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THE RELEVANCE OF DIVIDEND SMOOTHING IN THE CONSTRUCTION COMPANIES LISTED ON THE WARSAW STOCK EXCHANGE

ZNACZENIE EFEKTU WYGŁADZANIA DYWIDENDY W SPÓŁKACH BUDOWLANYCH NOTOWANYCH NA GPW W WARSZAWIE

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Summary: Dividend smoothing is a well-known empirical fact in developed countries. It is influenced by many factors. In this paper we analyse the relevance of dividend smoothing in the construction companies listed on the Warsaw Stock Exchange in 2000-2014. It is assumed that it is possible to estimate the level of dividend smoothing and to identify the factors determining this level. The implementation of the purpose and verification of the hypotheses required applying econometric models. The findings suggest that the Lintner model can be applied for construction companies listed on the Warsaw Stock Exchange because the smoothing effect was statistically significant in most cases. However, it was not possible to identify statistically significant smoothing factors, although these factors can be useful in order to estimate the logit model which is used to predict whether the company will pay a dividend or not.

Keywords: dividend policy, economic factors, corporate payout, Lintner model, logit model.

Streszczenie: Efekt wygładzania dywidendy jest empirycznie potwierdzony na rynkach finansowych w krajach wysoko rozwiniętych. Efekt ten jest uwarunkowany wieloma czynnikami. W niniejszym artykule dokonano analizy znaczenia wygładzania dywidendy w spółkach budowlanych notowanych na GPW w Warszawie w latach 2000-2014. Zakłada się, że możliwe są zarówno określenie nasilenia efektu wygładzania dywidendy, jak i identyfikacja uwarunkowań tego efektu. Aby osiągnąć tak sformułowany cel i zweryfikować założoną hipotezę, należało zastosować modele ekonometryczne. Jak wynika z przeprowadzonych badań, model Lintnera może być użyty w przypadku spółek budowlanych. Analizowane czynniki, wpływające na wygładzanie dywidendy, okazały się nieistotne statystycznie. Jednakże te same czynniki znalazły zastosowanie w modelu logitowym, który jest użytecznym narzędziem do prognozowania, czy spółka wypłaci dywidendę, czy nie.

Słowa kluczowe: polityka dywidendy, czynniki ekonomiczne, wypłata dywidendy, model Lintnera, model logitowy.

1. Introduction

One of the most important decisions made by listed companies is the decision to pay dividends. Companies must choose what part of the profit to retain and to spend on development, and how much of it to transfer to shareholders. All of the decisions leading to the determination of the above proportions is defined as the dividend policy [Kowerski 2011; Longinidis, Symeonidis 2013; Baker (ed.) 2009]. The adoption of the company's dividend policy is identified with the establishment of the principles of payments from profits to the owners. This favours the predictability and stability of the expected future streams of income from the dividends received by the owners (shareholders). Therefore the dividend policy refers to the companies that systematically share the generated profit with the shareholders [Wypych 2011].

The aim of this paper is to analyse the relevance of dividend smoothing in the construction companies listed on the Warsaw Stock Exchange in 2000-2014. The construction industry plays an important role in the national economy. The development of this sector caused a significant increase in employment, much greater than in the case of other sectors. Therefore, construction contributes to the growth of household income and gross domestic product (GDP). For this reason the object of research are the construction companies included in the WIG-construction index on July 8, 2015. The subject of the analysis are dividends paid by these companies and the factors potentially influencing the decisions on profit distribution. It is assumed that it is possible to estimate the level of dividend smoothing and to identify the factors determining this level. Moreover, on this basis we can effectively forecast whether the company will pay a dividend in a specified period. The implementation of the purpose and verification of the hypotheses is required to apply econometric models. The study was based on data from the annual financial statements contained in the Notoria database and published on the Warsaw Stock Exchange.

The paper is organized in the following way: after the introduction, the second part shows the relevance of the dividend policy according to the Lintner theory. The third part gives an overview of previous empirical works on factors influencing dividend policy. The next part presents the situation in the Polish construction sector. The fifth part shows the values and trends of dividend payments in the construction companies listed on the Warsaw Stock Exchange. The sixth one the empirical results and seventh part concludes.

2. The relevance of dividend policy according to the Lintner theory

The dividend payment, understood as the distribution of net profit, is closely related to the strategic objectives of the company. From the point of view of its owners, a dividend payment refers to the choice between current income and future economic benefits. Retaining part of the company's profit and its use as a source of the financing of development projects contributes to the increase in the value of such an entity, and thus leads to an increase in the value of its shares [Cozorici 2015]. The payment of dividend on the one hand means a decrease in equity, and thus limits the possibilities of development. On the other hand, many investors prefer shares of companies which regularly pay dividends. What is more, they treat them as a sign of the good financial condition of the company [Sommer, et al. 1996]. It often happens that in response to an increase in the dividend, the stock market prices rise. In contrast, the limitation of the payment of dividends is perceived by the market as a negative signal with regard to the value of future cash flows. This can lead to a decline in the share price [Damodaran 2011]. This means that dividends are important for shareholders, however more important is a stable dividend pay-out ratio, rather than its level. This is reflected in the decisions of the boards of companies which are reluctant to change the rate of dividend payment [Lintner 1956]. Such a policy is characterized by so-called dividend stickiness, which reflected higher earnings volatility than the volatility of dividends [Guttman et al. 2010]. In such a situation, the boards in a given year change the rate of dividend payment taking into account changes in earnings only partially. Further changes are introduced gradually in the following years. The consequence of this policy of partial adjustment is to stabilize the dividend pay-out ratio, which minimizes the adverse reactions of shareholders [Lintner 1956; Liu, Espahbodi 2014]. This procedure is referred to as dividend smoothing which means maintaining a stable dividend per share for two years or longer [Guttman, et al., 2008]. This means that the rate of dividend payment is determined in proportion to the net earnings.

3. Related studies

Dividend smoothing is a well-known empirical technique in developed countries. It is determined not only by the characteristics specific to particular companies, but also macroeconomic factors. The verification of this thesis and to identify the most important factors influencing the dividend payout ratio was subject to a wide variety of research. According to Baker, et al. [2001], the key determinants of dividend policy are the pattern of past dividends, stability of earnings and the level of current and expected future earnings. The results of these studies are consistent with the Lintner theory [1956].

Kožul and Orság [2012], examined the effects of profitability, stability of earnings, the company's size, its growth rate, debt level and ownership concentration on a dividend policy based on data from five European countries, Australia, Japan and the USA. It has been shown that among these factors only profitability had a significant impact on dividend policy in all countries. In turn, in the Nordic companies the most important determinant shaping the dividend payment, in addition to profitability, is the size of the company [Brunzell et al. 2014]. The studies also indicate that changes in dividends are lagged in relation to the changes in profitability [Fairchild et al. 2014].

Kowerski [2011], based on an analysis of existing theories and hypotheses, specified 13 main factors of dividends payment decisions. First the author mentioned earnings, and more specifically − profitability. This indicates that the higher the profitability the more likely the dividend payment. Apart from profitability, investment opportunities, company size, the company's maturity, financial leverage, financial and market risk, the dividend policy stickiness, dividend premium, economic and financial situation, tax policy, the degree of minority shareholders control of the company, the legislative and monetary system are the determinants affecting the dividend policy.

Akyildirim, et al. [2014], analysed the decision to pay dividends in the context of the financial market situation. The authors showed that firms distribute more dividends when interest rates are high and less when issuing costs are high.

In the US, Canada, the UK, Germany, France and Japan the propensity to pay dividends is higher among larger, more profitable firms, and those for which retained earnings comprise a large fraction of total equity [Denis, Osobov 2008]. According to the research, companies from emerging countries exhibit dividend pay-out patterns that are relatively similar to those of companies from developed countries. These conclusions were reached by Boţoc and Pirtea [2014], who studied 2,636 companies from 16 countries. A similar view is shared by Al-Najjar [2011], who analysed the relationship between the capital structure and dividend policy of companies from Jordan. However the intensity of the dividend smoothing varies significantly in the financial markets in different countries [Breuer et al. 2014], and even sectors [Gupta, Banga 2010]. As Chemmanur et al. [2010], proved that there is no significant dividend smoothing by Hong Kong firms.

Jeong [2013], studied factors influencing the rate of dividend payment in developing markets based on the example of South Korea. The author shows that the extent of dividend smoothing in South Korean firms is found to be less than that in the U.S. Tax and interest rates are found to have significantly positive relationships with the degree of dividend smoothing. This means that institutional factors can play a critical role in understanding the dividend behaviour in emerging markets. Boulton, et al. [2012], have the same point of view. They pay particular attention to the role of taxes as a key factor influencing the dividend policy in Brazil.

Secondly, according to Jeong [2013], the size, risk, growth and large shareholder ownership are found to be important determinants of dividend smoothing. Larger firms and lower growth firms smooth dividends more. Riskier firms tend to smooth more during the sample period, while safer firms smooth dividends more in the post-liberalization period in South Korea. Leary and Michaely [2009], who conducted a study on the US market, pay attention to the same relationships.

In India, the most important factors shaping the dividend behaviour are the size and growth rate of the company and the investment opportunities [Singhania, Gupta 2012]. In turn, Kumar and Chandrasekar [2014], pay attention to the strong correlation between economic value added and the rate of dividend payment in Indian companies.

In Greece, the factors influencing the growth rate of dividend payment are company size, profitability and liquidity. In turn, investment opportunities, debt levels and risk are reducing the likelihood of dividend payment [Patra et al. 2012].

In contrast to the UK and the USA, in Germany some evidence of significant flexibility in changes of the dividend per share value was observed. German companies manifested the tendency to reduce dividend payments during periodic declines in earnings. In addition, these entities made decisions on dividend policy with regard to cash flow rather than net earnings [Andres et al. 2009].

4. The situation in the Polish construction industry in 2000-2014

In 2000-2014 the situation in the Polish construction industry showed considerable variations, as shown in Figure 1.

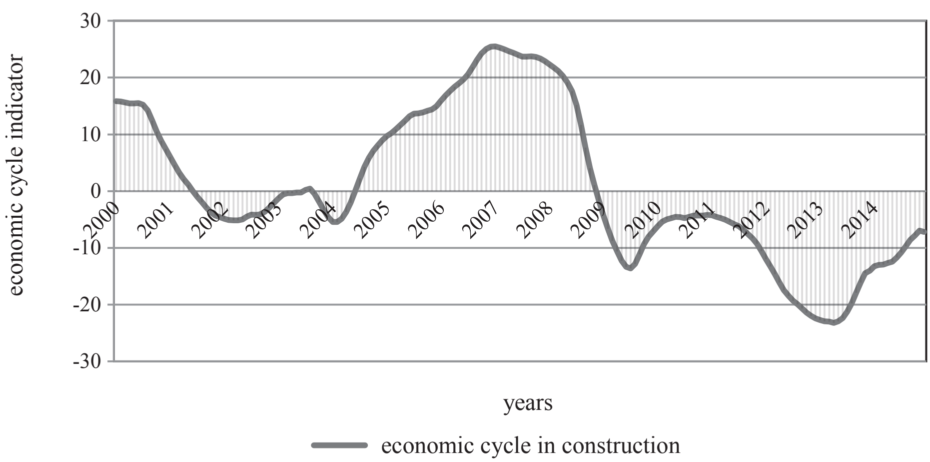

Fig. 1. The economic cycle in the construction sector in Poland in 2000-2014

Source: own elaboration, on the basis of: [Central Statistical Office of Poland 2016].

In Poland, after a period of economic downturn and the collapse of the economic situation in the construction industry at the beginning of this century, a gradual improvement occurred from 2004. The commencement of the economic recovery was caused primarily by the lower cost of mortgages and increasing lending activity conducted by banks. In 2006 the recovery turned into an unprecedented boom in the history of the development of construction. This state continued until mid-2007 (the economic situation indicator stood slightly over 25 points). Finally, in the second half of 2007 there was overproduction and the initiation of a new cycle, preceded by the upper turning point. In 2008, the situation in the construction market deteriorated further. This was related to the global financial crisis, to which the changes in the domestic credit market were attributed. The decline in lending activity was combined with an increase in margins and the rigorous assessment of the creditworthiness of customers, especially developers and individual investors applying for mortgages. In 2009 there was the first trough cycle (the economic situation indicator was about –14). A slight improvement in the economic situation, which was observed in mid-2010 did not prove the same as the sustained economic situation recovery (the economic situation indicator amounted to –5 points). The years 2011-2012 brought a further deterioration of the economic situation. Finally, in mid-2013 there was the second bottom of the cycle (the economic situation indicator decreased to –23 points). In the second half of 2013 the situation in the construction industry was gradually improving. This trend continued in 2014 (see Figure 1).

5. The dividend policy in the Polish construction industry in 2000-2014

On July 8, 2015, the WIG-construction consisted of 26 companies. 17 of them, i.e. 65% paid out a dividend at least once during the period of 2000-2014 (Table 1).

The dividend payments noted in the listed construction companies were generally irregular. In eight entities the decision on profit distribution was taken one, two, or three times. Only two companies paid out dividends every year since their IPO. They were Elektrotim and Unibep.

Budimex SA, one of the largest construction companies in Poland with over 40 years of history, regularly paid dividends in 2008-2014. It is worth noticing that the value of the dividend per share which was paid to the shareholders of the company, ranged from 5.85 PLN to 11.85 PLN, therefore it was the highest among the analysed companies.

Other companies took decisions on profit distribution at different intervals, mostly depending on the value of the generated net earnings and development plans of these entities. The changes observed in the economic cycle in 2000-2014 were a source of uncertainty in the construction industry. This uncertainty had probably a significant influence on the decisions on profit distribution, which partly explains the value of the dividend per share achieved in particular companies and in the whole construction sector.

Table 1. The dividend per share in construction companies listed on the Warsaw Stock Exchange in 2000-2014 (PLN)

No.	Dividend per share	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014
1	Budimex	0	0	0	0	0	0	0	0	5.84	6.8	9.08	10.97	4.39	11.85	6.11
2	Elbudowa	0	1	0	0.5	1	1.5	2	2.5	3	3.5	6	4	2	2	0
3	Elektrotim	x	X	x	x	x	x	x	1	0.6	1.4	0.7	1	0.6	0.75	0.6
4	Erbud	x	X	x	x	x	x	x	0	0	0.5	0	0	0	0.7	0.5
5	Herkules	x	X	x	x	x	x	x	0.06	0	0	0	0	0	0	0.06
6	Instal Kraków	0.3	0.1	0.1	0.1	0.1	0.1	0.1	0.3	0.3	0.3	0	0	0.2	0.2	0
7	Mostostal Export	0.2	0	0	0	0	0	0	0	0	0	0	0	0	0	0
8	Mostostal Płock	0	0.5	0	0	12.5	0	0.75	5	4.25	4	1.3	0	1.18	0	1.39
9	Mostostal Warszawa	0	0	0	0	0	0	0	0	0	1.4	0.55	0	0	0	0
10	Mostostal Zabrze	0.25	0	0	0	0	0	0	0	0	0	0.03	0	0	0	0.05
11	Panova	x	X	x	x	x	x	x	0	0	0	0	0.5	0	0.5	0.5
12	Prochem	0.15	0	0.15	0.15	0.4	1.4	1	0.7	0.13	0	0	0	0.78	0	0.35
13	Projprzem	0.4	0	0.3	0.4	0.3	0.5	0.4	0.5	1	0	0	0	0.4	0.4	0.6
14	Tesgas	x	X	x	x	x	x	x	x	x	0	0	0	0	0.25	0.1
15	Trakcja	x	X	x	x	x	x	x	x	0.1	0	0	0	0	0	0
16	Ulma	1	0	0	0	0	0	0	0	0	0	1.58	2.66	2	2	0
17	Unibep	x	X	x	x	x	x	x	x	0.1	0.1	0.12	0.12	0.12	0.12	0.15

x – the company was not listed on the WSE.

Source: own elaboration, on the basis of StockWatch [http://www.stockwatch.pl/].

6. The empirical analysis

Studying the impact of factors on the level of the dividend payment is based on the methodology proposed by Jeong [2013]. The starting point to determine the factors to estimate the model proposed by Lintner [1956], in which the increase in the level of the dividend per asset ($\Delta D_{i,t}$) is described by the equation:

$$\Delta D_{i,t} = \alpha_{0,i} + \gamma_{1,i} EPS_{i,t} + \gamma_{2,i} D_{i,t-1} + \varepsilon_{i,t} \tag{1}$$

where $EPS_{i,t}$ denotes the earnings per share of the *i'th* company in time *t*, $\varepsilon_{i,t}$ is the normally distributed error term. The value of the estimated parameter $-\gamma_{2,}$ is the degree of dividend smoothing DDS.

For the empirical analysis, annual data from the years 2000-2014 were used for the construction sector companies listed on the Warsaw Stock Exchange. After eliminating companies that have operated in the stock market only for the last three years or less, there ultimately remained, as mentioned before, 23 companies, and 17 of them at least once paid a dividend in that period. The results of the estimation of the model (1) are presented in Table 2.

Table 2. Estimates of the Lintner model for construction companies traded on the WSE, years 2000-2014

No.	Company	Estimated parameters			Determ. coeff.	Normality	Heterosce-dasticity
		$\hat{\alpha}_{0,i}$	$\hat{\gamma}_{1,i}$	$\hat{\gamma}_{2,i}$	R^2	JB	LM
1	2	3	4	5	6	7	8
1	Budimex	0.4331	0.9451*	–0.8683*	0.8220	8.3115*	4.2779
2	Elbudowa	0.2762	0.2095*	–0.6632*	0.4230	14.8689*	2.7773
3	Elektrotim	0.7858	0.3062	–1.2394*	0.8463	3.8008	2.1675
4	Erbud	0.1541	0.0397	–0.8760	0.4141	1.6661	1.7379
5	Herkules	–0.0023	0.1022	–0.9121*	0.9845	5.9807	7.2528
6	Instal Kraków	0.0996	0.0317	–0.9849*	0.4861	0.6732	5.6191
7	Mostostal Export	0.0253	0.0392*	–1.0564*	0.6810	10.5207*	13.0923*
8	Mostostal Płock	1.7108	0.4009	–1.1632*	0.6643	23.5212*	1.6039
9	Mostostal Warszawa	0.1674	0.0405	–0.8750*	0.6922	14.1842*	8.8684
10	Mostostal Zabrze	0.0298	0.0080	–1.0251*	0.5724	47.6316*	1.7113

1	2	3	4	5	6	7	8
11	Panova	0.6200	–0.2303	–1.0104	0.6157	4.8986	2.7257
12	Prochem	0.0610	0.3422*	–1.2222*	0.7351	0.5854	2.0562
13	Projprzem	0.2753*	0.2049*	–1.2332*	0.6858	0.3416	4.4110
14	Tesgas	0.0503	0.0080	–0.8049	0.4097	na	4.7382
15	Trakcja	0.0005	–0.0019	–0.5011	0.4170	na	7.0000
16	Ulma	–0.0120	0.0972	–0.3247	0.3946	0.3154	1.2449
17	Unibep	0.0933	0.0040	–0.7589*	0.8627	na	3.3324

* – significant at 0,05 significance level.

Source: own elaboration.

The results indicate the relatively good fit of empirical data. In most cases, the parameter standing by the lagged variable, considered as the level of smoothing dividends, proved to be statistically significant at the 0.05 level. For most models the stochastic assumptions regarding the normality of error terms and the stability of their variances have been met. Thus, according to the theory of Lintner the smoothing effect in most cases was important.

Using the above estimates attempt to verify the veracity of the theoretical model describing the level of smoothing dividend (DDS), the form [Jeong 2013]:

$$\begin{aligned} DDS_i = \beta_0 + \beta_1 SIZE + \beta_2 HISTORY + \beta_3 LARGE + \beta_4 SLACK + \beta_5 EV + \\ + \beta_6 GROWTH + \beta_7 INTEREST + \beta_8 TAX + \xi_i \end{aligned} \tag{2}$$

The variable SIZE is represented by the logarithmized value of company's total assets, HISTORY, the number of years of operation of the company on the stock exchange, LARGE means the percentage of the number of shares held by the largest shareholder, SLACK is the share of net profits in total assets, EV means the risk measured by the standard deviation of earnings per share, INTEREST is a one-year deposit rate and TAX is a dummy variable amounting to a value of 1 if the tax rate is higher than the average over the entire period, zero otherwise.

Model (2) is a cross-sectional relationship, estimated on the basis of data from last year. Assuming that in the Polish capital market the last two factors proved to be constant for all companies, finally the model form is:

$$\begin{aligned} DDS_i = \beta_0 + \beta_1 SIZE + \beta_2 HISTORY + \beta_3 LARGE + \beta_4 SLACK + \beta_5 EV + \\ + \beta_6 GROWTH + \xi_i \end{aligned} \tag{3}$$

Table 3 contains the basic statistics describing the variables used to estimate model (3). The values indicate a relatively large variation among companies and the asymmetric distributions of variables.

Then the correlation between pairs of individual variables was examined. The linear relationship is determined by the Pearson correlation coefficient. Table 4

Table 3. The characteristics of the variables used to cross-sectional model estimation

For all companies								
Variable	Mean	Median	Min	Max	Stand. Dev.	C.V.	Skewness	Ex. Kurtosis
DDS	0.6746	0.8683	0.0000	1.2394	0.4635	68.71%	–0.1900	–1.2805
SIZE	12.4385	12.7098	9.5014	15.0138	1.3120	10.55%	–0.2957	–0.2950
HISTORY	13.6522	16.0000	5.0000	23.0000	6.1468	45.02%	–0.0031	–1.6085
LARGE	37.9026	30.2500	8.2400	77.9800	21.0322	55.49%	0.5496	–0.9507
SLACK	0.0251	0.0297	–0.0730	0.0599	0.0291	115.80%	–1.9650	4.2639
EV	0.2416	0.1399	0.0008	1.0394	0.2930	121.28%	1.6887	1.7852
GROWTH	0.1113	0.0914	–0.1295	1.0758	0.2423	217.75%	2.7736	9.1104
For dividend paying companies								
Variable	Mean	Median	Min	Max	Stand. Dev.	C.V.	Skewness	Ex. Kurtosis
DDS	0.9129	0.9121	0.3247	1.2394	0.2541	27.84%	–0.6883	0.0038
SIZE	12.8160	12.7350	11.1440	15.0140	1.0434	8.14%	0.2797	–0.6810
HISTORY	14.4118	16.0000	6.0000	23.0000	6.3251	43.89%	–0.1219	–1.6737
LARGE	31.4659	28.8000	8.2400	75.4900	17.7901	56.54%	1.0238	0.4177
SLACK	0.10198	0.0240	–0.0730	0.0471	0.0306	154.75%	–2.0022	3.4592
EV	0.2697	0.1444	0.0163	1.0394	0.3134	116.23%	1.5860	1.2787
GROWTH	0.1514	0.0924	–0.1288	1.0758	0.2645	174.75%	2.5970	7.0564

Source: own elaboration.

Table 4. The correlation coefficients between variables

For all companies							
Variable	*DDS*	*SIZE*	*HISTORY*	*LARGE*	*SLACK*	*EV*	*GROWTH*
DDS	1	0.2729	0.2533	–0.6084	–0.2286	0.0062	0.3838
SIZE		1	–0.0083	–0.1713	0.0270	0.2873	0.0387
HISTORY			1	0.1022	–0.1572	0.3455	0.2322
LARGE				1	0.0453	0.1808	–0.2222
SLACK					1	0.1029	–0.6436
EV						1	–0.0598
GROWTH							1
For dividend companies							
Variable	*DDS*	SIZE	HISTORY	LARGE	SLACK	EV	GROWTH
DDS	1	–0.5224	0.1599	–0.4232	0.1222	–0.3282	0.3062
SIZE		1	0.0096	0.2615	0.3355	0.5436	–0.2296
HISTORY			1	0.4063	–0.2220	0.4421	0.3193
LARGE				1	–0.1581	0.2765	–0.0947
SLACK					1	0.2541	–0.6064
EV						1	–0.1616
GROWTH							1

Source: own elaboration.

includes the values of the coefficient. A 5% critical area for the analysis was assumed. The value of the coefficient, for all the companies, can be assumed to be significant when the module exceeds 0.4132, while for the dividend companies if it exceeds 0.5324. These values indicate a negligible dependence in most cases.

As mentioned, model (3) was estimated for all the companies and for dividend companies. The results are included in Table 5.

Table 5. Estimations of the smoothing dividend models

For all companies (n = 23)				
Variable	Estimated parameter	Standard error	t–ratio	p–value
const	0.0754	0.8821	0.0855	0.9329
SIZE	0.0640	0.0652	0.9817	0.3409
HISTORY	0.0209	0.0144	1.4495	0.1665
LARGE	–0.0125	0.0041	–3.0703	0.0073
SLACK	–1.1638	3.6045	–0.3229	0.7510
EV	–0.0369	0.3144	–0.1174	0.9080
GROWTH	0.2637	0.4510	0.5847	0.5670
Normality: $\chi^2(2) =$ 1.5817 Heteroscedasticity: LM =13.8439 Ramsey's RESET: F(2,14) = 2.89499				
For dividend companies (n = 17)				
Variable	Estimated parameter	Standard error	t–ratio	p–value
const	1.9629	0.7198	2.7272	0.0213
SIZE	–0.0989	0.0572	–1.7265	0.1150
HISTORY	0.0175	0.0101	1.7252	0.1152
LARGE	–0.0039	0.0032	–1.2271	0.2479
SLACK	5.1724	2.0570	2.5146	0.0307
EV	–0.2619	0.2086	–1.2556	0.2378
GROWTH	0.3589	0.2397	1.4975	0.1651
Normality: $\chi^2(2) =$ 0.0054 Heteroscedasticity LM = 14.2159 Ramsey's RESET: F(2,8) = 0.5008				

Source: own elaboration.

The results of model estimation (3), both for all companies and for dividend companies, indicate the fulfilment of the assumptions concerning normality random components (test of normality), and that the properly chosen form of analytical models (test specifications Ramsey's RESET), assuming a 5% significance level. The assumption on the constancy of variance of error terms (heteroscedasticity test) were not met. In all the cases, the explanatory variables proved to be statistically significant, which means that we cannot inform here about the impact of various factors on the level of smoothing dividends. It can be concluded that there is a smoothing effect but its importance comes down to trying to minimize the adverse reactions of the shareholders. The irrelevance of the macroeconomic factors may be due to the uncertainty which was associated with the strong fluctuation of the economic situation in the construction industry in the period considered.

On the basis of the pre-specified factors proposed to estimate the logit model, assuming as dependent binary variable, taking the value 1 in the case when the company paid out a dividend and zero otherwise. Using the method of maximum likelihood variance matrix resistant to heteroscedasticity and putting aside as irrelevant the time listing of the shares of a company on the stock exchange, there was estimated the model, the results of which are contained in Table 6.

Table 6. Estimation of the logit model

Variable	Estimated parameter	Standard error	Stat. z	Slope
const	–16.9510	8.3534	–2.0292	
SIZE	2.0712	0.7780	2.6621	0.0153
LARGE	–0.2419	0.0915	–2.6428	–0.0018
SLACK	–21.6426	22.9808	–0.9418	–0.1601
EV	22.4660	10.1868	2.2054	0.1662
GROWTH	3.3026	4.9710	0.6644	0.0244

Source: own elaboration.

The level of fitting this model to the empirical data, as measured by the R-squared Fadden coefficient stood at 0.7003 which can be considered satisfactory. Most of the variables proved to be statistically significant. Assessing the predictive ability of the above model, the results are contained in Table 7.

Table 7. Accordance of the prediction based on the logit model

		Forecasts	
		Non-payment	Payment
Empirical values	Non-payment	5	1
	Payment	1	16

Source: own elaboration.

When evaluating the above results, it can be seen that the forecasts were consistent with the empirical values in 21 to 23 cases, and therefore with the accuracy of forecasts, while the reliability of the model is 91.30%. Referring to the companies that pay out dividends, the ability of the model to identify those entities, as measured by the coefficient of sensitivity was up 94.12%. In turn, the ability of the model to identify companies not paying dividends, as measured by the coefficient of specificity, also known as the coefficient of specificity, amounted to 83.33%. The geometric mean of the sensitivity and specificity was 88.56%. The efficacy of the model in the prediction can also be assessed using the ratio of the AUC (area under the curve). This determines the probability that the model will give a higher rank to a randomly chosen company with the appropriate group (dividend payments or no pay) and not to a randomly chosen company of the group, in which it is not. The index value determined on the basis of the above model was 0.9412 which allows one to specify the model in terms of prognosis as very good.

7. Conclusion

Based on the conducted analysis we stated that the dividend smoothing can be modelled by a variety of factors. Its intensity varies significantly in the financial markets in different countries and even sectors.

As can be seen from the research, the Lintner model can be applied for construction companies listed on the Warsaw Stock Exchange because the smoothing effect was statistically significant in most cases. However, it was not possible to identify the statistically significant factors that determine the level of smoothing dividend the way it was proposed in the literature. Although these factors can be useful in order to estimate the logit model which is used to predict whether the company will pay a dividend or not.

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