THE INFLUENCE OF INFLATION ON THE REAL VALUE OF PAID OUT DIVIDENDS ON THE WARSAW STOCK EXCHANGE IN THE YEARS 2000-2012

Bartłomiej Łukasz JABŁOŃSKI
University of Economics in Katowice
Katowice, Poland
bartlomiejjablonski@o2.pl

Abstract

The article describes the issue of inflation and its influence on the value of dividends received by investors. In addition, the topic of dividend policy in the conditions of high (double-digit) inflation is discussed. The impact of inflation on the real rate of return from investments should be taken into consideration by investors who invest both in bonds and in shares. Research shows that, whereas bond market investors understand the impact of inflation on discount rates, stock market investors do not account for the impact of inflation on future earnings growth (Chordia et al, 2005, p.554).

On the basis of the conducted analyses the author concluded that in the 2000-2012 period, investors generally suffered a loss on the received dividend, if we quantified their size and attractiveness by means of a dividend rate.

The objective of the article is the presentation of the issue of inflation from the point of view of dividends paid out by companies (Hazlitt, 2007, p.90, Rutkowski, 2007, p. 245, Sayek, 2009, p. 441) and an investor allocating financial means on the capital market (in shares of companies listed on the capital market and not in bonds. (Laatsch, 2013, pp. 54-59)).

The following hypothesis was accepted in the article:

H1: in the period 2000-2012 an effective real dividend rate for companies quoted on Warsaw Stock Exchange had a negative value.

Keywords: dividend policy, inflation, real value of dividend.
JEL classification: E31, G11, G17, G35.

1. INTRODUCTION

The realization of the objective of the article will take place by means of the discussion of the problem of inflation from two perspectives: a company paying out dividend and capital markets investors receiving dividends. Both perspectives take into consideration the existence of high (two-digit) inflation. In the article, the issues of inflation and the reasons for its occurrence are discussed (the universal cash balance approach, consumer expenditure and credit markets approaches). Next, the influence of inflation on a proper functioning of a company, especially in relation to a dividend policy will be described.

Another stage of the article shows the consequences of the existence of inflation from a capital market investor's point of view. In this part of the article the changes of share prices

(the changes of Warsaw Stock Exchange Index WIG) and market parameters connected to it (e.g. P/E) as well as the real rate of return taking into consideration yearly profitability of investment counted in the 2000-2012 period will be studied. The conclusions received on the basis of the carried out research will support or contradict the accepted hypothesis.

Companies functioning in a market economy are subject not only to changes in demand and results and, in consequence, changes of their financial standing, but also to factors which are beyond their control. Inflation belongs to one of them.

In the first half of 2013, inflation in Poland reached the lowest level in the history amounting to 0.2% and exceeding significantly the limits of the inflation target set by the Monetary Policy Council at the level of 2.5%.

According to the data of National Bank of Poland[1], after considerable falls of inflation not only in Poland but also in the countries of Central and Western Europe in the following quarters of 2013, the inflation should stabilize. According to the data of the European Statistical Office Eurostat[2], inflation in Poland in the middle of 2013 was one of the lowest in Europe. The lowest level of inflation in the first part of 2013, apart from Poland, was recorded in Latvia and Switzerland (0.2%), Sweden (0.5%), Malta and Denmark (0.6%). The highest level of inflation in this period was recorded in Romania (4.5%), Estonia (4.1%) and Holland (3.2%).

However, in the history of Poland, inflation has accepted much higher values. In the 1980s, inflation reached 100.8% in 1982, 639.6% in 1989, and 249.3% in 1990. It is only since 1998 that inflation in Poland has been below 10%.

Inflation influences not only the economic functioning of a company and financial condition of households, but also investors, both institutional and individual ones. It significantly lowers the real effectiveness of investment.

2. LITERATURE REVIEW

Inflation (CPI) is a measure of growth in an average level of prices of goods and services in a given economy. This index informs what the average changes in prices characterise a given basket of goods and services.

Inflation is defined as a rise of the general level of prices. It refers to an increase of the general level of prices and not an increase in the price of one product or a few products, whose influence on the dynamics of the general level of prices can be compensated by a decrease in the prices of other goods (Milewski *et al*, 2008, pp. 264-265).

A direct cause of inflation is issuing an excessive amount of paper money on a market. The most common reason for such surfeit of paper money is the existence of a governmental budget deficit (Hazlitt, 2007, p. 61).

While looking at the main theoretical concepts of inflation one can notice division into: the monetarist (neo quantity), demand and cost-structure theories of inflation. (Begg, 2007, p.137, Milewski *et al*, 2008, pp. 269-278).

As M. Skousen indicates (Skousen, 2011, p. 318 and further) there are at least three ways which lead to financial inflation. The first approach– universal cash balance approach – assumes that the expansion of money supply (understood in terms of cash balance) applies to the same extent to all participants of the market. The second approach, described as the consumer spending approach, assumes the stimulation by a government at the retail level by spending the newly printed money directly on goods, services, social benefits, etc. The third

approach assumes that the financial expansion takes place by means of credit markets and money goes evenly to entities that inform about such a need.

There are premises that indicate that prices and salaries can rise due to higher inflational expectations. Therefore, the risk exists that a longer period of inflation above the inflation target can influence the consumption and investment decisions and can be a reason why the inflation is longer above the inflation target level (Maule *et al,* 2013, pp. 110-120).

Assuming a lack of inflational expectations, the interest rate will have a downward tendency, which influences in the profitability of capital investments. In this way, the number of investment projects characterised by a positive NPV increases. The changes in interest rates and, consequently, the changes in the cost of debt capital, have bigger influence on a further company's income as compared to incomes achieved in the nearest future. As a result, the employment and incomes rise, leading to a final increase in prices that decreases the tendency to save. Households have a tendency to spend more and pay for those expenditures in the future. A rising value of money causes an increase in the external capital price, which causes a decrease in the profitability of realised investment projects. In such a situation, the uncertainty about the future results of a company rises and the number of investment projects realised by companies goes down.

One can conclude that credit expansion does not increase the supply for real goods but only changes their allocation. An increase of production lacks real and solid basis and the observed prosperity is illusory (Mises, 1978, p.183).

It means that the only lasting consequence of a rise in money supply is an increase of inflation.

In the past, the prices mass increase phenomenon was observed during wars or other exceptional events, when countries were forced to have extraordinary expenditures and decided to abandon the gold standard system for a while and issued big amounts of paper money. The money flooded the market, causing a rapid increase of prices, disorganising the monetary and credit system and the whole economy (Milewski *et al*, 2008, p. 264).

According to the price-rising criterion, inflation can be divided into creeping one (an increase in prices of 5% over a year) and moderate one, in other words, walking (an increase in prices of 10% over a year. Galloping inflation is described as an increase in prices of 50% over a year. A critical type of inflation is hyperinflation. In the studies of the topic, different levels of price growth described as hyperinflation are accepted from 50% to 150% over a month (Lipsey *et al,* 2008, p. 645; Owsiak, 2002, p. 194 and further, Milewski *et al*, 2008, p. 266-267). The process of hyperinflation has 3 phases. The first one involves a rapid growth of the amount of paper money in circulation in relation to the general rise in prices. A rise in prices is observed and it is understood as a temporary anomaly. The society tries to postpone consumption in time hoping for a fall in prices in the future. The second phase is characterised by an increase in prices at a level similar to an increase of the amount of money in circulation. The third phase is characterised by a faster growth of prices than the growth of the amount of money in circulation.

Hyperinflation and galloping inflation occur rarely in economies, so for the sake of the analysis of the influence of inflation on the real value of paid out dividends by companies listed on Warsaw Stock Exchange, the periods of creeping and walking inflation were selected: an increase in prices not exceeding 10% over a year (years 2000 - 2012).

In real economy, the result of prolonged high inflation is a reduction of the expenditure for goods and services due to their high cost. On the other hand, the interest in investing capital, especially by companies, rises. Moreover, growing prices cause a bigger interest in

work and a drop of the value of a given currency causes the depreciation not only of financial liabilities but also of savings.

Inflation permanently accompanies any economic activity and, regardless of its level, makes business decisions more difficult. This phenomenon refers, first of all, to investment projects that are realised and exploited in a longer time. Inflation makes it difficult to assess investment projects objectively. It deforms particular incomes and investment expenses. (Rutkowski, 2007, p. 245).

In a period of an intensive growth of prices, companies pay out lower dividends. This is caused by the fact that companies try to reinvest earned profits fast and effectively so that the smallest part of the profit loses its real value. Another reason for a decrease (or total cessation) in the value of paid out dividends in a period of high inflation is the fact that the time that passes from a moment of earning a profit to its division and actual outpayment, causes a significant decrease in the real value of the paid out dividend.

Furthermore, in a period of two-digit inflation, prices and costs change in a non-uniform way, which makes it difficult for a company to establish future prices and costs and, consequently, the relation between them. It results in rapid changes in demand and causes a high risk on production and profit. This uncertainty is another factor in favour of dividend payout limitation.

In the period of high inflation (at least two-digit ones) cash flows, profits or other values describing results generated by a company are discounted at a higher rate than in a situation when inflation is low.

In the high inflation period, banks want to protect themselves against future fall of purchasing power of money, raise the interest rate on their loan products with an additional premium. However, this process does not make the loans less attractive, because when companies take loans on the banking market they pay it off in the future in money losing its purchasing power. This results in a growth of the so-called credit inflation (Hazlitt, 2007, p. 90).

High inflation also causes higher salary demands and social benefits, which, in a significant way, increases the costs of the functioning of a company. This results in a drop of income of entities, slower development and even bankruptcy. These factors are the reason for a growth in unemployment rate (in the article, the problem of the influence of inflation on anxiety growth and a decrease in living standards of a society was omitted.)

Research shows that the ability of diversifying investment decisions as well as financing decisions across countries (foreign direct investment) in response to inflation fluctuations reduces the fluctuations in physical investment (Sayek, 2009, p. 441).

When a country rushes to print money and spends it on consumption, companies operate less productively carrying out short term projects with a lower risk. The rising hyperinflation causes a flight of capital and loss of currency exchange control, which finally results in the instability of the monetary system.

3. METHODOLOGY, DATA AND RESULTS

There is clearly a relationship between profitability of investment on a capital market, the economic condition of a country and inflation. Small economic growth or recession, as well as an increase of inflation cause a growth in interest rate and a decrease in investors' interest in the capital market. On the other hand, a falling inflation causes lower interest rates, and consequently, a bigger interest of investors in the capital market.

When the profitability of investment is estimated, the future inflation rate is calculated on the basis of the historical values of this index. For an investor, historical values of inflation are not as much interesting as the future ones that can significantly lower the real rate of return.

The basis for establishing the expected interest rate is an interest rate free from risk. In the process of evaluation of companies, very often the discount rate is an arithmetic average of the rate free from risk, risk premium and inflation rate (or forecast inflation rate) (Nowak *et al,* 1999, p. 102).

Stock market investors fail to incorporate inflation in forecasting future earnings growth rates, and this causes firms whose earnings growth is positively (negatively) related to inflation to be undervalued (overvalued) (Chordia *et al,* 2005, p.521).

An increase of inflation, and more specifically, changes in expectations concerning a rise in inflation cause an increase in discount rate and, consequently, a decrease in the value of a company. The changes in investors' expectations concerning future inflation have their climax in investment decisions on the financial market. It is especially visible on the capital market in the changes of levels of stock exchange indices.

The analysis of the commodity markets is helpful in forecasting inflation. The changes on these markets precede common indices of inflation levels (Consumer Price Index - CPI and Producer Price Index - PPI) in a few months. The general rule is that when the prices of goods rise, the inflation rises. On the other hand, when the depreciation of goods takes place, we will have to do with deflation. In a period of economic expansion, the prices of goods rise together with the price for money, which causes fears of a growth of inflation increase. In such situations, the bodies responsible for the monetary policy raise the interest rates. This is aimed at preventing the inflation. (Murphy, 1998, pp. 24-25).

When investors take into account low inflation in the calculation of the profitability of investment, they can use instruments whose profitability enables to preserve the real value of capital. TIPS (Treasury Inflation Protected Securities) is one of such instruments. However, with relatively high inflation and especially with hyperinflation, TIPS real realized yields fall dramatically and can even become negative (Laatsch, 2013, p.54).

For an economy with a higher inflation rate a more significant increase is expected, which means a much faster growth of the stock exchange index in a local currency. It means that the main indices of stock exchanges in different countries have lower P/E ratio (the P/E ratio is calculated as a quotient of share price and yearly profit per share), when inflation is high and higher P/E when inflation is low (Lee, 2000, p. 188).

Inflation can influence P/E ratio in two ways. First of all, during the inflation period the profits of companies grow faster than the inflation rate. Such a phenomenon takes place when the depreciation of capital is taken into consideration according to historical costs and not according to the cost of replacement of capital which makes the nominal cost of depreciation remain fixed. Then, an artificial inflation of profits takes place. If investors take this fact into consideration in their decisions, the P/E ratio will go down, because the apparent increase of profitability adjusted to inflation is not real.

Inflation also influences the profitability of a company and its P/E ratio by means of the real cost of a debt and interests. It diminishes the real value of the debt and leads to an increase in real profits by means of interest.

To conclude, inflation should exert a pronounced upward thrust on the value of leverage and on P/E (Modigliani, 1982, p. 264).

From the influence of inflation on artificial profitability and uncertainty about real future profits, one can conclude that premium risk is usually higher during the higher inflation period.

Other serious negative consequences of inflation are: making the economic calculation more difficult, weakening the tendency to save and redistribution of incomes. The redistribution of incomes is especially unfair for investors because of shifting the cash resources from all owners to 'producers' of money, that is the government and commercial banks. (Milewski *et al*, 2008, pp. 268-269).

Summing up, a money supply increase rate higher than the supply for this money causes, in the first place, an increase in prices of assets, then a bigger economic growth and, consequently, inflation of prices of goods and services. An increase in prices of assets caused by a higher increase in money supply can mean that shares are evaluated at a higher P/E ratio (Lee, 2000, p. 191).

When calculating the nominal return rate on investment on a capital market not only are changes of share prices taken into consideration but also received dividends. On the day of receiving the right to dividend, share prices are adjusted to the value of the dividend received per share, which should be taken into consideration in the estimates of the return on investment.

That is why a nominal return on investment rate is counted in the following way (total shareholders return - TSR):

$$R_t = \frac{P_t - P_{t-1} + D_t}{P_{t-1}} \tag{1}$$

where:
R_t – nominal return rate in the period t
P_t – price of security in the period t
P_{t-1} – price of security in the period $t-1$
D_t – dividend paid out in period t.

Table no. 1 shows the level of inflation, the annual return rate of the Warsaw Stock Exchange Index (WIG) and the real dividend rate for WIG in the period 2000 - 2012.

Table no. 1 Nominal dividend rate and return rate of the Warsaw Stock Exchange Index (WIG) [in %]

| Period	Inflation	Annual return rate for WIG	Dividend rate for WIG
2000	8,50%	-1,30%	0,80%
2001	3,60%	-22%	1,30%
2002	0,80%	3,19%	1,30%
2003	1,70%	44,92%	1,60%
2004	4,40%	27,94%	1,30%
2005	0,70%	33,66%	2,80%
2006	1,40%	41,60%	2,90%
2007	4,00%	10,39%	2,60%
2008	3,30%	-51,07%	4,60%
2009	3,50%	46,85%	2,10%
2010	2,60%	18,77%	1,59%
2011	4,30%	-20,83%	4,10%
2012	3.70%	26.24%	3.80%

Source: [own study on the basis of Warsaw Stock Exchange and Central Statistical Office]

In the analysed period, a creeping inflation was mainly recorded in Poland, apart from the year 2000, when it was 8.5%. Studying the Table 1, one can also notice that there has been an increase in the dividend rate for the WIG index since 2000. It means that a sum of paid out dividends per share in a given year in comparison to the WIG index from this period was systematically higher or remained unchanged, but with reference to lower price levels of the WIG index. The practice shows, however, that more and more companies pay out dividends, so there is an increase of the index in the analysed period .

Figures 1 and 2 show changes of the annual rate of return of the WIG index and dividend rates of the WIG index as compared to inflation in the period 2000 - 2012.
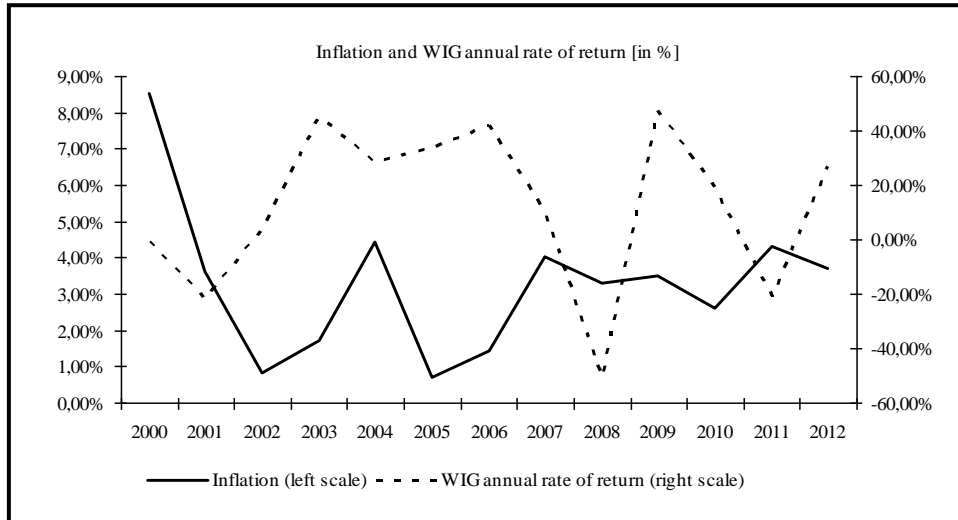
Source: [own study on the basis of Warsaw Stock Exchange and Central Statistical Office]
Figure no. 1 Inflation and annual rate of return of WIG in the period 2000 - 2012
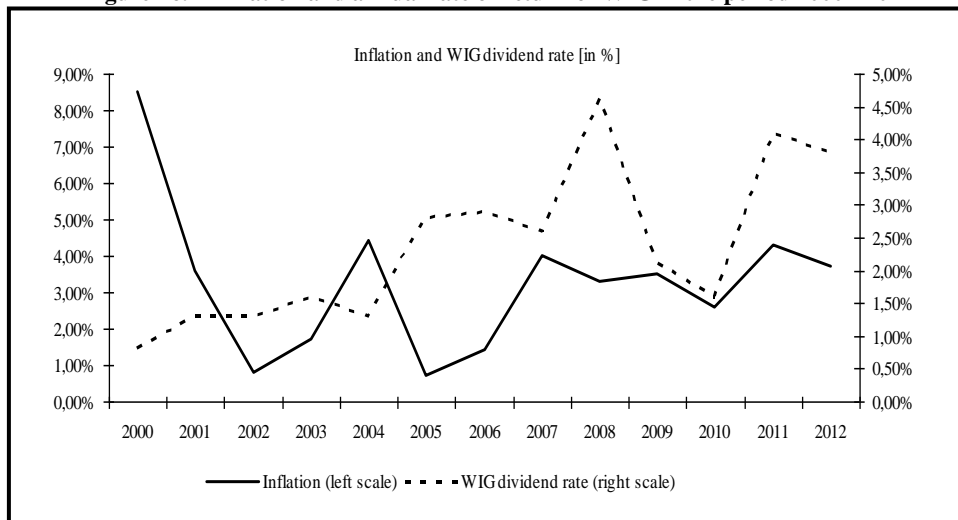
Source: [own study on the basis of the Warsaw Stock Exchange and Central Statistical Office]
Figure no. 2 Inflation and dividend rate of WIG in the period 2000 - 2012

The inflation that exists on the market diminishes the real value of investors' capital. That is why inflation is used to calculate the real rate of return according to Fisher's equation. After transforming the initial equation, a real interest rate is calculated as follows:

$$i_{real} = \frac{i_{nom} - i_{\inf}}{1 + i_{\inf}} \tag{2}$$

where:
i_{real} – real rate of return,
$i_{\inf}$ – annual rate of inflation,
i_{nom} – annual nominal rate of return.

Table no. 2 shows, after the application of formula (2) a comparison of the annual rate of return of WIG and a dividend rate of WIG in terms of nominal and real value.

Table no. 2 Nominal and real dividend rate and rate of return of WIG [in%] in the period 2000 - 2012

Period	WIG Annual rate of return	WIG real annual rate of return	WIG dividend rate	WIG real dividend rate
2000	-1.30%	-9,0%	0,80%	-7,1%
2001	-22%	-24,7%	1,30%	-2,2%
2002	3.19%	2,4%	1,30%	0,5%
2003	44.92%	42,5%	1,60%	-0,1%
2004	27,94%	22,5%	1,30%	-3,0%
2005	33,66%	32,7%	2,80%	2,1%
2006	41,60%	39,6%	2,90%	1,5%
2007	10,39%	6,1%	2,60%	-1,3%
2008	-51,07%	-52,6%	4,60%	1,3%
2009	46,85%	41,9%	2,10%	-1,4%
2010	18,77%	15,8%	1,59%	-1,0%
2011	-20,83%	-24,1%	4,10%	-0,2%
2012	26,24%	21,70%	3,80%	0,1%

Source: [own study on the basis of Warsaw Stock Exchange and Central Statistical Office]

A compariso between the WIG real return rate and the dividend rate for the whole market is shown in Figure no. 3.
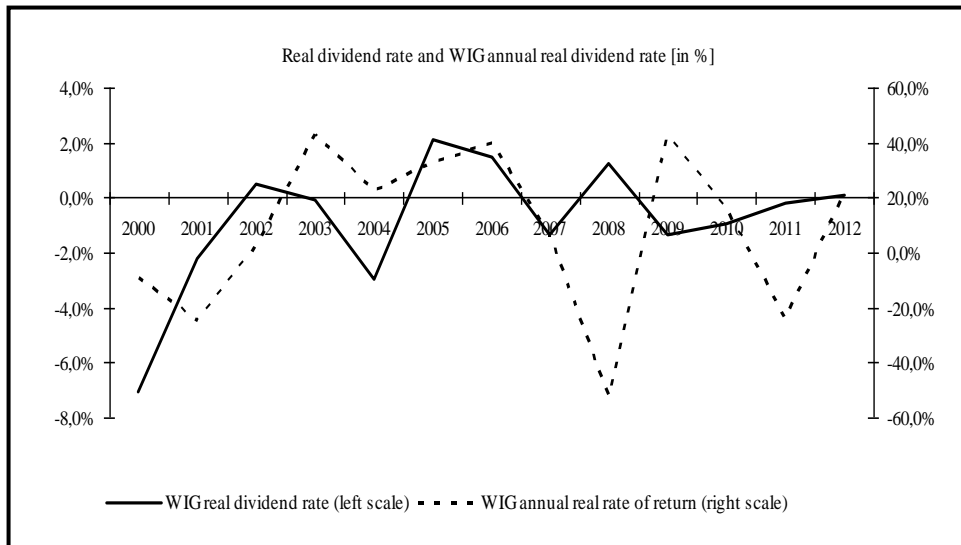
Figure no. 3 Real dividend rate and annual real rate of return of WIG in the period 2000 - 2012

After taking into consideration inflation and realignment of the WIG annual rate of return, it turns out that, especially in the periods of higher inflation, profits from a rise of index decreased, and in the periods of slump, a real fall of the WIG index is a lot more significant.

Moreover, one should pay attention to the property of real rate of return estimated according to Fisher's equation. From formula (2) one can conclude that, for an inflation amounting to 5% and changes of the WIG index at 0%, the real change rate of the WIG index is 4.76%. On the other hand, for the same level of inflation and changes of the WIG index at -10%, the real rate is – 14.29%. Thus, the difference between the nominal and real return rate for a positive nominal rate is bigger than a difference for a negative nominal rate; 5.24% and 4.29% respectively. Despite the appropriateness of the application of Fisher's equation for positive and negative return rates, the effect of raising the WIG real return rate for its negative nominal return rate is observed.

On the other hand, after taking into consideration inflation in the calculation of the real dividend rate (always a positive one) for the period 2000 – 2012 it turns out that their positive real value is obtained only in 5 periods. In most cases, real dividend rate accepts negative values.

The outpayment of dividend by companies listed on the capital market diminishes the quotations by the value of the paid out dividend. Consequently, the value of the index that gathers such companies becomes adequately adjusted. That is why, taking the outpayment of dividend in the calculation of the effectiveness of investment, one should use the formula (1) - total shareholders return (TSR).

Table no. 3. presents the quotations of the WIG index in particular periods together with the sum of the dividends paid out in the given year.

Table no.3 Value of paid out dividends and WIG quotations in the period 2000-2012

Period	Inflation	WIG quotations [PLN]	Dividend rate for WIG	Value of paid out dividend [PLN]
1999		18083,60		
2000	8,50%	17847,55	0,80%	142,78
2001	3,60%	13922,16	1,30%	180,99
2002	0,80%	14366,65	1,30%	186,77
2003	1,70%	20820,07	1,60%	333,12
2004	4,40%	26636,19	1,30%	346,27
2005	0,70%	35600,79	2,80%	996,82
2006	1,40%	50411,82	2,90%	1461,94
2007	4,00%	55648,54	2,60%	1446,86
2008	3,30%	27228,64	4,60%	1252,52
2009	3,50%	39985,99	2,10%	839,71
2010	2,60%	47489,91	1,59%	755,09
2011	4,30%	37595,44	4,10%	1541,41
2012	3,70%	47460,59	3,80%	1803,50

Source: [own study]

Table no. 4. presents the comparison of the WIG annual real rate of return with real total shareholders return (RTST) in the period 2000-2012.

Table no.4 Comparison of WIG annual real rate of return with real total shareholders return (RTST) in the period 2000-2012

Period	WIG annual rate of return	Total shareholders return (TSR)	WIG annual real rate of return	Real total shareholders return (RTSR)
2000	-1,30%	-0,52%	-9,0%	-8,3%
2001	-22,00%	-20,98%	-24,7%	-23,7%
2002	3,19%	4,53%	2,4%	3,7%
2003	44,92%	47,24%	42,5%	44,8%
2004	27,94%	29,60%	22,5%	24,1%
2005	33,66%	37,40%	32,7%	36,4%
2006	41,60%	45,71%	39,6%	43,7%
2007	10,39%	13,26%	6,1%	8,9%
2008	-51,07%	-48,82%	-52,6%	-50,5%
2009	46,85%	49,94%	41,9%	44,9%
2010	18,77%	20,65%	15,8%	17,6%
2011	-20,83%	-17,59%	-24,1%	-21,0%
2012	26,24%	31,04%	21,7%	26,4%

Source: [own study]

In order to take into account the capitalisation of interests in the analysed period, effective real return rate and effective real dividend rate were calculated.

Effective annual rate taking into consideration capitalisation is calculated for „n" periods as:

$$r_{ef} = \sqrt[n]{\prod_{j=1}^{n}(1+r_j)} - 1 \tag{3}$$

where:

r_{ef} – effective annual return rate,

r_j – return rate in period j,

n – number of periods (years).

The results of calculation of the effective real WIG return rate and effective real dividend rate for the period 2000 – 2012 are presented in Table no. 5.

Table no. 5 Effective WIG real annual rate of return and effective WIG real dividend rate for the period 2000 - 2012 [in%]

Category	Effective measure of a given category
WIG annual rate of return	7,71%
WIG dividend rate	2,36%
WIG real annual rate of return	4,31%
WIG real dividend rate	-0.86%

Source: [own study]

The calculations show that in the period 2000 - 2012 the effective real WIG return rate amounted to 4.31%. Although inflation and significant changes of index during selected slump and bull market periods were taken into account, the inflation average value is still above zero, which lets us think that, in the long run, an effective real return rate on investment on a capital market is above zero.

The results of the calculation of the effective real rate of return of WIG and effective real total shareholders return for the period 2000 – 2012 is presented in Table no. 6.

Table no.6 Effective WIG real annual rate of return and effective real total shareholders return for the period 2000 - 2012 [in%]

Category	Effective measure of a given category
WIG annual rate of return	7,71%
Total shareholders return (TSR)	10,25%
WIG annual real rate of return	4,31%
Real total shareholders return (RTSR)	6,78%

Source: [own study]

In order to compare the results of the research on the WIG real dividend rate and real total shareholders return (RTSR) with an alternative form of investment, the real annual

profitability of the 52-week Polish Treasury Bills for the 2000-2012 period is presented. The average profitability of treasury bills is a basis for calculating the interest on other securities, e.g treasury bonds.

Table no. 7. presents a comparison of real measures with real profitability of the 52-week Polish Treasury Bills in the period 2000-2012.

Table no.7 Comparison of Real mesures with Real profitability of the 52-week Treasury Bonds in the period 2000-2012 [in %]

Period	Inflation	Profitability of 52-week Polish Treasury Bills	Real profitability of 52-week Polish Treasury Bills	WIG real dividend rate	WIG annual real rate of return	Real total shareholders return (RTSR)
2000	8,50%	17,27%	8,08%	-7,10%	-9,03%	-8,31%
2001	3,60%	10,84%	6,99%	-2,22%	-24,71%	-23,73%
2002	0,80%	5,69%	4,85%	0,50%	2,37%	3,70%
2003	1,70%	5,97%	4,20%	-0,10%	42,50%	44,78%
2004	4,40%	6,46%	1,97%	-2,97%	22,55%	24,14%
2005	0,70%	4,32%	3,60%	2,09%	32,73%	36,44%
2006	1,40%	4,21%	2,77%	1,48%	39,64%	43,70%
2007	4,00%	5,74%	1,67%	-1,35%	6,14%	8,90%
2008	3,30%	6,21%	2,82%	1,26%	-52,63%	-50,45%
2009	3,50%	4,22%	0,70%	-1,35%	41,88%	44,87%
2010	2,60%	4,06%	1,42%	-0,98%	15,76%	17,60%
2011	4,30%	4,58%	0,27%	-0,19%	-24,09%	-20,99%
2012	3,70%	4,47%	0,74%	0,10%	21,74%	26,36%

Source: [own study]

As a summary of the calculations made for the period 2000 – 2012, Table no. 8 presents effective return rates for all real measures presented in the Table no. 7.

Table no.8 Comparison of effective rates of return of the analised categories in the period 2000-2012 [in %]

Category	Effective measure of a given category
WIG annual real rate of return	4,31%
WIG real dividend rate	-0,86%
Real total shareholders return (RTSR)	6,78%
Real profitability of 52-week Polish Treasury Bills	3,06%

Source: [own study]

The calculations made show that if the value of the dividend paid out in particular years (TSR) is taken into account in the calculation of the effectiveness of investment, the

attractiveness of investment change significantly from 7.71% to 10.25%, which is shown in Table no. 6. Additionally, if we take the inflation into account in both measures, it turns out that the effective WIG annual real rate of return and effective real total shareholders return (RTSR) still have positive values; 4.31% and 6.78% respectively. Therefore, when effective real total shareholders return taking into account the outpayment of dividends and inflation is used as a measure of attractiveness of investment, investors obtained a positive average annual rate of return.

If we take into consideration an effective measure for the real dividend rate, it turns out that in the analysed period 2000 – 2012 it had a negative value, which is shown in Table no. 5. The negative effective real dividend rate for WIG index means that investors estimating the profitability of investment in dividend companies on the basis of share prices suffered from a real loss. Thus, the research hypothesis of the article was confirmed.

In addition, one should pay attention to the comparison of the effective rate of return of the analised categories presented in Table no. 8. The effective annual real rate of return for WIG is higher than the effective real profitability of the 52-tweek Polish Treasury Bills, which is caused by a higher bonus for risk of investment on the capital market. However, if we treat the dividends received as an interest on the capital invested in shares, the real effective real profitability of a one - year Polish Treasury Bills is higher than effective real dividend rate for WIG, with the risk being lower. Only when the changes of shares prices together with dividends received are taken into consideration in the calculation of the effectiveness of investment, the attractiveness of effective real total shareholders return (RTSR) in comparison with the effective real profitability of the Polish one- year treasury bills turns out to be twice as high.

4. CONCLUSIONS

When we analyse the level of paid out dividends and the influence of inflation on their real value, one should pay attention to the fact that dividend constitutes a part of earned profit. Income from dividends is a real changeable and an investor gets a compensation for inflation in a form of higher dividends. However, as it has already been mentioned, in the period of at least two-digit inflation, companies withhold outpayments of dividend and prefer to reinvest capital in the development of company property.

The analyses carried out show that, in the period 2000 – 2012, investors generally suffered a loss on dividends, if we quantify their size and attractiveness by dividend rate. Still, we should add that the dividend rate for the WIG index published by the Warsaw Stock Exchange is calculated as a quotient of sum of dividends per share paid out by companies that are included in the WIG index and all companies that make up this index. The WIG dividend rate calculated in this way is, to an extent, undervalued, because it refers to all companies, regardless of whether they paid out a dividend or not.

Moreover, in the calculation of the effectiveness of investment one should take into consideration not only the value of the paid out dividends during the period while the investment lasts, but also the inflation. This makes real total shareholders return an appropriate measure of the effectiveness of investment.

If an investor builds his or her portfolio with a few companies hoping to obtain dividends, they can estimate dividend rate for a portfolio and take into consideration only the companies in which he or she invested. Moreover, by investing in given companies, they can estimate portfolio dividend rate not for a single session (and listings of the companies

from the portfolio) but for the purchase price of a given company or a date of creating the portfolio. When dealing with a single investment, when we estimate the dividend rate, we take into consideration the purchase price of a company. If the investment was spread in time, when calculating the dividend rate one should take into consideration the average purchase price of the shares of a given company. Consequently, it may turn out that in the situation when the amount of dividends paid out by companies from the portfolio is high, the dividend rate of such a portfolio will significantly surpass the dividend rate of the WIG index. Then, an investor, assuming the creeping or walking inflation, can obtain a positive effective real dividend rate of his or her investment portfolio.

References

Begg, D., Fischer, S. and Dornbusch, R., 2007. *Economics. Microeconomics.* Warsaw: PWE Publishing.

Belka, M., 2008. Inflation. In: R. Milewski, ed. 2008. *Elementary Issues in Economics.*
Warsaw: PWN Publishing. Ch.14.

Chordia, T., Shivakumar, L., 2005. Inflation Illusion and Post-Earnings-Announcement Drift. *Journal of Accounting Research*, 43(4), pp. 521-556.

Hazlitt, H., 2007. *Inflation, public enemy no. 1.* Warsaw: Fijorr Publishing.

Laatsch, F., 2013. Inflation, Hyperinflation, Adjustment Lags: Why TIPS Don't Guarantee Real Rate of Return. *Journal of Financial Planning,* 26(5), pp. 54-59.

Lee, T., 2000. *Economics for stock-exchange investors.* Warsaw: Wig-Press.

Lipsey, R.G., Ragan, C.T.S., 2008. *Macroeconomics.* Toronto: Pearson Education.

Maule, B., Pugh, A., 2013. Do inflation expectations currently pose a risk to the economy?. *Bank of England Quarterly Bulletin,* Q2, pp. 110-121.

Modigliani, F., 1982. Debt, Dividend Policy, Taxes, Inflation and Market Valuation. *The Journal of FINANCE,* 37(2), pp. 255-273.

Mises, von L., 1978. *On the manipulation of Money and Credit.* New York: Free Market Books.

Murphy, J.J., 1998. *Intermarket Technical Analysis: Trading Strategies For The Global Stock, Bond, Commodity And Currency Market*s. Warsaw: Wig-Press.

Nowak, E., Pelichaty, E., Poszwa, M., 1999. *Calculation of Profitability of Investment.* Warsaw: PWE Publishing.

Owsiak, S., 2002. *Basis of Finance*. Warsaw: PWE Publishing.

Rutkowski, A., 2007. *Finance Management.* Warsaw: PWE Publishing.

Sayek, S., 2009. Foreign Direct Investment and Inflation. *Southern Economic Journal,* 76(2), pp. 419-443.

Skousen, M., 2011. *Structure of Production. Stock-exchange, Capital, Consumption*. Warsaw: Fijorr Publishing.

Notes

[1] See more at http://nbp.pl/publikacje/nms/nms_07_13.pdf

[2] See more at *www.*ec.europa.eu/eurostat