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Are Emerging Markets Efficient? Evidence from Informational Content of Dividend Changes in Polish Stock Market

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Abstract:

Purpose: *The objective of this paper is to present the dividend signaling hypothesis, in particular, an empirical analysis of the relationship between the current changes in the level of a dividend paid (t0) and the future profitability of the companies.*
Design/Methodology/Approach: *The dividend signaling hypothesis is empirically tested using the dynamic causality analysis based on the regression approach monitoring for expected earnings changes and past returns with a set of linear and non-linear controls. The conducted analyses comprised the domestic companies quoted on the Warsaw Stock Exchange, which paid dividends in 2001-2016.*
Findings: *The empirical results confirm that in the audited period, dividend decisions bring some information about the current situation (t = 0) and future (t = 1, t = 2) of the analyzed companies. It is also worth noting that among the analyzed indicators, the gross profit ratio (PBT) referred either to the market value or the book value of equity was most often in the statistically significant analyzes. In general, our results confirm the validity of the signaling hypothesis in the case of continuation-growth and initiation of payments in the Polish capital market as in the developed market.*
Practical Implications: *We can say that investors, based on "signals" coming out of dividends advertisements, may conclude the future-income potential of a given company.*
Originality/value: *As mentioned, the gross profit ratio (PBT) referred either to the market value or the book value of equity was most often in the statistically significant analyses. Thus, it seems that, contrary to the adopted assumptions in the literature, gross profit (PBT) in dividend signaling is more important than net profit (E).*

Keywords: *Information content of dividends, Modigliani-Miller hypothesis, Emerging markets.*
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1. Introduction

When Miller and Modigliani (1961) first introduced the theory of the irrelevance of the dividend, the company's governing bodies, i.e., both the insiders and investors are known as outsiders, were assumed to have identical information about the company. In terms of a real financial market, this assumption, however, cannot be supported. Managers who deal with companies' affairs daily have information about the company's current standing and prospects that may never be available to the general public. This knowledge gap between insiders and outsiders may be considered to be a special form of information asymmetry. It may result in the business's intrinsic value being hidden and unknown to the market participants. If this is the case, the stock market price cannot be regarded as an accurate business value index. In an imperfect market, to fill the cognizance gap so that an investor can deduce a company's true value, managers can therefore face the necessity to share their knowledge with investors using a dividend tool. Stock prices are then believed to react to changes in dividends since the latter contains the necessary update and pieces of information to understand intrinsic business value (Thalassinos and Thalassinos, 2006; Thalassinos and Politis, 2011). Accordingly, dividend announcements may be perceived in the same way as a transmission of confidential information about the future possible income to be earned by the company (Miller and Modigliani, 1961; Curtis *et al.*, 2020). This phenomenon is also known as the informational content of dividends, and in the modern financial, economic literature, it is also referred to as the theory of signaling (Filbeck, 2009, Brigham and Houston, 2012, Araujo *et al*., 2011).

According to the signaling theory, investors based on signals containing information derived from dividend announcements may deduce future business yield. For this theory to prove efficient, i.e., for the market to respond positively to announcements about the growth of dividends and react negatively in the reverse situation, two conditions must be met. First of all, managers need to have private information on the prospects of a given company inaccessible from the outside. They must also be willing to share the news with the market participants. Secondly, the signal sent by managers must not be noisy, i.e., dividend growth announcements should be combined with specific business plans and adequate funding sources, so that those who lack the information on the company's prospects are unable to imitate such signals and send false information to the market (Koch and Shenoy, 1999).

If managers have comparatively more information on the companies' business prospects than external investors, they may be able to use the announcement of dividend change as a tool to generate news to the financial market about the company's future growth and profits. On the other hand, external investors may perceive these pieces of information as a reflection of the manager's assessment of the company's business performance and prospects. The announcement of the increase in the payment of dividends may be interpreted positively, i.e., that the company is well ahead of the growth prospects and profits. Therefore the current

price of its shares should respond positively. Similarly, an announcement about a dividend reduction may be treated as bad news - a signal that the company has poor prospects; the current stock price may react negatively in this case. In connection with the above, it is not a surprise that the managers do not want to announce any reduction in the dividend, and corporations are unwilling to change the adopted withdrawal policy (Lintner, 1956). Managers increase dividends only if they believe that the company's profits will increase permanently and reduce dividends only if the current level of payments cannot be maintained in the future. This prediction of behavior is in line with the so-called dividend smoothing hypothesis, where managers strive to smooth out the level of the dividend in the long run and thus will not keep up to significant dividend increases unless they can maintain the increased dividends also in the foreseeable future (Chen *et al.*, 2012, Lipson *et al.*, 1998).

Lipson *et al*. (1998) have further stated that managers will not even initiate dividend payments until they conclude that future profits may sustain the dividends. It should be noted that, although the management board of the company may benefit from a change in the dividend in some cases, these changes may, however, generate ambiguous signals like in a situation where the company reduces dividend payments and uses its own funds to finance investments to improve future performance indicators. Without sufficient information, market participants may mistakenly interpret the event as a signal of deteriorating prospects, and the stock prices in the short run may consequently decrease (Soter *et al*., 1996, Vernimmen *et al*., 2014).

Existing efforts to examine the above issues have been conducted mostly in developed markets using the event analysis or cointegration and causality tests (Garrett and Priestley, 2000; Mougoué and Rao, 2003). On the contrary, the research conducted in emerging markets has been partially affected by limitations in the data availability and estimation techniques (Fairchild *et al.*, 2014, *Lee et al*., 2012; Kadioglu and Ocal, 2016). Nevertheless, more research still needs to address specific issues related to emerging markets and their formal and legal ineffectiveness (Wrońska, 2009; Brycz and Pauka, 2013; Rupeika-Apoga *et al.*, 2018). This paper aims to explore the informational content of dividend changes taking into account the Polish stock market.

This paper addresses gaps in the existing literature by making three distinct contributions to the body of knowledge in corporate finance. The signaling hypothesis is empirically tested using the dynamic causality analysis based on the regression approach monitoring for expected earnings and past returns with a set of linear and non-linear controls (Fama and French, 2001, Michaely *et al.*, 2018, Grullon *et al*., 2005, Ball and Brown, 1968). For this study, a specific set of data from companies listed on the Warsaw Stock Exchange is used. The panel regression with the autoregressive structure and dummy variables is applied to measure the informational content of dividends. The results obtained for the Warsaw Stock Exchange confirm the existence of dependencies verified during the previous analyzes for other developed and emerging markets. In this paper, the gap between

the existing economic theory and empirical observations is summarized into testable hypotheses considering links between changes in dividends and future companies' prospects represented by the market value of equity and the book value of equity. Secondly, the government, as the major shareholder, is in this paper isolated from the informational effect that dividends exhibit legal inefficiencies and political risk. The conviction has guided such an elimination that the dividend decisions could often result from political rather than economic reasons in the case of the State-owned companies. As a result of the selection carried out in this way, a test sample of 250 enterprises corresponding to 1292 dividend events was obtained.

The rest of the paper is organized as follows. Section 2 provides for a review of the literature on the informational content of dividends in developed markets. The subsequent section 3 describes the Polish capital market and the Polish stock exchange in the spirit of recent empirical results of the signaling hypothesis tested in emerging markets. In section 4, the model specification is presented. Data description, the paper's main results, and robustness checks linking the theoretical model with the empirical analysis are presented in sections 5 and 6. The final section 7 summarizes the results and draws implications for market efficiency.

2. Literature Review - Dividend Signaling Hypothesis in Developed Markets

Koch and Shenoy (1999), Allen and Michaely (2003), Al-Malkawi *et al.* (2010), Chen (2006), Seaton (2006), Zenonos (2003) agree that the signaling theory carries two important empirically verifiable implications which have been drawn much attention in terms of the related literature. The relevant literature states that stock prices should move in the same direction as unexpected changes in dividends immediately after the announcement of the relevant information. According to the other pieces of literature, which also constitutes a central concern of this paper, changes in the dividends should involve movement in the same direction as changes in the future profits. This implication may be reduced in practice to the question of whether the future business performance may be predicted with sufficient accuracy based on changes in the current dividend policy.

Watts (1973) was one of the first scientists who tried to verify the claim that based on information about past and current trends in dividends, future profits could be predicted better than on the basis of information on the past and current profits. Using a sample of 310 corporations for 1946-1967, Watts (1973) tested whether the yield in the year t + 1 may be explained by the current value of dividends or profits t. The results of such analyzes confirmed by Gonedes *et al.* (1978) showed that there was a relationship between future profits and current unexpected changes in dividends, which would have confirmed the hypothesis of signaling, but the value of information contained in dividends due to small statistical significance of results was very small. The lack of dependence between the current changes in the dividend policy and future profits was also indicated by Benartzi *et al.* (1997) and DeAngelo

et al. (1996). In response to the aforementioned findings Laub (1976) and Pettit (1976) independently contested the dividends to contain information on future profits. The results of Healy and Palepu (1988) are also partially consistent with the signaling theory. In the sample of enterprises that had initiated dividend payments, they showed that the profit of those enterprises increased in the year of initiation and in two consecutive years. In the sample of enterprise, that had ceased to pay dividends, the obtained results were the opposite of what the signaling theory had predicted. The profits of these enterprises decreased in the year in which the information about discontinuation of payments took place, but in the next two years it already significantly increased.

The signaling hypothesis was revived in numerous studies conducted in the US market and described in recent papers of Grullon *et al.* (2002; 2005), Nissim and Ziv (2001), Howatt *et al.* (2009) and Chen and Fu (2011). The empirical results are ambiguous ranging from partially confirming the informational content of dividends to those completely rejecting the signaling hypothesis. For example, Grullon *et al.* (2002) on a sample of enterprises that had changed their dividends by more than 10%, showed that the increase or respective reduction of dividends in subsequent years was associated with a decline and adequate increase in profitability measured by ROA and a decrease (increase) in systematic risk. Grullon *et al.* (2005) also showed that the changes in the dividend were negatively correlated with future changes in profitability i.e., ROA. These statements have allowed Grullon *et al.* (2005) to conclude that changes in the dividend policy do not contain any information about future profits. This hypothesis has neither been confirmed by Ap Gwilym *et al.* (2005) in the case of dividend events for UK companies. The authors have found, however, a statistically significant proof of the positive impact of the decision to resume dividend payments on the future profitability of the companies measured by ROE, but only in the first year after the decision was made. In the case of the next two years, profitability decreased. Those results are in line with the analyses conducted for French and Swiss markets (Vieira and Raposo, 2007, Stacescu, 2006).

Outcomes of the research conducted by Nissim and Ziv (2001) are consistent with the results obtained by Healy and Palepu (1988). Although the authors generally confirm that changes in dividends and changes in profits are positively correlated, which supports the signaling hypothesis, they have also found no link between the reduction of the dividend and the future profitability (ROE) of enterprises. Furthermore, in contrast to the results of Grullon *et al.* (2002), Howatt *et al.* (2009) have fully confirmed the dividend signaling hypothesis. The results of their research have shown that the increase / initiation of the payment (reduction / cessation of payment) of dividends in the future leads to an increase (decrease) in the enterprise value. Surprisingly the results of Howatt *et al.* (2009) have also shown that changes in the dividends lead immediately and in the future to an increase in risk. Result of Chen and Fu (2011) have been inconclusive. They confirm the correctness of the signaling hypothesis in relation to the increase in the dividend ratio and future results

measured by the volume of profit from business operations. In the case of the indicator of future profits expressed in terms of EBITDA (earnings before interest, tax, depreciation and amortization) their results have rejected the signaling hypothesis.

Summarizing the above review of studies, one can assume that the evidence collected for the US market does not allow to state unequivocally that changes in the dividend policy carry information on the future performance of the companies. A similar conclusion may be also found by following the results of the research carried out on the stock markets in other countries. That is why in the next sections the research will focus on the Polish stock market.

3. Informational Content of Dividends in the Polish Capital Market

Among the works that have confirmed the signaling hypothesis in emerging markets, for example, Chowdhury *et al.* (2014) using data from the Chinese capital market and ROE as a measure of profits show that the increase in the dividend payments is a positive signal about future profits of companies, while the reduction in the dividend policy is generally considered as bad news. Similar conclusions were obtained by Lee (2010), who used EPS as a measure of profits and examined the sample consisted of those companies from the Singapore stock market that increased dividends. Choi *et al.* (2011) used ROE as a profit measure. A full sample of companies listed on the South Korean market positively confirmed the signaling hypothesis after reducing the sample to only those enterprises where dividend payout events occurred. As a result, the authors have formulated the conclusion that the corporate governance system may determine the informational content of dividends.

These results are in line with the study conducted by Liljeblom *et al*. (2015) on a sample of companies from Denmark, Norway, and Sweden, which have confirmed the informational content of dividends for Swedish companies only EPS has been used for measuring profits. Other studies exploiting the relationship between the current changes in the dividend and the future profits of companies in the Iranian and Malaysian markets have only partially confirmed the signaling hypothesis. In particular, the results of the research by Lee *et al.* (2012) for the stock market in Malaysia and EPS as a profit measure have indicated that changes in dividends regardless of the increase or decrease of the payout ratio must be significant (50% or more) to give a specific signal about future profits. The range of this signal is limited to the first year after the changes in dividends are introduced.

The analyzes conducted by Ghodrati and Hashemi (2014) for companies from Iran show in turn that the impact of the increase in dividends on the future profitability of companies measured by ROE is positive in the next three years (+1, +2, +3) but statistically significant only in the first year. However, in the case of dividend reductions, the authors do not confirm the existence of specific links between ROE and dividend changes. Just as numerous studies more or less confirm the existence

of links in line with the signaling hypothesis in the markets, the same hypothesis has been rejected using samples of companies listed in stock markets in Turkey (Kadioglu and Ocal, 2016), Thailand (Fairchild *et al.*, 2014), Portugal (Vieira and Raposo, 2007).

In the Polish stock market Wrońska (2009), Brycz and Pauka (2013), Pieloch-Babiarz (2015) have tried to verify the presented aspect of the signaling hypothesis. Wrońska (2009) has analyzed the relationship between dividends and various measures of operating effects (net profit, operating profit, net cash flows, net operating cash flow), which companies reported both before and after dividend payment. The results of that research do not confirm the signaling hypothesis because the conclusion is that in the case of the audited enterprises, dividends contain information on past results and may be used as a signal only for those results. In turn, Brycz and Pauka (2013), in the case of initiating dividend payments, have tried to answer the question of whether the information on the beginning of dividend payments may be treated as an actual signal from the management board of those companies about their expected better financial standing in the future. The results of their analyzes show that the companies initiating dividend payments in the future increase their assets and revenues from sales; however, as the authors have stated, that the informational content of initial dividends regarding future results is not strong enough so that investors can only base their expectations on it. The initiation of dividend payments has also been the object of the research conducted by Pieloch-Babiarz (2015), who, unlike the above-mentioned authors, has confirmed the signaling hypothesis with its analysis results. In particular, she has stated that the companies that have initiated the payment of dividends are usually profitable a few years before (t-5) making the first payment as well as a few years after (t + 4), in the first year (t + 1) after the year of initiation, the average profitability of the companies decreases.

Literature studies concluded that scientists generally agree that dividend payments carry certain information, but there is no agreement about what they really signal (Frankfurter *et al*., 2003; Benhamouda, 2007). Whether the dividends signal the trend of historical profits or whether they are a more precise a measure of current profits or maybe they signal expectations about future profits, remains an open question and is the main concern of this paper. It bears noting that the Polish capital market, with its stock exchange in Warsaw, is the main focus of this paper, is claimed to be the leader among capital markets in central and eastern Europe.

Although its origins date back to 1809 and the French Commercial Code, the outbreak of World War II formally froze Poland's capital market for over 40 years. The Warsaw Stock Exchange was established on April 12, 1991, as a joint-stock company owned by the Minister of Privatization and commenced its operations four days later. In the first two years, the stock exchange sessions took place once, and then twice a week, and the turnover was carried out on shares privatized by the state treasury of companies. The years 1993-1994 were marked by strong increases,

followed by declines in the prices of listed instruments. In 1993, the value of the main stock index increased by 1095%, to drop by 50% by the end of the first quarter of 1994. These events were characteristic of the young market in the speculative phase of the stock exchange in Poland. In the following years, the Polish capital market was gradually evolving. New categories of financial instruments (bonds, futures) were introduced to the market, and stock exchange sessions were held five times a week. During this period, privatizations of large companies took place, which significantly contributed to the increase in the capital market's attractiveness from the point of view of the number of listed entities, their market value, and liquidity.

At the end of 2000, listed companies' market value amounted to PLN 130 billion, while the turnover of shares amounted to PLN 84 billion in the whole year, which was 1657% and 623% more than in 1994, respectively. A new quotation system was introduced, thanks to which transaction terms changed radically, and investors were able to react quickly to various types of information appearing during the day. The accession of Poland to the European Union in 2004 resulted in the adoption of uniform regulations in many areas of life, including the transactions in the capital markets in the community's countries. These changes were the opening of the capital market in Poland to issuers and foreign investors. In the years 2004-2017, the number of foreign companies listed in Warsaw increased from 5 to 50, and their market value at the end of 2017 amounted to PLN 709 billion. On the other hand, investors' activity on the Warsaw Stock Exchange measured by the average daily turnover in the same period increased from PLN 234 million to PLN 1 billion. The data from the Warsaw Stock Exchange shows that the percentage share of foreign investors in stock trading in 2004 was 33%, while in 2017, it was 53%. At the end of 2017, there were more than 3,000 companies listed on the Warsaw Stock Exchange, not to mention financial instruments, including 894 listed companies, 174 series of futures, 218 options, 943 structured products, 953 issues of bonds, and 39 investment certificates and ETFs.

4. Methodological Framework and Testable Hypotheses

Although the informational content of dividends was recorded on the capital market as early as in the 1950s and early 1960s, in the initial period, it did not have a theoretical foundation because it was not modeled until the end of the 1970s and early 1980s. Bhattacharya (1979), John and Williams (1985), Miller and Rock (1985), modeling approaches most often elaborated upon in the literature are based on several diverse assumptions, but they also have and are common. First of all, it is common to assume an asymmetry of information in the market between its managers and shareholders. Managers represent a group with the best, most comprehensive information on the company's current standing and prospects. Secondly, all authors assume that announcements about dividends are used as a signaling mechanism because they contain certain information about the company, and manager-divers have the motivation to transfer their private information to the market to close the

information gap. A common element of the models is the general conclusion that the announcement of the increase in the dividend is interpreted as a good signal that communicates to the market that the company has good prospects for the future and may increase cash expenditures.

$$max_{D_1} D_1 + E(Y_2) \tag{1}$$

where financial indicator (book value or market value of equity respectively) $Y_2 = f(I_1) + \nu$, $D_1 \leq \omega_0$. In this setup larger dividends should be associated with lower financial indicator changes and since dividends are paid before the financial indicator is known to the general public, under certainty equivalence condition paying higher dividends will increase the probability of foregoing future investment opportunities, as the (expected) volatility of company value grows higher. Then dividend changes should be followed by changes in the business value volatility in the opposite direction. Furthermore, under asymmetric information following a dividend increase, there is a larger increase in the business value volatility for enterprises with smaller current earnings, since smaller earnings give larger investment opportunities for a given dividend payment. Therefore, the same dividend should carry a larger informational content for future changes in the business value indicator for firms with smaller earnings. Finally announcements of dividend changes should carry a larger information content (i.e., have a larger announcement return), as the expected reduction in the business value increases.

In this section, the methodology to empirically test whether dividend changes have the informational content about future earnings via three distinct approaches. First, the relation between dividend changes and future earnings changes is estimated in a regression approach, which includes variables suggested by the extant literature to control expected earnings changes in the absence of any dividend change. The signaling tool used in all analyzes is the change in the level of the paid dividend (Benartzi *et al*., 1997; Nissim and Ziv, 2001; Grullon *et al*., 2005; Lee *et al*., 2012) and is calculated as the rate of change between the level of dividend paid per one share in the current year - the base year DIV0 and the level of dividend paid in the previous year DIV−1. The formulas are presented in the following equation:

$$\Delta DIV_0 = \frac{DIV_0 - DIV_{-1}}{DIV_{-1}} \tag{2}$$

where ΔDIV_0 is the change in the paid dividend between the current and previous year, DIV_0 is a dividend per share in the current - base year, DIV_{-1} is a dividend per share in the previous year compared to the base year. Then research scheme related to the informational content of dividends may be summarized into three testable hypotheses using financial indicators Fi described below.

Benartzi *et al.* (1997) were the first to use the indicator expressing the relation of the difference between net profit in a year and the level of net profit in a year in the dividend signaling model as a dependent variable, i.e., the financial result expected in subsequent years. t − 1 to the market value of equity in year -1, where year 0 is the current (base) year in which the examined change in the level of dividend paid takes place. In later years, this indicator was also used in their research by Nissim and Ziv (2001), Kadioglu and Ocal (2016), and Al-Shattarat *et al.* (2018). Following the authors mentioned in this article, a general hypothesis (H1) was formulated, which states that:

H1: Dividend changes signal the future company's financial standing i.e. yield changes related to the market value of equity in the previous period P_{-1} described by the following equation:

$$\Delta E_{i,t} = \frac{F_{i_t} - F_{i_{t-1}}}{P_{-1}}$$

Nissim and Ziv (2001) formulated the opinion that changes in corporations' future results should be determined rather by the book value of the equity capital engaged in their activities, not by the market value of these capitals. Therefore, the authors, by modifying the Benartzi *et al.* (1997) model in their research as a measure of future financial results, used the ratio of the difference between net profit in the year and the level of net profit in the year t − 1 about the book value of equity in the year t − 1. In later years, this indicator, as a dependent variable in the analyzed model, was also used by Grullon *et al.* (2005), Choi *et al.* (2011), Kadioglu and Ocal (2016), Liu and Chen (2015), Vieira and Raposo (2007). Based on the examples cited in this article, a general hypothesis (H2) was formulated, according to which:

H2: Dividend changes signal the future company's financial standing i.e. yield changes related to the book value of equity in the previous period B_{-1} described by equation:

$$\Delta E_{i,t} = \frac{F_{i_t} - F_{i_{t-1}}}{B_{-1}}$$

As suggested by Grullon *et al*. (2002; 2005), the dividend signaling theory does not precisely indicate which measures of financial performance predict dividend payments, i.e., whether future profits or future profitability (Dividend-signaling theory does not indicate precisely which companies performance metric (e.g., future income or future profitability) should be used.) Bearing this fact in mind, the authors have introduced in their models as a dependent variable, i.e., a variable reflecting future financial results, the difference in the level of return on assets in the year t and t − 1 and the return on equity in the year t and used both changes (e.g., Change in Return on Assets) and the level of change (e.g., Level of Return on Assets) of their

value. A similar research approach may also be found in Choi *et al.* (2011), Liu and Chen (2015). This article includes the suggested solution in the form of the following hypothesis:

H3: Dividend changes signal changes in the future company's financial standing, i.e., yield changes where dependent variables are either relative or absolute.

Especially to test for the informational content of dividend changes, the earning changes on the percentage of dividend change ΔDIV and a series of explanatory variables are regressed. All earning changes are computed as the difference between earnings announced after the dividend change and earnings for the same period in the prior year (before the dividend change) and scaled by the market value of equity the quarter before the dividend announcement, similar to (Benartzi *et al.*, 1997). The earning changes are calculated over one year prior, current year, as well as one year ahead changes after the dividend announcement:

$$\Delta E_{i,t+n} = \beta_0 + \beta_1 \Delta DIV_{it} + \beta_2 \Delta E_{i,t+n-1} + \beta_j d_j + \varepsilon_t \tag{3}$$

Empirically, negative dividend changes have a larger effect on yields related to the book value of equity/changes in yields related to the market value of equity/changes of the future company's financial standing than positive dividend changes. If variation in informational content causes the association between dividend changes and respective indicator, dividend decreases would be expected to have more informational content about future earnings than dividend increases, i.e.:

$$\Delta E_{i,t+n} = \beta_0 + \beta_1 \Delta DIV_{it} \cdot \Theta_{\Delta DIV_{i,t-1}} + \beta_2 \Delta E_{i,t+n-1} + \beta_j d_j + \varepsilon_t \tag{4}$$

where

$$\Theta_{\Delta DIV_{i,t-1}} = \begin{cases} 1 \ for \ \Delta DIV_{i,t-1} > 0 \\ 0 \ for \ \Delta DIV_{i,t-1} = 0 \\ -1 \ for \ \Delta DIV_{i,t-1} < 0 \end{cases}$$

Divides set of dividends into distinct subgroups. Each of the above equations is a form of a panel regression with an autoregressive structure imposed by independent variables and estimated using the maximum likelihood method.

5. Empirical Results and Discussion

The analysis of the relationship between the current changes in the paid dividend (t = 0) and the current (t = 0) and future profitability of companies (t + 1; t + 2), which made these changes, covered the years 2001-2016. The initial test sample consisted of all Polish companies, which were not banks and insurers, which at the end of 2016 were listed on the main market of the Warsaw Stock Exchange and paid dividends. The list of companies paying the dividend and their DPS index have been

identified based on calendars of dividend payments included in the Annual Reports in respective years.

However, due to the analysis methodology and the signaling period adopted (t + 2), which meant the need to obtain financial data for 1 year before and 1-2 years after the payment of dividends, the initial sample was narrowed down. Only companies that had paid dividends were included in the study - not earlier than in 2001 and not later than in 2015. At the end of the sample, the companies in which the State Treasury was the dominant shareholder were eliminated from the sample. The conviction guided the elimination that the dividend decisions could often result from political rather than economic reasons in those companies. As a result of the selection carried out in this way, a test sample of 250 entities corresponding to 1292 dividend events was obtained. A detailed breakdown of the sample size by year, and individual dividend events is presented in Table 1.

Table 1. *The size of the sample of companies surveyed by year and individual dividend events*

	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015
DPS growth	6	2	7	15	22	19	20	27	16	29	25	44	50	47	72
DPS init.	7	8	16	11	16	18	8	23	25	22	38	46	31	38	38
DPS unchd.	4	3	2	6	4	10	10	2	10	14	16	11	8	22	22
DPS red.	4	6	2	1	5	8	13	13	21	7	16	12	26	27	21
DPS stop	12	10	8	6	4	11	11	9	18	23	15	28	29	19	17
Total	**21**	**19**	**27**	**33**	**47**	**55**	**51**	**65**	**72**	**72**	**95**	**113**	**115**	**134**	**153**

Source: *Own compilation based on EMIS data from particular years.*

As already mentioned, Grullon *et al.* (2002; 2005) suggest that the dividend signaling theory does not precisely indicate which financial indices predict dividend payments. A review of the literature confirms this opinion because of the financial indices (Benartzi *et al.*, 1997; Nissim and Ziv, 2001; Kadioglu and Ocal, 2016), operating profit (the earnings before extraordinary items; e.g. (Chen and Fu, 2011; Grullon *et al.*, 2005; Stacescu, 2006; Choi *et al.*, 2011) or EBITDA (earnings before interests, taxes, depreciation, and amortization; (Chen and Fu, 2011; Chowdhury *et al.*, 2014). This article tries to determine the financial indicators - profit that would be most closely related to dividend signaling, using the data coming from the profit and loss account (name: Incomes). For the sample selected using criteria defined above, the data from financial statements was gathered from WSE websites and EMIS database and used for calculating the following five financial indices, i.e.:

1. net profit / loss (E),
2. operating profit / loss (OP),
3. gross profit / loss on sales (GPoS),
4. profit / loss on sales (PoS),
5. profit / loss before tax (PBT).

Turning to the verification of the accepted research hypotheses, i.e., examining the relationship between the dividend paid in a given year ΔDIV0 and the results obtained in the current year t = 0 and the next t + 1 and the next t + 2, about the dividend payment year, the first step was to try to answer the question whether dividend payment brings with it hidden information about the future-income potential of the company. Results gathered in table 2 present estimates from the panel regression for each indicator. One can interpret them in a way that the payment of dividend brings certain information.

However, it seems that to the greatest extent, which is also consistent with the conclusions of Benartzi *et al.* (1997), it is information on the current financial standing of the paying entity. What is worth noting in the presented statement, regardless of the considered hypothesis, the financial results depicted by indicators based on the change in the level of net profit (E) are statistically significant in all three hypotheses. In hypotheses 1 and 2, significant indicators of results are indicators based on changes in the gross profit/loss of sales (GPoS) and profit/loss before tax (PBT).

Since researchers Koch and Shenoy (1999), Allen and Michaely (2003), AlMalkawi *et al*. (2010), Chen (2006), Seaton (2006), Zenonos (2003) agree that the signaling theory carries important empirically verifiable implications. It also states that changes in the dividends should involve the same directional changes in future profits. Furthermore, Lintner (1956) claims that changes in the dividends go hand in hand with long-term changes in the level of earnings. Managers also show a great reluctance to reduce or increase the dividend if it may be necessary to change these decisions. Therefore, the increase in the paid dividends occurs only when the management board believes that it is possible to maintain this level in the future. Managers also have a strong aversion to reduce the dividend and make such decisions only when unfavorable conditions cannot be overcome quickly.

Table 2. *Identification of informational content of dividends based on β_1 significance for $\Delta E_{i,t}$ as a dependent variable*

	H1			H2			H3a		
Time period	t=0	t+1	t+2	t=0	t+1	t+2	t=0	t+1	t+2
indicator	$(E_0-E_{-1})/P_{-1}$	$(E_1-E_0)/P_{-1}$	$(E_2-E_1)/P_{-1}$	$(E_0-E_{-1})/B_{-1}$	$(E_1-E_0)/B_{-1}$	$(E_2-E_1)/B_{-1}$	$(E_0/E_{-1})/-1$	$(E_1/E_0)-1$	$(E_2/E_1)-1$
Estimate	**3.5050**	-0.1530	-0.0136	**3.2926**	-0.0925	0.0207	**0.0272**	0.0068	-0.0044
Std. error	**1.0105**	0.3450	0.1617	**1.7636**	0.2889	0.1168	**0.0145**	0.0280	0.0225
t-student	**3.4690**	-0.4430	-0.0840	**1.8670**	-0.3200	0.1770	**1.8710**	0.2440	-0.1960
p-value	**(0.0042)**	(0.6648)	(0.9342)	**(0.0846)**	(0.7538)	(0.8624)	**(0.0839)**	(0.8114)	(0.8476)
indicator	**$(OP_0-OP_{-1})/P_{-1}$**	$(OP_1-OP_0)/P_{-1}$	$(OP_2-OP_1)/P_{-1}$	$(OP_0-OP_{-1})/B_{-1}$	$(OP_1-OP_0)/B_{-1}$	$(OP_2-OP_1)/B_{-1}$	$(OP_0/OP_{-1})-1$	$(OP_1/OP_0)-1$	$(OP_2/OP_1)-1$
Estimate	**4.0533**	-0.6785	**-1.4552**	2.5285	-0.5223	-0.6829	0.0708	-0.0052	0.0002
Std. error	**1.2352**	1.1728	**0.5933**	2.0812	1.4402	0.7385	0.0904	0.0113	0.0090
t-student	**3.2810**	-0.5790	**-2.4530**	1.2150	-0.3630	-0.9250	0.7830	-0.4660	0.0260
p-value	**(0.0060)**	(0.5728)	**(0.0291)**	(0.2460)	(0.7227)	(0.3719)	(0.4474)	(0.6492)	(0.9793)
indicator	**$(GPoS_0-GPoS_{-1})/P_{-1}$**	$(GPoS_1-GPoS_0)/P_{-1}$	$(GPoS_2-GPoS_1)/P_{-1}$	$(GPoS_0-GPoS_{-1})/B_{-1}$	$(GPoS_1-GPoS_0)/B_{-1}$	$(GPoS_2-GPoS_1)/B_{-1}$	$(GPoS_0/GPoS_{-1})-1$	$(GPoS_1/GPoS_0)-1$	$(GPoS_2/GPoS_1)/-1$
Estimate	**2.8311**	-1.0158	-0.9125	**2.1661**	-0.0379	-0.2520	-0.0385	0.0280	-0.0132
Std. error	**0.8404**	1.4770	0.5663	**1.1935**	1.0458	0.4691	0.1001	0.0360	0.0302
t-student	**3.3690**	-0.6880	-1.6110	**1.8159**	-0.0360	-0.5370	-0.3840	0.7780	-0.4360
p-value	**(0.0050)**	(0.5037)	(0.1311)	**(0.0927)**	(0.9717)	(0.6001)	(0.7069)	(0.4504)	(0.6703)
indicator	**$(PoS_0-PoS_{-1})/P_{-1}$**	$(PoS_1-PoS_0)/P_{-1}$	$(PoS_2-PoS_1)/P_{-1}$	$(PoS_0-PoS_{-1})/B_{-1}$	$(PoS_1-PoS_0)/B_{-1}$	$(PoS_2-PoS_1)/B_{-1}$	$(PoS_0/PoS_{-1})-1$	$(PoS_1/PoS_0)-1$	$(PoS_2/PoS_1)-1$
Estimate	**5.0385**	-1.5993	**-1.4579**	1.3515	-1.6469	-0.4643	-0.0389	-0.0449	0.0095
Std. error	**1.6572**	1.5769	**0.7324**	2.2019	1.9448	0.8202	0.0384	0.0301	0.0353
t-student	**3.0400**	-1.0140	**-1.9910**	0.6140	-0.8470	-0.5660	-1.0130	-1.4910	0.2690
p-value	**(0.0095)**	(0.3290)	**(0.0680)**	(0.5499)	(0.4124)	(0.5810)	(0.3297)	(0.1599)	(0.7928)
indicator	**$(PBT_0-PBT_{-1})/P_{-1}$**	$(PBT_1-PBT_0)/P_{-1}$	$(PBT+2-PBT_1)/P_{-1}$	$(PBT_0-PBT_{-1})/B_{-1}$	$(PBT_1-PBT_0)/B_{-1}$	$(PBT_2-PBT_1)/B_{-1}$	$(PBT_0/PBT_{-1})-1$	$(PBT_1/PBT_0)-1$	$(PBT_2/PBT_1)-1$
Estimate	**3.0630**	-0.1484	-0.0047	**3.4222**	-0.0847	0.0189	0.0284	-0.0015	-0.0076
Std. error	**0.8376**	0.2695	0.1420	**1.4513**	0.2194	0.0991	0.0334	0.0258	0.0177
t-student	**3.6570**	-0.5500	-0.0330	**2.3580**	-0.3860	0.1910	0.8510	-0.0600	-0.4300
p-value	**(0.0029)**	(0.5913)	(0.9741)	**(0.0347)**	(0.7058)	(0.8517)	(0.4101)	(0.9531)	(0.6751)

Source: *Own compilation. Results are presented up to four significant digits. P-values of significance test in brackets below. Independent variables for each model are mentioned above. Statistically significant variables are shaded*

Also, Lipson *et al.* (1998) also notice that managers will not decide to initiate dividend payments unless they conclude that future profits may sustain them.

Table 3. *Informational content of dividend changes in relation to market value of equity when signals are positive*

	$0<\Delta DIV_0<1$			**$\Delta DIV_0=1$**		
	t=0	**t+1**	**t+2**	**t=0**	**t+1**	**t+2**
indicator	$(E_0-E_{-1})/B_{-1}$	$(E_1-E_0)/B_{-1}$	$(E_2-E_1)/B_{-1}$	$(E_0-E_{-1})/B_{-1}$	$(E_1-E_0)/B_{-1}$	$(E_2-E_1)/B_{-1}$
Estimate	-0.0727	1.0125	**0.5398**	<0.0000	<0.0000	<0.0000
Std. error	0.6098	0.6478	**0.2295**	<0.0000	<0.0000	<0.0000
t-student	-0.1190	1.5630	**2.3520**	0.9220	**3.0800**	-0.3910
p-value	(0.9070)	(0.1420)	**(0.0351)**	(0.3740**)**	**(0.0089)**	(0.7020**)**
indicator	$(OP_0-OP_{-1})/B_{-1}$	$(OP_1-OP_0)/B_{-1}$	$(OP_2-OP_1)/B_{-1}$	$(OP_0-OP_{-1})/B_{-1}$	$(OP_1-OP_0)/B_{-1}$	$(OP_2-OP_1)/B_{-1}$
Estimate	0.1676	0.5745	**0.5001**	<0.0000	<0.0000	<0.0000
Std. error	0.6198	0.4264	**0.2184**	<0.0000	<0.0000	<0.0000
t-student	0.2700	1.3470	**2.2900**	0.5160	**1.7800**	-1.1100
p-value	(0.7910**)**	(0.2010**)**	**(0.0394)**	(0.6140**)**	**(0.0984)**	(0.2860**)**
indicator	$(GPoS_0-GPoS_{-1})/B_{-1}$	$(GPoS_1-GPoS_0)/B_{-1}$	$(GPoS_2-GPoS_1)/B_{-1}$	$(GPoS_0-GPoS_{-1})/B_{-1}$	$(GPoS_1-GPoS_0)/B_{-1}$	$(GPoS_2-GPoS_1)/B_{-1}$
Estimate	0.0895	0.3840	0.0472	<0.0000	<0.0000	<0.0000
Std. error	0.2949	0.5366	0.1804	<0.0000	<0.0000	<0.0000
t-student	0.3040	0.7160	0.2610	0.2700	0.3550	0.2290
p-value	**(**0.7660**)**	**(**0.4870**)**	**(**0.7980**)**	**(**0.7910**)**	**(**0.7290**)**	**(**0.8220**)**
indicator	$(PoS_0-PoS_{-1})/B_{-1}$	$(PoS_1-PoS_0)/B_{-1}$	$(PoS_2-PoS_1)/B_{-1}$	$(PoS_0-PoS_{-1})/B_{-1}$	$(PoS_1-PoS_0)/B_{-1}$	$(PoS_2-PoS_1)/B_{-1}$
Estimate	0.3808	0.5954	0.0634	<0.0000	<0.0000	<0.0000
Std. error	0.4684	0.5061	0.2722	<0.0000	<0.0000	<0.0000
t-student	0.8130	1.1760	0.2330	0.2210	0.0730	-0.5260
p-value	**(**0.4310**)**	**(**0.2610)	**(**0.8190)	**(**0.8280)	(0.9430)	(0.6080)
indicator	$(PBT_0-PBT_{-1})/B_{-1}$	$(PBT_1-PBT_0)/B_{-1}$	$(PBT_2-PBT_1)/B_{-1}$	$(PBT_0-PBT_{-1})/B_{-1}$	$(PBT_1-PBT_0)/B_{-1}$	$(PBT_2-PBT_1)/B_{-1}$
Estimate	0.0518	**1.0855**	**0.4425**	<0.0000	<0.0000	<0.0000
Std. error	0.4075	**0.5817**	**0.2092**	<0.0000	<0.0000	<0.0000
t-student	0.1270	**1.8660**	**2.1160**	0.8840	**2.3600**	-0.3740
p-value	(0.9010)	**(0.0848**)	**(0.0543**)	(0.3930)	(**0.0349**)	(0.7140)

Source: *Own compilation. Results are presented up to four significant digits. P-values of significance test in brackets below.*

Taking up subsequent analyzes, in the next step, we have tried to verify in the first place whether the increase in the paid dividend is a positive signal about the future performance of the company; in particular, two events have been taken into consideration, i.e., continuation - increase in payouts, i.e., an increase in the dividend paid about the previous year in a situation wherein the year t−1 the company also paid dividend which means $0 < \Delta DIV0 < 1$ and initiation of payments, i.e., an increase in the level of dividend paid about the previous year in a situation wherein the year t − 1 the company did not pay dividends, which means $\Delta DIV0 = 1$.

Table 4. *Informational content of dividend changes in relation to book value of equity when signals are positive*

	$0<\Delta DIV_0<1$			$\Delta DIV_0=1$		
	t=0	**t+1**	**t+2**	**t=0**	**t+1**	**t+2**
indicator	$(E_0-E_{-1})/B_{-1}$	$(E_1-E_0)/B_{-1}$	$(E_2-E_1)/B_{-1}$	$(E_0-E_{-1})/B_{-1}$	$(E_1-E_0)/B_{-1}$	$(E_2-E_1)/B_{-1}$
Estimate	-0.0727	1.0125	**0.5398**	<0.0000	<0.0000	<0.0000
Std. error	0.6098	0.6478	**0.2295**	<0.0000	<0.0000	<0.0000
t-student	-0.1190	1.5630	**2.3520**	0.9220	**3.0800**	-0.3910
p-value	(0.9070)	(0.1420)	**(0.0351)**	(0.3740**)**	**(0.0089)**	(0.7020**)**
indicator	$(OP_0-OP_{-1})/B_{-1}$	$(OP_1-OP_0)/B_{-1}$	$(OP_2-OP_1)/B_{-1}$	$(OP_0-OP_{-1})/B_{-1}$	$(OP_1-OP_0)/B_{-1}$	$(OP_2-OP_1)/B_{-1}$
Estimate	0.1676	0.5745	**0.5001**	<0.0000	<0.0000	<0.0000
Std. error	0.6198	0.4264	**0.2184**	<0.0000	<0.0000	<0.0000
t-student	0.2700	1.3470	**2.2900**	0.5160	**1.7800**	-1.1100
p-value	(0.7910**)**	(0.2010**)**	**(0.0394)**	(0.6140**)**	**(0.0984)**	**(**0.2860**)**
indicator	$(GPoS_0-GPoS_{-1})/B_{-1}$	$(GPoS_1-GPoS_0)/B_{-1}$	$(GPoS_2-GPoS_1)/B_{-1}$	$(GPoS_0-GPoS_{-1})/B_{-1}$	$(GPoS_1-GPoS_0)/B_{-1}$	$(GPoS_2-GPoS_1)/B_{-1}$
Estimate	0.0895	0.3840	0.0472	<0.0000	<0.0000	<0.0000
Std. error	0.2949	0.5366	0.1804	<0.0000	<0.0000	<0.0000
t-student	0.3040	0.7160	0.2610	0.2700	0.3550	0.2290
p-value	**(**0.7660**)**	**(**0.4870**)**	**(**0.7980**)**	**(**0.7910**)**	**(**0.7290**)**	**(**0.8220**)**
indicator	$(PoS_0-PoS_{-1})/B_{-1}$	$(PoS_1-PoS_0)/B_{-1}$	$(PoS_2-PoS_1)/B_{-1}$	$(PoS_0-PoS_{-1})/B_{-1}$	$(PoS_1-PoS_0)/B_{-1}$	$(PoS_2-PoS_1)/B_{-1}$
Estimate	0.3808	0.5954	0.0634	<0.0000	<0.0000	<0.0000
Std. error	0.4684	0.5061	0.2722	<0.0000	<0.0000	<0.0000
t-student	0.8130	1.1760	0.2330	0.2210	0.0730	-0.5260
p-value	**(**0.4310**)**	**(**0.2610**)**	**(**0.8190**)**	**(**0.8280**)**	(0.9430)	(0.6080)
indicator	$(PBT_0-PBT_{-1})/B_{-1}$	$(PBT_1-PBT_0)/B_{-1}$	$(PBT_2-PBT_1)/B_{-1}$	$(PBT_0-PBT_{-1})/B_{-1}$	$(PBT_1-PBT_0)/B_{-1}$	$(PBT_2-PBT_1)/B_{-1}$
Estimate	0.0518	**1.0855**	**0.4425**	<0.0000	<0.0000	<0.0000
Std. error	0.4075	**0.5817**	**0.2092**	<0.0000	<0.0000	<0.0000
t-student	0.1270	**1.8660**	**2.1160**	0.8840	**2.3600**	-0.3740
p-value	(0.9010)	**(0.0848**)	**(0.0543**)	(0.3930)	**(0.0349**)	(0.7140)

Source: *Own compilation. Results are presented up to four significant digits. P-values of significance test in brackets below.*

To sum up, both the increase in the dividend paid and the initiation of payments is clearly treated as a positive signal. Besides, it should be noted that since companies deciding to initiate dividend payments generally do not intend to stop at just paying out in one year. Still, these payments will also continue shortly (Ap Gwilym *et al.*, 2005) and that this action is justified in future financial indicators (Healy and Palepu, 1988), it may be assumed that initiating payments is a more important signal for investors - stronger than the usual, most often expected, a dividend increase, i.e., the payment of another dividend, but at a higher level than in the previous year. The results of the analyzes carried out are presented in Tables 3 - 5.

Table 5. *Informational content of dividend changes in relation to relative changes of value indicators when signals are positive*

	$0<\Delta DIV_0<1$			$\Delta DIV_0=1$		
	t=0	**t+1**	**t+2**	**t=0**	**t+1**	**t+2**
indicator	$(E_0/E_{-1})/-1$	$(E_1/E_0)-1$	$(E_2/E_1)-1$	$(E_0/E_{-1})/-1$	$(E_1/E_0)-1$	$(E_2/E_1)-1$
Estimate	0.0198	**0.0170**	0.0010	<0.0000	<0.0000	<0.0000
Std. error	0.0765	**0.0091**	0.0031	<0.0000	<0.0000	<0.0000
t-student	0.2590	**1.8670**	0.3220	1.0100	-1.2600	0.1460
p-value	(0.7990)	**(0.0846)**	(0.7530)	(0.3330)	(0.2310)	(0.8860)
indicator	$(OP_0/OP_{-1})-1$	$(OP_1/OP_0)-1$	$(OP_2/OP_1)-1$	$(OP_0/OP_{-1})-1$	$(OP_1/OP_0)-1$	$(OP_2/OP_1)-1$
Estimate	0.0001	0.0084	0.0025	<0.0000	<0.0000	<0.0000
Std. error	0.0283	0.0138	0.0076	<0.0000	<0.0000	<0.0000
t-student	0.0050	0.6090	0.3260	1.0300	-0.0950	-0.2990
p-value	(0.9960)	(0.5530)	(0.7500)	(0.3230)	(0.9260)	(0.7700)
indicator	$(GPoS_0/GPoS_{-1})-1$	$(GPoS_1/GPoS_0)-1$	$(GPoS_2/GPoS_1)/-1$	$(GPoS_0/GPoS_{-1})-1$	$(GPoS_1/GPoS_0)-1$	$(GPoS_2/GPoS_1)/-1$
Estimate	0.0859	<0.0000	0.0823	<0.0000	<0.0000	<0.0000
Std. error	0.1795	0.0190	0.1996	<0.0000	<0.0000	<0.0000
t-student	0.4780	-0.0020	0.4120	0.3380	0.0090	0.3220
p-value	(0.6400)	(0.9980)	(0.6870)	(0.7410)	(0.9930)	(0.7520)
indicator	$(PoS_0/PoS_{-1})-1$	$(PoS_1/PoS_0)-1$	$(PoS_2/PoS_1)-1$	$(PoS_0/PoS_{-1})-1$	$(PoS_1/PoS_0)-1$	$(PoS_2/PoS_1)-1$
Estimate	**0.0066**	0.0051	0.0013	<0.0000	<0.0000	<0.0000
Std. error	**0.0006**	0.0114	0.0130	<0.0000	<0.0000	<0.0000
t-student	**11.4700**	0.4510	0.1030	-0.1810	**-26.4000**	-0.3680
p-value	**(<0.0000)**	(0.6590)	(0.9190)	(0.8590)	**(<0.0000)**	(0.7190)
indicator	$(PBT_0/PBT_{-1})-1$	$(PBT_1/PBT_0)-1$	$(PBT_2/PBT_1)-1$	$(PBT_0/PBT_{-1})-1$	$(PBT_1/PBT_0)-1$	$(PBT_2/PBT_1)-1$
Estimate	0.1104	**0.1266**	0.0012	<0.0000	<0.0000	<0.0000
Std. error	0.0813	**0.0187**	0.0060	<0.0000	<0.0000	<0.0000
t-student	1.3590	**6.7870**	0.2040	0.3650	0.6450	-0.3510
p-value	(0.1970)	**(0.0001)**	(0.8420)	(0.7210)	(0.5300)	(0.7310)

Source: *Own compilation. Results are presented up to four significant digits. P-values of significance test in brackets below.*

In the case when $0 < \Delta DIV0 < 1$, as shown in Tables 3 and 4, three out of five considered indicators have been statistically significant. In particular, it may be concluded that the continuation-increase in dividend payments has carried information about positive change in year 2 of financial indicators based on changes in E and OP levels and PBT in t = 1 and t = 2.

In the results presented in Table 5, a positive and statistically significant response may be found for three out of five considered indicators for the analyzed changes in the paid dividend. However, these are indicators based on the change in E and PBT levels in t = 1 and PoS in t = 0. When $\Delta DIV0 = 1$, the following results are gathered in table 3 four out of five, and in table 4, three out of five considered indicators have been statistically significant. In particular, it may be concluded that the initiation of dividend payments carries positive information. The signaling theory for t = 1 about

H1 and H2 was confirmed for indicators based on the change in E, OP, and PBT and H1 for PoS. In the case of H1 in turn and the indicator based on OP change in t = 2, although the index is statistically significant, it is negative, not in line with expectations. In H3, only 1 of the 5 indicators considered has been statistically significant (index based on the change of PoS in t = 1); however, the assessment's value has been negative, which is inconsistent with the conclusions stemming from the signaling hypothesis.

In our further study, we again follow Lintner (1956), who have claimed that managers reduce dividends only when the current level of payments cannot be sustained in the future. According to the signaling theory, the reduction in the level of the paid dividend is a negative message that carries information about the deterioration of a given entity's financial indicators in the future. However, it seems that such a clearly negative assessment is not justified in particular when the company implements the residual dividend policy. As pointed out by Soter *et al.* (1996), Vernimmen *et al*. (2014), when the company reduces the payment of dividends and uses its own funding sources for investment purposes and the same company inefficiently communicates with investors, the value for shareholders in the short term may decrease because the market without having full information misinterprets the existing situation. So if in the short term the signal resulting from lowering the paid dividend may or may not be interpreted negatively in the long term (t = 1ort = 2) when all information reaches investors, it seems that it is reasonable to expect a positive reaction for this type of signaling.

Taking into consideration the above remarks, in further analyzes, two situations have been distinguished. A positive signal is assumed to be a continuation - reduction of payments, i.e., reduction of the level of dividend paid about the previous year in a situation wherein the year t = 0 the company still paid a dividend which means $-1 < \Delta DIV0 < 0$ and the negative signal means the cessation of payments, i.e., the reduction of the level of dividend paid concerning the previous year in a situation wherein the year t = 0 the company has not already paid a dividend, which means $\Delta DIV0 = -1$.

To sum up, dividend omission is treated as a negative signal; In contrast, the reduction of dividend payments, in the short term may, due to the phenomenon of information asymmetry, generate a negative signal, but in the long run, as a result of the reduction of said asymmetry, it may be interpreted as a positive signal. Also, it should be noted that since companies give up dividends only as a last resort (Lintner 1956), the failure to pay dividends, i.e., the dividend is no longer paid, is undoubtedly a stronger signal than the dividend reduction, i.e., the dividend is still paid but at a lower level than in the previous year. The results of the analyzes carried out are presented in Tables 6 -8.

Table 6. *Informational content of dividend changes in relation to market value of equity when signals are negative*

	$-1<\Delta DIV_0<0$			$\Delta DIV_0=-1$		
	t=0	**t+1**	**t+2**	**t=0**	**t+1**	**t+2**
indicator	$(E_0-E_{-1})/P_{-1}$	$(E_1-E_0)/P_{-1}$	$(E_2-E_1)/P_{-1}$	$(E_0-E_{-1})/P_{-1}$	$(E_1-E_0)/P_{-1}$	$(E_2-E_1)/P_{-1}$
Estimate	0.2790	-0.2741	-0.1753	**<0.0000**	<0.0000	<0.0000
Std. error	0.3265	0.3409	0.2374	**<0.0000**	<0.0000	<0.0000
t-student	0.8540	-0.8040	-0.7380	**-2.4400**	0.2940	-0.1190
p-value	(0.4080)	(0.4360)	(0.4730)	**(0.0301)**	(0.7730)	(0.9070)
indicator	$(OP_0-OP_{-1})/P_{-1}$	$(OP_1-OP_0)/P_{-1}$	$(OP_2-OP_1)/P_{-1}$	$(OP_0-OP_{-1})/P_{-1}$	$(OP_1-OP_0)/P_{-1}$	$(OP_2-OP_1)/P_{-1}$
Estimate	0.1092	-0.3220	-0.2665	**<0.0000**	<0.0000	<0.0000
Std. error	0.3569	0.3030	0.2810	**<0.0000**	<0.0000	<0.0000
t-student	0.3060	-1.0630	-0.9490	**-2.5300**	0.9870	0.1500
p-value	(0.7640)	(0.3070)	(0.3600)	**(0.0251)**	(0.3420)	(0.8830)
indicator	$(GPoS_0-GPoS_{-1})/P_{-1}$	$(GPoS_1-GPoS_0)/P_{-1}$	$(GPoS_2-GPoS_1)/P_{-1}$	$(GPoS_0-GPoS_{-1})/P_{-1}$	$(GPoS_1-GPoS_0)/P_{-1}$	$(GPoS_2-GPoS_1)/P_{-1}$
Estimate	-0.1473	-0.9476	-0.1541	<0.0000	<0.0000	<0.0000
Std. error	0.3799	0.7978	0.1743	<0.0000	<0.0000	<0.0000
t-student	-0.3880	-1.1880	-0.8840	-1.5300	0.1480	0.0570
p-value	(0.7050)	(0.2560)	(0.3930)	(0.1510)	(0.8840)	(0.9550)
indicator	$(PoS_0-PoS_{-1})/P_{-1}$	$(PoS_1-PoS_0)/P_{-1}$	$(PoS_2-PoS_1)/P_{-1}$	$(PoS_0-PoS_{-1})/P_{-1}$	$(PoS_1-PoS_0)/P_{-1}$	$(PoS_2-PoS_1)/P_{-1}$
Estimate	-0.2787	-0.8145	-0.5170	**<0.0000**	<0.0000	<0.0000
Std. error	0.4862	0.8467	0.5082	**<0.0000**	<0.0000	<0.0000
t-student	-0.5730	-0.9620	-1.0170	**-2.0000**	1.3900	0.0100
p-value	(0.5760)	(0.3540)	(0.3280)	**(0.0672)**	(0.1870)	(0.9930)
indicator	$(PBT_0-PBT_{-1})/P_{-1}$	$(PBT_1-PBT_0)/P_{-1}$	$(PBT_2-PBT_1)/P_{-1}$	$(PBT_0-PBT_{-1})/P_{-1}$	$(PBT_1-PBT_0)/P_{-1}$	$(PBT_2-PBT_1)/P_{-1}$
Estimate	0.2220	-0.2990	-0.1512	**<0.0000**	<0.0000	<0.0000
Std. error	0.2788	0.3273	0.2252	**<0.0000**	<0.0000	<0.0000
t-student	0.7960	-0.9130	-0.6710	**-2.6500**	0.2980	-0.1270
p-value	(0.4400)	(0.3780)	(0.5140)	**(0.0200)**	(0.7710)	(0.9010)

Source: *Own compilation. Results are presented up to four significant digits. P-values of significance test in brackets below.*

Looking closely at the results gathered in Tables 6 and 7 in the case when $-1 < \Delta DIV0 < 0$, all considered indicators about the market (H1) and book values (H2) are statistically insignificant. In the case of relative values of indicators (H3) presented in 8 in turn, one can state a positive and statistically significant response only to one out of five indicators under study. In particular, it may be argued that the continuation-reduction of dividend payments carries positive current information ($t = 0$) in the indicator based on the change in the PoS level.

Table 7. *Informational content of dividend changes in relation to book value of equity when signals are negative*

	$-1<\Delta DIV_0<0$			$\Delta DIV_0=-1$		
	t=0	**t+1**	**t+2**	**t=0**	**t+1**	**t+2**
indicator	$(E_0-E_{-1})/B_{-1}$	$(E_1-E_0)/B_{-1}$	$(E_2-E_1)/B_{-1}$	$(E_0-E_{-1})/B_{-1}$	$(E_1-E_0)/B_{-1}$	$(E_2-E_1)/B_{-1}$
Estimate	0.0689	-0.1040	-0.1285	<0.0000	<0.0000	<0.0000
Std. error	0.2925	0.1880	0.2192	<0.0000	<0.0000	<0.0000
t-student	0.2360	-0.5530	-0.5860	-1.4400	0.2410	-0.1580
p-value	(0.8170)	(0.5900)	(0.5680)	(0.1750)	(0.8130)	(0.8770)
indicator	$(OP_0-OP_{-1})/B_{-1}$	$(OP_1-OP_0)/B_{-1}$	$(OP_2-OP_1)/B_{-1}$	$(OP_0-OP_{-1})/B_{-1}$	$(OP_1-OP_0)/B_{-1}$	$(OP_2-OP_1)/B_{-1}$
Estimate	-0.0480	-0.1240	-0.2963	<0.0000	<0.0000	<0.0000
Std. error	0.2779	0.1875	0.2670	<0.0000	<0.0000	<0.0000
t-student	-0.1730	-0.6610	-1.1100	-1.5400	0.5280	0.0520
p-value	(0.8660)	(0.5200)	(0.2870)	(0.1470)	(0.6060)	(0.9590)
indicator	$(GPoS_0-GPoS_{-1})/B_{-1}$	$(GPoS_1-GPoS_0)/B_{-1}$	$(GPoS_2-GPoS_1)/B_{-1}$	$(GPoS_0-GPoS_{-1})/B_{-1}$	$(GPoS_1-GPoS_0)/B_{-1}$	$(GPoS_2-GPoS_1)/B_{-1}$
Estimate	-0.3811	-0.3666	-0.0470	<0.0000	<0.0000	<0.0000
Std. error	0.4349	0.5459	0.1074	<0.0000	<0.0000	<0.0000
t-student	-0.8760	-0.6710	-0.4380	-1.4200	-0.2060	-0.0290
p-value	(0.3970)	(0.5140)	(0.6690)	(0.1780)	(0.8400)	(0.9770)
indicator	$(PoS_0-PoS_{-1})/B_{-1}$	$(PoS_1-PoS_0)/B_{-1}$	$(PoS_2-PoS_1)/B_{-1}$	$(PoS_0-PoS_{-1})/B_{-1}$	$(PoS_1-PoS_0)/B_{-1}$	$(PoS_2-PoS_1)/B_{-1}$
Estimate	-0.6638	-0.1329	-0.5975	<0.0000	<0.0000	<0.0000
Std. error	0.4592	0.7465	0.4514	<0.0000	<0.0000	<0.0000
t-student	-1.4460	-0.1780	-1.3240	-1.0100	0.7450	-0.1030
p-value	(0.1720)	(0.8610)	(0.2080)	(0.3300)	(0.4700)	(0.9200)
indicator	$(PBT_0-PBT_{-1})/B_{-1}$	$(PBT_1-PBT_0)/B_{-1}$	$(PBT_2-PBT_1)/B_{-1}$	$(PBT_0-PBT_{-1})/B_{-1}$	$(PBT_1-PBT_0)/B_{-1}$	$(PBT_2-PBT_1)/B_{-1}$
Estimate	0.1699	-0.1309	-0.0920	<0.0000	<0.0000	<0.0000
Std. error	0.1451	0.1108	0.1696	<0.0000	<0.0000	<0.0000
t-student	1.1720	-1.1810	-0.5420	-1.6200	0.2470	-0.1630
p-value	(0.2620)	(0.2590)	(0.5970)	(0.1290)	(0.8090)	(0.8730)

Source: *Own compilation. Results are presented up to four significant digits. P-values of significance test in brackets below.*

When $\Delta DIV0 = -1$, in the case of indicators calculated about the market value of equity (H1) 4 out of 5, and when looking at relative values of indicators (H3), 2 out of 5 considered indicators have been on a statistically significant level. In particular, it may be concluded that the cessation of dividend payments carries negative information for t = 0 concerning H1 and H3 for indicators based on changes in E and H1 levels for OP, PBT, PoS, and H3 changes for GPoS.

Table 8. *Informational content of dividend changes in relation to relative changes of value indicators when signals are negative*

	$-1<\Delta DIV_0<0$			$\Delta DIV_0=-1$		
	t=0	**t+1**	**t+2**	**t=0**	**t+1**	**t+2**
indicator	$(E_0/E_{-1})/-1$	$(E_1/E_0)-1$	$(E_2/E_1)-1$	$(E_0/E_{-1})/-1$	$(E_1/E_0)-1$	$(E_2/E_1)-1$
Estimate	0.0001	-0.0007	-0.0219	**<0.0000**	<0.0000	<0.0000
Std. error	0.0166	0.0012	0.0155	**<0.0000**	<0.0000	<0.0000
t-student	0.0080	-0.5840	-1.4170	**-5.3200**	-0.5900	0.2680
p-value	(0.9940)	(0.5690)	(0.1800)	**(0.0001)**	(0.5650)	(0.7930)
indicator	$(OP_0/OP_{-1})-1$	$(OP_1/OP_0)-1$	$(OP_2/OP_1)-1$	$(OP_0/OP_{-1})-1$	$(OP_1/OP_0)-1$	$(OP_2/OP_1)-1$
Estimate	-0.0074	-0.0012	-0.0028	<0.0000	<0.0000	<0.0000
Std. error	0.0052	0.0028	0.0038	<0.0000	<0.0000	<0.0000
t-student	-1.4440	-0.4500	-0.7350	-0.2940	0.3480	-0.3500
p-value	(0.1730)	(0.6600)	(0.4760)	(0.7740)	(0.7340)	(0.7320)
indicator	$(GPoS_0/GPoS_{-1})-1$	$(GPoS_1/GPoS_0)-1$	$(GPoS_2/GPoS_1)/-1$	$(GPoS_0/GPoS_{-1})-1$	$(GPoS_1/GPoS_0)-1$	$(GPoS_2/GPoS_1)/-1$
Estimate	-0.0056	0.0018	-0.0459	**<0.0000**	<0.0000	<0.0000
Std. error	0.0046	0.0051	0.1070	**<0.0000**	<0.0000	<0.0000
t-student	-1.2260	0.3630	-0.4290	**-1.8300**	-0.1930	0.3380
p-value	(0.2420)	(0.7230)	(0.6750)	**(0.0911)**	(0.8500)	(0.7410)
indicator	$(PoS_0/PoS_{-1})-1$	$(PoS_1/PoS_0)-1$	$(PoS_2/PoS_1)-1$	$(PoS_0/PoS_{-1})-1$	$(PoS_1/PoS_0)-1$	$(PoS_2/PoS_1)-1$
Estimate	**0.0086**	-0.0254	-0.0093	<0.0000	<0.0000	<0.0000
Std. error	**0.0039**	0.0216	0.0127	<0.0000	<0.0000	<0.0000
t-student	**2.2270**	-1.1770	-0.7360	-1.4200	0.5100	0.7460
p-value	**(0.0442)**	(0.2600)	(0.4750)	(0.1800)	(0.6190)	(0.4690)
indicator	$(PBT_0/PBT_{-1})-1$	$(PBT_1/PBT_0)-1$	$(PBT_2/PBT_1)-1$	$(PBT_0/PBT_{-1})-1$	$(PBT_1/PBT_0)-1$	$(PBT_2/PBT_1)-1$
Estimate	-0.0032	-0.0012	-0.0003	<0.0000	<0.0000	<0.0000
Std. error	0.0210	0.0023	0.0023	<0.0000	<0.0000	<0.0000
t-student	-0.1500	-0.5340	-0.1470	-1.0100	-0.0200	-0.0830
p-value	(0.8830)	(0.6030)	(0.8850)	(0.3320)	(0.9850)	(0.9350)

Source: *Own compilation. Results are presented up to four significant digits. P-values of significance test in brackets below.*

6. Robustness Checks

Although the estimates of β1 have been in line with current literature and theoretical expectations for all significant statistical indicators, the information transferred by the dividends concerns only the current standing, and thus the signaling theory is not confirmed. In the case of H2, the tests' results have been inconclusive because all considered indicators have been at a statistically insignificant level. As already mentioned, scientists agree that dividend payments carry some information, so there is no agreement about what they really signal (Frankfurter *et al.*, 2003; Benhamouda, 2007). There is no agreement as to which measures of financial results of dividend

payments indicate, i.e., whether future profits or future profitability (Grullon *et al.*, 2002, 2005). The problem of various financial indicators expressed in profit has been analyzed earlier. However, the results of the tests carried out have been inconclusive. In the case of financial indicators expressed as profitability as well as with profit indicators, based on a literature study, it may be concluded that there is no consensus as to which rate of return is best signaled by dividend payments (Grullon *et al.*, 2002, 2005, Choi *et al*., 2011, Liu and Chen, 2015). In this article, to determine the measure of financial results expressed in profitability, which would be most closely related to dividend signaling, six traditional profitability ratios have been used:

1. return on equity (ROE),
2. return on assets (ROA),
3. return on sales (ROS),
4. gross profit margin on sales (GPMoS),
5. profit gross profit margin (GPM),
6. operating profit margin (OPM).

In order to ensure robustness and stability the companies in the case of which the government is the major shareholder, have been excluded.

Table 9. *Informational content of dividends in the case of future income indicators for non-state owned companies*

	t=0	**t+1**	**t+2**	**t=0**	**t+1**	**t+2**
indicator	ROA_0-ROA_{-1}	ROA_1-ROA_0	ROA_2-ROA_1	ROE_0-ROE_{-1}	ROE_1-ROE_0	ROE_2-ROE_1
Estimate	**7.1563**	1.3373	**-1.8467**	-0.0888	0.0979	-0.0065
Std. error	**3.1684**	1.3866	**0.9795**	0.2074	0.1514	0.0968
t-student	**2.2590**	0.9640	**-1.8850**	-0.4280	0.6470	-0.0680
p-value	**(0.0417)**	(0.3524)	**(0.0819)**	(0.6756)	(0.5291)	(0.9472)
indicator	ROS_0-ROS_{-1}	ROS_1-ROS_0	ROS_2-ROS_1	$GPMoS_0$-$GPMoS_{-1}$	$GPMoS_1$-$GPMoS_0$	$GPMoS_2$-$GPMoS_1$
Estimate	-0.0797	0.2457	-0.2127	1.3054	-2.6452	-0.0149
Std. error	0.5418	0.5464	0.7534	2.2508	2.3022	1.7563
t-student	-0.1470	0.4500	-0.2820	0.5800	-1.1490	-0.0080
p-value	(0.8853)	(0.6604)	(0.7822)	(0.5718)	(0.2713)	(0.9934)
indicator	GPM_0-GPM_{-1}	GPM_1-GPM_0	GPM_2-GPM_1	OPM_0-OPM_{-1}	OPM_1-OPM_0	OPM_2-OPM_1
Estimate	-0.0839	0.2049	0.2546	1.0410	-1.7916	0.4991
Std. error	0.4088	0.7305	1.0765	2.6190	2.3006	1.5310
t-student	-0.2050	0.2800	0.2370	0.3970	-0.7790	0.3260
p-value	(0.8406)	(0.7835)	(0.8167)	(0.6975)	(0.4501)	(0.7496)

Source: *Own compilation. Results are presented up to four significant digits. P-values of significance test in brackets below.*

Using the conventions the same as before. The first step has been to answer the

question: does the payment of dividends carry hidden information about the company's future income? The results of the analyzes carried out are presented in table 9. The performed estimations and statistical significance tests suggest that dividends' payment brings certain information only concerning the results expressed in the change in ROA. To get a more accurate picture of the informational content of dividends, similarly to the previously analyzes, the data sets have been divided into two events interpreted as a positive signal, i.e., continuation - increase in payouts ($0 < \Delta DIV0 < 1$) and initiation of payouts ($\Delta DIV0 = 1$).

The results of the analyzes carried out are presented in table 10; as can be seen from the data included in table 10, when $0 < \Delta DIV0 < 1$, five out of the six indicators of profitability changes were at a statistically significant level and in their case the signaling theory has been confirmed. In particular, it may be concluded that the continuous increase in dividend payments carries information about positive change in year $t = 1$ and $t = 2$ of financial indicators expressed by changes in ROA, ROE, OPM as well as ROS, GPM, but only in $t = 1$.

In contrast, when $\Delta DIV0 = 1$, only two of the six measures of changes in profitability have been considered statistically significant. In particular, it may be concluded that in the case of dividend payment initiation, results in line with the conclusions from the signaling theory have been obtained in $t = 1$ concerning changes in ROA and ROE. In the case of $t = 2$, however, changes in ROA and ROE are statistically significant. Still, their assessment is negative, which means that it is not consistent with the signaling theory.

Moving to subsequent analyzes, just as before, two more events have been distinguished, i.e., continuation-reduction of payments ($-1 < \Delta DIV0 < 0$) interpreted as a positive signal and cessation of payments ($\Delta DIV0 = -1$) interpreted as a negative signal. The analysis results are presented in Table 11, as can be seen from the data included in table 11 in a situation where $-1 < \Delta DIV0 < 0$ only two out of six considered profitability ratios and only in $t = 1$ have been statistically significant. In particular, however, it should be noted that the values of both changes in GPMoS and OPM have been negative and, therefore, inconsistent with the adopted assumptions, which means that the conclusions from the signaling theory have not been confirmed. In the situation, on the other hand, the withdrawal of payments, i.e., when $\Delta DIV0 = -1$, only one out of six considered profitability ratios were at a statistically significant level. In particular, it may be noticed that discontinuation of dividends is carried in the case of changes in ROE on one side for $t = 1$ negative information, which is consistent with the signaling theory and, on the other hand, for positive information. Still, it has been the current information - neither positive nor negative, as could be expected.

In general conclusions, the theory of dividend signaling has been confirmed mainly in the continuation-growth and initiation of payments. Initiation of payments ($\Delta DIV0 = 1$) brings positive information concerning the year $t = 1$, and this is partly

also in line with the conclusions of Healy and Palepu (1988). In particular, positive signaling in t = 1 is recorded concerning changes in E, OP, PoS, PBT determined by the market value of equity, changes E, OP, and PBT determined by the book value of equity as changes in ROA and ROE.

Table 10. *Informational content of dividends when signals are positive for non-state owned companies*

	$0<\Delta DIV_0<1$			$\Delta DIV_0=1$		
	t=0	**t+1**	**t+2**	**t=0**	**t+1**	**t+2**
indicator	ROA_0-ROA_{-1}	ROA_1-ROA_0	ROA_2-ROA_1	ROA_0-ROA_{-1}	ROA_1-ROA_0	ROA_2-ROA_1
Estimate	0.4464	**3.1715**	**1.5389**	<0.0000	**<0.0000**	**<0.0000**
Std. error	1.9085	**1.0273**	**0.5501**	<0.0000	**<0.0000**	**<0.0000**
t-student	0.2340	**3.0870**	**2.7970**	0.6700	**2.3500**	**-3.2300**
p-value	(0.8190)	**(0.0087)**	**(0.0151)**	(0.5150)	**(0.0352)**	**(0.0065)**
indicator	ROE_0-ROE_{-1}	ROE_1-ROE_0	ROE_2-ROE_1	ROE_0-ROE_{-1}	ROE_1-ROE_0	ROE_2-ROE_1
Estimate	0.1430	**1.8694**	**0.8882**	<0.0000	**<0.0000**	**<0.0000**
Std. error	0.9277	**0.7360**	**0.3397**	<0.0000	**<0.0000**	**<0.0000**
t-student	0.1540	**2.5400**	**2.6140**	0.8780	**21.0000**	**-14.5000**
p-value	(0.8800)	**(0.0247)**	**(0.0214)**	(0.3960)	**(<0.0000)**	**(<0.0000)**
indicator	ROS_0-ROS_{-1}	ROS_1-ROS_0	ROS_2-ROS_1	ROS_0-ROS_{-1}	ROS_1-ROS_0	ROS_2-ROS_1
Estimate	0.2205	1.4358	**1.2594**	<0.0000	<0.0000	<0.0000
Std. error	1.4260	0.9972	**0.3896**	<0.0000	<0.0000	<0.0000
t-student	0.1550	1.4400	**3.2330**	-0.2300	0.2270	0.2960
p-value	(0.8790)	(0.1740)	**(0.0065)**	(0.8220)	(0.8240)	(0.7720)
indicator	$GPMoS_0$-$GPMoS_{-1}$	$GPMoS_1$-$GPMoS_0$	$GPMoS_2$-$GPMoS_1$	$GPMoS_0$-$GPMoS_{-1}$	$GPMoS_1$-$GPMoS_0$	$GPMoS_2$-$GPMoS_1$
Estimate	1.4333	0.7783	0.2357	<0.0000	<0.0000	<0.0000
Std. error	1.0082	1.2253	0.5172	<0.0000	<0.0000	<0.0000
t-student	1.4220	0.6350	0.4560	0.6650	-0.5910	-0.8030
p-value	(0.1790)	(0.5360)	(0.6560)	(0.5180)	(0.5650)	(0.4370)
indicator	GPM_0-GPM_{-1}	GPM_1-GPM_0	GPM_2-GPM_1	GPM_0-GPM_{-1}	GPM_1-GPM_0	GPM_2-GPM_1
Estimate	0.5676	1.5114	**0.9588**	<0.0000	<0.0000	<0.0000
Std. error	1.2484	0.8857	**0.3611**	<0.0000	<0.0000	<0.0000
t-student	0.4550	1.7060	**2.6550**	-0.2330	0.1200	0.2030
p-value	(0.6570)	(0.1120)	**(0.0198)**	(0.8200)	(0.9060)	(0.8420)
indicator	OPM_0-OPM_{-1}	OPM_1-OPM_0	OPM_2-OPM_1	OPM_0-OPM_{-1}	OPM_1-OPM_0	OPM_2-OPM_1
Estimate	2.1993	**2.5918**	**1.8229**	<0.0000	<0.0000	<0.0000
Std. error	1.6123	**0.9515**	**0.3762**	<0.0000	<0.0000	<0.0000
t-student	1.3640	**2.7240**	**4.8460**	0.2770	-0.4120	0.0580
p-value	(0.1960)	**(0.0174)**	**(0.0003)**	(0.7860)	(0.6870)	(0.9550)

Source: *Own compilation. Results are presented up to four significant digits. P-values of significance test in brackets below.*

Table 11. *Informational content of dividends when signals are negative for non-state owned companies*

	$-1<\Delta DIV_0<0$			**$\Delta DIV_0=-1$**		
	t=0	**t+1**	**t+2**	**t=0**	**t+1**	**t+2**
indicator	ROA_0-ROA_{-1}	ROA_1-ROA_0	ROA_2-ROA_1	ROA_0-ROA_{-1}	ROA_1-ROA_0	ROA_2-ROA_1
Estimate	-0.3285	-0.2072	-0.2082	<0.0000	<0.0000	<0.0000
Std. error	0.9505	0.3842	0.4516	<0.0000	<0.0000	<0.0000
t-student	-0.3460	-0.5390	-0.4610	-1.5600	0.1040	0.5090
p-value	(0.7350)	(0.5990)	(0.6520)	(0.1440)	(0.9190)	(0.6190)
indicator	ROE_0-ROE_{-1}	ROE_1-ROE_0	ROE_2-ROE_1	ROE_0-ROE_{-1}	ROE_1-ROE_0	ROE_2-ROE_1
Estimate	0.0105	-0.0136	-0.2272	**<0.0000**	**<0.0000**	<0.0000
Std. error	0.5252	0.2606	0.1715	**<0.0000**	**<0.0000**	<0.0000
t-student	0.0200	-0.0520	-1.3250	**3.5500**	**-1.9600**	0.0010
p-value	(0.9840)	(0.9590)	(0.2080)	**(0.0036)**	**(0.0719)**	(0.9990)
indicator	ROS_0-ROS_{-1}	ROS_1-ROS_0	ROS_2-ROS_1	ROS_0-ROS_{-1}	ROS_1-ROS_0	ROS_2-ROS_1
Estimate	-0.3654	-0.3228	-0.2790	<0.0000	<0.0000	<0.0000
Std. error	0.6066	0.3234	0.2055	<0.0000	<0.0000	<0.0000
t-student	-0.6020	-0.9980	-1.3580	-0.7930	-0.2430	0.3050
p-value	(0.5570)	(0.3360)	(0.1980)	(0.4420)	(0.8120)	(0.7660)
indicator	$GPMoS_0$-$GPMoS_{-1}$	$GPMoS_1$-$GPMoS_0$	$GPMoS_2$-$GPMoS_1$	$GPMoS_0$-$GPMoS_{-1}$	$GPMoS_1$-$GPMoS_0$	$GPMoS_2$-$GPMoS_1$
Estimate	0.3511	**-0.8484**	-0.0873	<0.0000	<0.0000	<0.0000
Std. error	0.3706	**0.4220**	0.2758	<0.0000	<0.0000	<0.0000
t-student	0.9470	**-2.0100**	-0.3160	0.0640	0.7390	0.1670
p-value	(0.3610)	**(0.0656)**	(0.7570)	(0.9500)	(0.4730)	(0.8700)
indicator	GPM_0-GPM_{-1}	GPM_1-GPM_0	GPM_2-GPM_1	GPM_0-GPM_{-1}	GPM_1-GPM_0	GPM_2-GPM_1
Estimate	-0.2007	-0.2955	-0.3278	<0.0000	<0.0000	<0.0000
Std. error	0.6579	0.3085	0.2283	<0.0000	<0.0000	<0.0000
t-student	-0.3050	-0.9580	-1.4360	-0.0090	-0.2270	0.5490
p-value	(0.7650)	(0.3560)	(0.1750)	(0.9930)	(0.8240)	(0.5930)
indicator	OPM_0-OPM_{-1}	OPM_1-OPM_0	OPM_2-OPM_1	OPM_0-OPM_{-1}	OPM_1-OPM_0	OPM_2-OPM_1
Estimate	-0.0513	**-0.7065**	-0.5214	<0.0000	<0.0000	<0.0000
Std. error	0.6691	**0.3809**	0.4438	<0.0000	<0.0000	<0.0000
t-student	-0.0770	**-1.8550**	-1.1750	-0.0210	-0.0360	0.4000
p-value	(0.9400)	**(0.0864)**	(0.2610)	(0.9840)	(0.9720)	(0.6950)

Source: *Own compilation. Results are presented up to four significant digits. P-values of significance test in brackets below.*

In the case of the increase-continuation of payments ($0 < \Delta DIV0 < 1$), it may be stated that the event also brings positive information. This result is consistent with the results obtained by Chen and Kao (2014). In particular, positive responses to the increase in dividend payments at t = 0 are recorded to some extent in year t = 1 but mainly in year t = 2. In year t = 1, the signaling theory is confirmed about PBT

changes determined by the market value of equity and book value of equity as well as E, PBT, ROA, ROE, OPM changes. In the case of t = 2, however, the conclusions from the signaling theory have been confirmed concerning E, OP, and PBT change both determined by the market value of equity and book value of equity as well as changes in ROA, ROE, ROS, and GPM, OPM. Bearing in mind the presented changes in the level of paid dividend, i.e., continuation-growth and initiation, it is worth mentioning because it contradicts the results of Grullon *et al. (*2002, 2005), Liu and Chen (2015) often presented in the literature, i.e., that the results obtained concerning ROA indicate its positive relationship with ΔDIV0 (except for ΔDIV0 = 1 and t = 2) and thus confirm the theory of signaling.

In the case of cessation of payments (ΔDIV0 = −1), the signaling theory's conclusions, i.e., the negative signal, have been confirmed only for the year t = 1 and only concerning changes in ROE. For other indicators used in the analyzes of the signaling theory carried out, it could not be confirmed. It is worth noting, which is also consistent with the conclusions of Benartzi *et al.* (1997) and Chen and Kao (2014), that cessation of dividend payments is admittedly a negative signal but brings only information about the current standing (t = 0) of the company. In particular, the current standing is reflected in changes in E, OP, PBT, PoS determined by the market value of equity, and changes in E and GPoS. However, in a situation of continuation-reduction of payments (−1 < ΔDIV0 < 0) where, according to the assumption, positive signaling is expected, none of the indicators used in the analysis can confirm or deny the theory of signaling. As Nissim and Ziv (2001) stated, it seems the same that it is reasonable to conclude that there is no link between the reduction of the dividend and the future results of the companies.

7. Summary

The informational content of dividend policy changes has been named one of the major concerns in the corporate finance literature. Surprisingly most studies related to the signaling hypothesis have been conducted in developed markets. On the contrary, emerging markets are rarely mentioned as a research field in this area due to limited data availability. This paper aims to explore the informational content of dividend changes taking into account the Polish stock market. In this paper, we have used a specific set of data from companies listed on the Warsaw Stock Exchange, and the gap between the existing economic theory and empirical observations is summarized into testable hypotheses considering links between changes in dividends and the future company's performance represented by the market value of equity and the book value of equity.

The analysis presented in the article considers such indicators as the value of listed companies, their number, turnover, liquidity ratio, the average value of the company, and the ratio of capitalization to gross domestic product. In light of the situation of the European stock exchanges, the authors have stated that the capital market in Poland in the years 2000-2017 strengthened its position and reported the highest

growth rate, thus becoming an important market in Europe, occupying the leading position among the Central European stock exchanges.

The obtained results confirm that dividend decisions in the audited period bring some information about the current situation (t = 0) and future (t = 1,t = 2) of the analyzed companies. It is also worth noting that among the analyzed indicators, the gross profit ratio (PBT) referred either to the market value or the book value of equity is most often in the statistically significant analyzes. Thus, it seems that, contrary to the adopted assumptions in the literature, gross profit (PBT) in dividend signaling is more important than net profit (E) and because often, the tax status of the analyzed enterprises is a factor that significantly affects their final yield. Our results confirm the validity of the signaling hypothesis in the case of continuation-growth and initiation of payments in the Polish capital market as in the developed market. It is no wonder since the high growth of the capital market in Poland, regulatory adjustment to international requirements resulted in the decision of the FTSE-Russell organization at the end of 2017 on the re-qualification of this capital market from the developing to the developed market. Thus, Poland's stock exchange has been the first among the Central European countries to meet the highest global standards that apply to the largest stock markets in the world. The current volume of the capital market in Poland, the number of listed entities, their liquidity and reclassification of the capital market, and recognition of it as the developed market is a premise for verifying hypotheses about the relationship between the current dividend the future profits of companies. Therefore, the attempt to verify the hypotheses of dividend dependence and its profits for the largest Central European developing market is original from the research point.

Finally, the attention should be paid to the fact that, although the article has exposed cases showing that dividends carried information about the future performance of the analyzed companies, it must be stated for accuracy that the obtained research results provide arguments for both advocates and opponents of the dividend signal theory. This means that the answer to whether or not what information signals dividend decisions remain an open question. Thus, although the" dividend puzzle" remains unresolved, each subsequent theoretical and empirical research may be assumed to provide additional hints that will bring us closer to solving it.

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