for quick economic growth of the economic region. Similar high values in Bulgaria were observed in 2007, but they were not justified both in regard to inflation, and to the corporative profits. Obviously, the high value of the indicator (>20 times) is accepted as a sign of overestimation of the market.

- The P/E ratio of a company can take high values if the investors think that the net profit of this company does not reflect correctly its value. In such cases the investors rely on other market indicators. This private case, however, is not typical, when it comes to a value of the indicator for a whole index, and not for a separate company.

Chart 1. Interrelation between the inflation rate and the P/E ratio for the period 2007-2015



Source: the National Statistical Institute, own calculations

The data shows presence of a positive correlation between the inflation rate and the values of the P/E ratio. The high inflation is related to the high level of the P/E ratio, and the low inflation – to the low level of the P/E. This **rejects** the hypothesis that the low inflation stimulates high values of the indicator, due to which the following conclusion can be made: that the Rule of 20 does not apply in the context of the Bulgarian capital market for the observed years, as well as that the inflation is not a leading factor defining the dynamic of the stock exchange trading.

Furthermore, the data gives a reason to come to the conclusion that high inflation is related to the high values of the P/E ratio, and the low inflation – to a low P/E ratio.

The rejection of the Rule of 20 for the Bulgarian stock exchange market may be due to the influence of a series of factors:

- Instability of the corporative results of the companies over the years, where the companies registered highly cyclical financial results with wide deviations over the years.
- The hypothesis that the market is probably at low values of the indicator due to the presence of investors' selling off, is supported.
- Low investors' confidence in the accounting results of the companies, due to which they do not attach great importance to the P/E ratio, but they search for other evaluating indicators, such as Price/Sales, Price/Book value, dividend profitability, etc.
- Investors' expectations for deterioration of the Bulgarian economy, which would influence negatively on the corporative profits, and this in turn would lead to an increase of the value of the indicator in case of unchanged stock-exchange quotations.

- Expectations for strong rise in inflation rate in the short run, which contradicts the expectations of the official bodies, as well as the expectations of the rest of the market investors, such as the investors in government securities, where the low profitability is regarded as an indicator for expected low inflation or even deflation.

Chart 2. Relation between the market return and Index of consumer prices for the period 2004-2015



Source: the National Statistical Institute, the Bulgarian Stock Exchange - Sofia, own calculations

The data shows that at the end of August 2016 the P/E ratio for the companies, which participate in the structure of the SOFIX stock exchange index, was at 9,14x levels. It was under its average long-term levels. The indicator itself alerts for underestimation of the market. It, however, should be used in a certain context, because if it is examined independently, as it has been established, the ratio cannot be used as a reliable indicator about the future short-term market return. What is more, its low values are realized in a period, in which the interest rates are at a record low, and the inflation takes values close to zero.

The data from Chart 2 unambiguously shows that the following hypothesis has not been proven: that the decreasing levels of the interest rates and of the inflation after 2008 contribute to the increase of the value of the index in the next years. The correlation coefficient between the two values is negative for the observed period, which proves, that the low inflation rate is not related to an increase of the market return, but the opposite correlation is rather observed – the high inflation is related with the positive market return. The restrictive conditions for this statement are that the examined period coincides with the advent and development of the financial crisis, the effects of which continue to be felt today. The main trends observed in Bulgaria during this period are:

- Reduction of interest rates;
- Reduction of inflation rates and recording deflation for certain periods;
- Bank credit crunch;
- Reduction of the foreign direct investments in the country;
- Increase in government debt;
- Realizing chronic budget deficit;
- Etc.

All these trends have contributed to repression of stock exchange trade in Bulgaria and therefore to reduction of the values of the P/E ratio.

Table 1. The P/E ratio against the market return of SOFIX for the period 2007-2015

Year	P/E	Reported inflation	Expected inflation in accordance with the Rule of 20	Market return
2007	23,97	8,4%	0%	44,42%
2008	15,05	12,3%	4,95%	-79,71%
2009	6,65	2,8%	13,35%	19,13%
2010	8,06	2,4%	11,94%	-15,19%
2011	8,23	4,2%	11,77%	-11,11%
2012	6,06	3,0%	13,94%	7,25%
2013	7,06	0,9%	12,94%	42,28%
2014	8,36	-1,4%	11,64%	6,22%
2015	10,95	-0,1%	9,05%	-11,72%

Source: the National Statistical Institute, the Bulgarian Stock Exchange - Sofia, own calculations

In the long run, the average value of the P/E ratio is 10x. It is obvious that over the years it has taken different values, with no evidence that the indicator always goes back to its long-term values. This is another confirmation of the statement that the Rule of 20 is not valid for the Bulgarian stock exchange market. The results from Table 1 also prove that the P/E ratio cannot be used for predicting the inflation rate in the following year by means of the Rule of 20, because it obviously is not valid for the Bulgarian stock exchange market. According to the Rule, the Bulgarian stock exchange market predicted high inflation rates after 2009, which, however, did not come true. In this case the low level of the P/E indicator is rather related to low expectations of the investors about the future corporate profits, i.e. low values of the divisor.

The data also gives reason to support the hypothesis that the low value of the P/E ratio and the low inflation, the sum of which does not exceed the Rule of 20, can be regarded as a state of underestimation of the market, since there is no strong correlation between the low level of the P/E ratio and the high market return.

REFERENCES

1. „Government Debt” Monthly Newsletter of the Ministry of Finance for the period 2001 – 2014.
2. Tanner G., Journal of Financial and Strategic Decisions Volume 12 Number 2 Fall 1999 59 Tactical Asset Allocation: Follow the Rule of 20
3. Bernstein R., Richard Bernstein Advisors, Insights, July 2016
4. The relationship between equity and bond values has changed again, The Economist, August 6th, 2016
5. Bleiberg, St., “How Little We Know,” *Journal of Portfolio Management* 15, Summer 1989.
6. Good, Walter R., “When are Price/Earnings Ratios Too High - or Too Low?” *Financial Analysts Journal* 47, July/August 1991