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Inwestycje finansowe i ubezpieczenia – tendencje światowe a polski rynek

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EMPIRICAL ANALYSIS ON GERMAN PAYOUT PATTERNS

1. Introduction

The two most important categories of decisions that corporate managers have to make are investment and financing decisions. The former determine the structure of the left-hand side of a firm's balance sheet – the assets; the latter decide on the size and composition of liabilities and equity on the right-hand side of the balance sheet. Financing decisions also involve an important secondary type of decision, the payout decision which affects the level of equity retained in the firm.

Payout policy may be defined as the practice that the management of a company follows when determining the size and pattern of distributions to its shareholders over time as part of the compensation for their investment. It is not a decision made in an arbitrary or random manner; rather, it entails certain consistency over time.

Comparison of the payout patterns of corporations in the U.S., United Kingdom, and Germany shows that there exist striking national differences in how much of their profits firms pay to their shareholders. In the mid 1970s, the dividend payout ratios were fairly close, all lying within a band of 42-47%. On the contrary, in 1993 British firms paid shareholders on average 69% of their after-tax profits. American firms paid about 51%, while German firms paid only just above 40% of their profits.

This paper examines the relationship between earnings performance and dividends of firms in Germany in contrast to U.S. and U.K., and the empirical analysis of the dependency of dividend payments on past, current and future earnings in Germany accompanied by supporting figures. For this purpose, the considerations of the agency and signaling theories discussed in following sections are combined.

2. Agency theory

The different forces that operate within a firm can, at different points in time, pull it in different directions, and the interests of different groups within a firm may conflict. The groups that are presumably to be affected the most by a firm's payout policy are the shareholders, management and the bondholders.

The first type of agency conflict, as interpreted by Jensen/Meckling [1976], results from the disparity of interests between the shareholders as residual claimants and the bondholders as fixed claimants of cash flows generated by firm's operations. In particular, excess or unanticipated distributions can transfer wealth from bondholders to shareholders by reducing assets for meeting their fixed claims. Efficient contracting in conjunction with legal restrictions can eliminate this conflict and provide bondholders with the necessary protection.

A second type of agency conflict is the one between shareholders and management. Managers who are subject to weak control from their shareholders may deviate from the behaviour which maximizes shareholder value. As cash is the asset which managers can misuse most easily, the related literature highlights two effects that could be achieved by higher payout ratios. Firstly, Jensen [1986] specifies that they can mitigate agency conflicts by paying out excess cash and thereby reduce the scope of managerial misallocation of corporate funds in unprofitable projects which yield to them personal benefits of control. Secondly, as pointed out by Rozeff [1982], by distributing cash, a more frequent recourse to the external capital markets will provide shareholders to benefit from monitoring of investment plans by potential lenders. A slightly different interpretation of agency costs was offered by Easterbrook [1984]. He views distributions as a device of corporate governance that helps to reduce the cost associated with the separation of ownership and control. The starting point of his argument is that if the ownership of a firm is dispersed, individual investors have little incentive to monitor managers in their actions. This is due to the fact that monitoring investors bear all the cost but profit only in proportion to their partial shareholding. Costly monitoring is then subject to a classical free-rider problem. Therefore only a large control stake compensates for this cost; large investors are more willing and able to provide for regular and intensive monitoring of managerial behaviour than smaller and more diffuse owners. In other words, as the number of shareholders increases, the agency problem becomes more severe, the cost of monitoring also increases, and the outside shareholders have preference for cash payments over retained earnings. Thus, firms with dispersed ownership will establish higher payouts.

3. The Theory on Signalling

Managers might have more information about the firm's future prospects than do individuals outside the firm, i.e. the quality of its investment opportunities and future cash

flows, and they have incentives to signal this superior information to the investors. Managers strive to move market's expectations about future earnings prospects to those of their own especially in cases when it is important for a firm to establish true market value. This occurs particularly when it is selling stocks or other securities in the market, when it faces a takeover threat, or when shareholders are selling their shares for personal reasons[1]. Theories attempting to provide a framework for understanding how payout policy can convey relevant new inside information to the market include those developed by Bhattacharya [1979], John/Williams [1985], and Miller/Rock [1985]. The basic idea behind these models is that manages possess private information about future prospects and choose distributions levels to signal that private information. If this holds, then announcements of large dividend increases are met with upward share price movements, and announcements of dividend cuts are associated with share price declines.

Alternative theoretical models of signaling are based on dividend smoothing. The milestone of this phenomenon was set by Lintner who pronounced that firms undeniably follow well-considered payout strategies. The idea behind his considerations is based on a sample of interviews with U.S. managers. He developed a mathematical regression model to represent the verbal descriptions of the payout process described by the questioned managers[2].

$$\Delta D_{it} = A_i + C_i(r_i E_{it} - D_{i(t-1)}) + U_{it},$$

where: A_i – the intercept term for i,

C_i – the speed of adjustment coefficient of firm i,

r_i – the target payout ratio for a firm i,

E_{it} – the after tax earnings per share in period t for a firm i,

$D_{i(t-1)}$ – the dividends per share paid out last period by firm i,

U_{it} – the error term for firm i in period t.

Lintner states that dividends[3] are smoothed from year to year and are a result of a partial adjustment process towards a target ratio. Dividend changes follow sustainable rather than temporary shifts in the levels of earnings. Dividend increases are made only if management believes they could be sustained in the future, and dividend cuts are avoided if earnings' decline is only temporary. A slow adjustment of dividends follows a sudden unexpected change in earnings.

Taking into consideration various aspects of the theory of signalling described here above with respect to the level of the ownership concentration we can conclude that firms with concentrated ownership may not need to use dividends as signal when compared with firms with disperse ownerships.

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[1] See Lease et al. [2000, p. 98].

[2] As reported by Allen/Michaely [2002], almost 50 years after Lintner's ground-braking study, his model remains to be considered by some economists the best description of dividend setting process available.

[3] As share repurchases were not common at the time of Lintner's study, the model in its notation only refers to dividend streams. However, the considerations of the model are valid for the total payout as well.

4. Payout ratio as an Outcome of Ownership Concentration

Based on the argument of Easterbrook, we hypothesize that the concentration of ownership is associated with lower levels of distributed cash as proportion of earnings whereas dispersed ownership leads to higher payout ratios.

The information regarding ownership structures across the U.S., U.K. and Germany differs for each, depending on the particular dataset and time horizon examined. Also, there are several reasons why the available data on shareholdings is imperfect in terms of quality and international comparability[4]. In particular, there are different requirements regarding the reporting thresholds of large ownership and voting stakes. Also, different countries have different legal devices available as means of separating ownership (cash-flow rights) from voting (control rights), e.g. dual-class stocks, non-voting share certificates, restrictions on voting rights of large positions, or deviations from the one-share-one-vote-rule due to pyramidal and cross-ownership structures as is especially the case in Germany[5].

The U.S. is known as the country with the most dispersed ownership structures which is confirmed by a number of sources. Zwiebel [1995] reports, that the median largest shareholder for the Fortune 500 corporations holds only about 9% of firm's equity; the top 5 shareholders hold on average 28.8%[6]. A recent study by Barca/Becht [2001] reports that the median voting power of the largest U.S. shareholder is 5.4%. Becht/Röell [1999] document distribution of voting rights for sample of 1309 companies listed on NYSE and 2831 NASDAQ listed companies. Their findings of voting power stake within various ranges show that in the U.S., over 50% of companies have a largest shareholder who holds less than 5% of the outstanding shares. Over 90% of the companies do not have a largest shareholder that would control a block of 25%. Moreover, only less than 2% of all sample companies own more than 50% of the voting power.

In addition, in the U.S., shareholdings in excess of 10% and 20% may have undesirable regulatory control implications in terms of share disposal and liabilities for federal law violations[7]. This is consistent with the concentration of ownership below 10% and 20% and the small number of shareholdings in excess of 20%.

Information on ownership structure and voting rights for the U.K. market also differs depending on the observed sample. Goergen/Renneboog [2003] report on a random sample of 250 listed companies a rather modest median value of the largest voting block, namely 9.9%. Crespi/Renneboog [2003] document that little shareholder monitoring is expected in U.K. as 85% of listed U.K. industrial companies

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[4] See Becht/Röell [1999, p. 1051].

[5] For separation of ownership and control, see for example Becht/Röell [1999, pp. 1051-1052]; Gugler [2002, pp. 731-758], or Franks/Mayer [2000, pp. 8-10].

[6] These figures are derived from the 1981 CDE Stock Ownership Directory: Fortune 500.

[7] See Barca/Becht [2001, p. 28]. A controlling shareholder is by SEC regulation liable for federal securities law violations committed by the controlled corporation, unless an affirmative defence of nonnegligence can be established. Also he cannot sell his shares absent of registration.

lack a controlling share block of 25% or more. Mayer [2001] reports that only 16% of the largest 170 listed companies in the United Kingdom have a single shareholder owning more than 25% of shares, and only 6% have a single majority shareholder. A possible cause for the relatively low concentration of voting shares is, similarly to the U.S., the legal environment. In the U.K., whenever a blockholder crosses 30% threshold of the company's votes, the Takeover Panel's mandatory bid rule prescribes him to a general cash offer to all shareholders.

The voting power in Germany tends to be generally highly concentrated as recorded by several empirical surveys. Barca/Becht [2001] find the median voting block in Germany to be 57%. In spirit with these findings, Becht/Böhmer [2003][8] document that above 82% of officially listed AGs have a minority blockholder controlling more than 25% of the votes and 65% are majority controlled. Even though the studies differ in data source, sample of companies, or year, they all prove for generally high concentration of German ownership structures.

A clear statement in favour of the agency hypothesis can be made if summarizing the evidence on ownership and voting power across the three examined countries: payout decisions are significantly affected by ownership structure and control. We earlier identified that the U.S. makes the highest distributions to its shareholders. Correspondingly, the shareholder structure is most dispersed and the median voting power of the largest shareholder lies at some 5%. Germany on the contrary has the lowest dividend payout ratio. The presence of large blockholders which averages to above 50%, makes the managerial problem less severe, controlling shareholders may effectively monitor management decisions and do not have to fear misallocation of corporate funds. Once again, the U.K. lies on the midway between U.S. and Germany; the British shareholders are relatively diffuse with median voting power of some 10% (or more depending on whether voting coalitions are included), and they are subscribed to payout ratios that are lower than in the U.S. but fairly higher than in Germany.

5. Modelling the Hypothesis

In the section 3 we have concluded that firms with concentrated ownership may not need to use dividends as signal. This should be the case of Germany. As identified earlier, the German ownership structure is indeed highly concentrated and most firms have a large controlling shareholder. Consequently, the traditional agency problem between management and shareholders is expected to be less of an issue in Germany, and the need to use expensive dividends as signaling device is to be less pronounced than in the U.S. or U.K. where ownership is much more dispersed. Dividends in Germany should be less valuable as a signal and therefore more volatile.

Based on these considerations, current changes in profitability rather than permanent changes should be the key determinant of German dividend policy. Especially,

[8] Becht/Böhmer [2003, p. 1]. The sample consists of 430 officially listed corporations.

if a firm incurs a loss or a decline in earnings in period t which are not expected to be repeated in the future, it will ceteris paribus tend to cut or reduce its dividends immediately in period t and not use former high levels of dividends to signal to shareholders that the earnings deterioration is only temporary. The relationship between dividends and earnings is thus expected to be strongest when figures from the same period are compared. On contrary, dividends in a specific period should not depend on earnings lagged by one or more periods or on earnings succeeding that specific period. The rationale for inclusion of future earnings as a determinant of dividend policy is that dividend levels should signal management's assessments of the farm's future profitability, and future earnings realizations are a reasonable proxy for managers' expectations of future earnings at the time they make their dividend decision[9].

The hypothesis is formed as follows: the relationship between dividends in t and earnings in t is significantly stronger than the relationship between dividends in t and earnings proceeding period t as well as dividends in t and earnings succeeding period t.

6. Sample and Data Description

The empirical analysis is based on a sample containing 115 quoted German industrial, financial, and commercial firms listed on the German Stock Exchanges, and covers the time period ranging from 1993 to 2002. In the first step, firms included in the stock index DAX 100 as to 2001 were selected[10]. These were then complemented by 26 firms which reported at least one annual loss between 1993 and 2002 and were a member of DAX 100. Subsequently, firms without at least five years of accounting data were excluded. The reason for this particular sample composition is that the number of loss incurring firms over the observed time period was highest in 2001 as a consequence of an economic recession, and it is likely that such firms will be under pressure to revise their dividend policy. This is also why the additional 28 firms were added to the sample.

Altogether, there are 1045 firm-year observations; the panel counts ten years of observations for 76 firms, 9 for 13 firms, 8 for 5 firms, 7 for 6 firms, 6 for 11 firms and 5 for 4 firms.

The figures for dividends and published profits as well as records of the ownership structure were collected from the Hoppenstedt Stockguide. Items missing in the electronic version were obtained from the paper version of the same database. Items not found in either of the two versions were, where possible, taken from the web pages of the particular companies. All values are in DM.

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[9] See DeAngelo/DeAngelo [1992, p. 1850].

[10] There are occasional changes in the composition of the stock index DAX 100; however, a vast majority of the firms has permanent membership.

7. Methodology and Results

In order to determine the degree of dependency between dividends in period t and earnings in the same period as well as lagged earnings up to three periods, and earnings succeeding t by one period, the coefficients of correlations are applied[11]. In particular, Pearson's product moment correlations between each pair of variables are calculated. These are calculated for each of the sample firms i separately[12] and with different time lags: coefficient of correlation r between dividends in period t and earnings in $t(D_itE_it)$ [13], between dividends in t and earnings in $t-1(D_itE_it\_1)$, dividend in t and earnings lagged by two periods $(D_itE_it\_2)$, dividends in t and earnings lagged by three periods $(D_itE_it\_3)$, and finally dividends in t and earnings in $t+1(D_itE_itt)$. The summary of the statistics is observable from Tab. 1. Measures of central tendency, of variability and of shape are included.

Table 1. Summary statistics on Pearson's coefficients of correlation between dividends and earnings

Summary Statistics					
		corr(DtEt)	corr(DtEt_1)	corr(DtEt_2)	corr(DtEtt)
N	Valid	110	110	107	110
	Missing	5	5	8	5
Mean		0.6345	0.4176	0.2878	0.2960
Median		0.7065	0.4863	0.3005	0.3478
Std. Deviation		0.3260	0.3930	0.4633	0.4544
Variance		0.1063	0.1545	0.2146	0.2065
Skewness		–1.5947	–0.7005	–0.4156	–0.6534
Minimum		–0.7001	–0.5984	–0.8853	–0.9969
Maximum		0.9999	0.9936	0.9914	0.9819
Percentiles	10	0.2494	–0.1772	–0.3822	–0.3266
	20	0.3794	0.0626	–0.2144	–0.0892
lower quartile	25	0.4620	0.2361	–0.0043	–0.0020
	50	0.7065	0.4863	0.3005	0.3478
upper quartile	75	0.9028	0.6942	0.7113	0.6787
	90	0.9473	0.9066	0.8726	0.8381

Following statement may be established: dividends in a specific period are in the main driven by earnings in the same period. The relationship measured by cor-

[11] A time series analysis where the intensity of dependency between two variables is measured by deviations from a specific trend is not applied. This is because the observed time range of 10 years (or less for 40 sample firms) is considered rather short to specify a relatively stable trend. Also, as dividend time series often do not experience a specific trend and are characterized as stationary, this method would be inappropriate.

[12] As the coefficients of correlation are calculated separately for each of the sample firm, we do not standardize for the difference in sizes of dividend payment and earnings. However, it is assumed that each firm enters the analysis with the same weight.

[13] For DtEt, the excel formula is CORR(D1993:D2002;E1993:E2002). Analogously, for DtEt_1 it is CORR(D1994:D2002;E1993:E2001). With the lag by one period, we loose a year of observations for each of the firms. The same procedure is applied for DtEt_2, DtEt_3, and DtEtt.

relation coefficients is much weaker when considered with a time lag of up to three periods or with one period succeeding. In detail, the correlation between dividends and earnings in the same period is for half of the examined firms 0.71 whereas the median lies at 0.49 for DtEt_1, at 0.30 for DtEt_2 and DtEt_3 and at 0.34 for DtEtt. This is in contrast to the results of DeAnfelo/DeAngelo [1992] who find for a sample of 167 NYSE listed firms that the dividend decision strongly depends on the earnings before the dividend year, on the current earnings and on earnings of the year following the dividend year[14]. The upper quartile of correlation coefficients between DtEt lies at 0.9 and the lower at 0.46 which is considerably higher when compared with the other cases. Also, the standard deviation is respectively lower when measured for DtEt. The standardized skewness, which is used to determine whether the sample comes from a normal distribution or not lies for all five columns within the range of –2 to 2 so that there are no significant departures from normality which would invalidate the statistical procedures applied.

In order to test the validity of the computed coefficients of correlation, a contingency test is applied based on Fisher's z-transformation[15]. The coefficients of correlation are for some firms very high; for other firms they are close to 0, and it may be coincidental that they are different from 0. Therefore, the null hypothesis $H_0 : \rho = 0$ is tested against the alternative hypothesis $H_1 : \rho \neq 0$ where ρ is estimated *corr*. The test characteristics $z = z_F \sqrt{n-3}$ is applied which is normally distributed and where z_F is Fisher's z-transformation of the coefficient of correlation computed for a specific n. The region for which the alternative hypothesis is accepted, meaning that the relationship between dividends and earnings for a specific firm is significant at a 95% confidence level, is defined by $\vartheta_\alpha = \{z : |z| > 1.96\}$. If n = 10 (for the case of DtEt), then $z_F > 0.74$. After transforming the z value, it corresponds $r = 0{,}63$. This means that all $r \in (-0.63; 0.63)$ are statistically significant. Analogously, we compute the confidence intervals for n = 9 (DtEt_1 and DtEtt), n = 8, (DtEt_2)[16].

For a more comprehensible understanding, Fig. 1-3 illustrate the above discussed results together with the intervals for which the coefficients of correlation are significant. As visible from Fig. 1, the coefficients of correlations between DtEt (points) are for the vast majority of firms greater than those between DtEt_1 (diamonds). Figures 2 and 3 are interpreted analogously.

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[14] See DeAngelo/DeAngelo [1992, p. 1862].

[15] This is a standard method used to test the significance of correlation coefficients. See e.g. Bakytova et al. [1975].

[16] The decrease in the degree of freedom n is caused by the loss of year observations as described in Footnote 13.

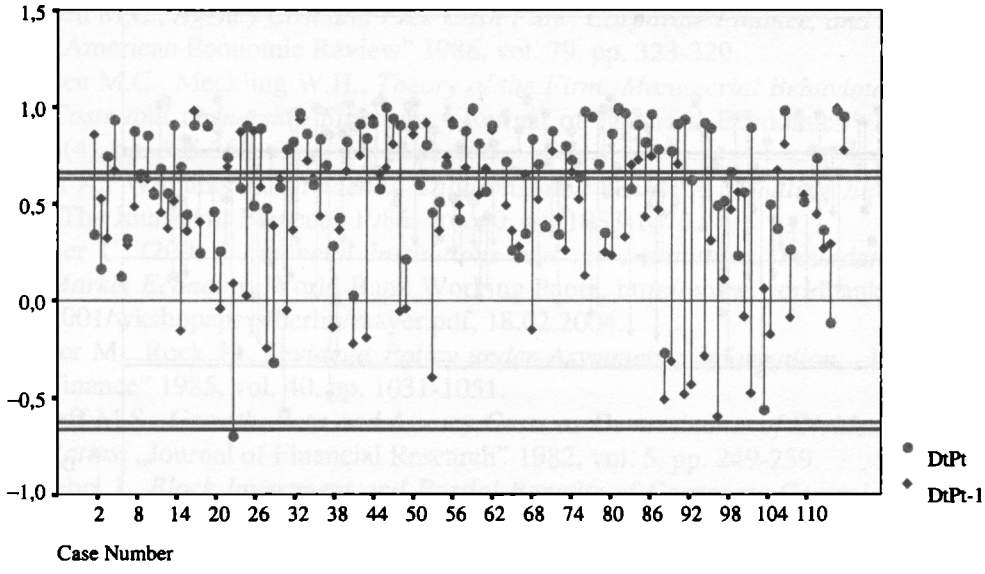

Fig. 1. Comparing correlation coefficients between dividends and profits for current period and lag-1

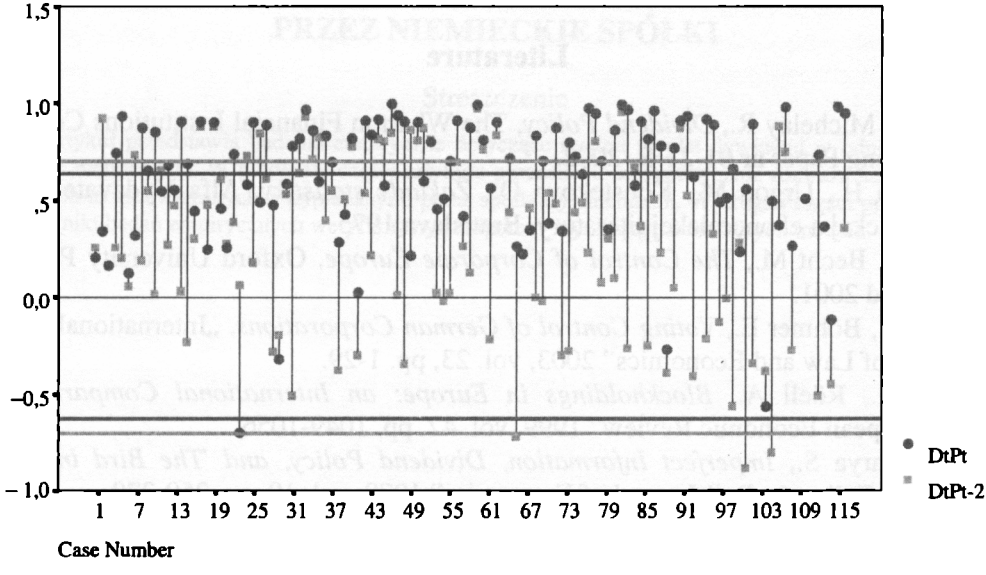

Fig. 2. Comparing correlation coefficients between dividends and profits for current period and lag-2

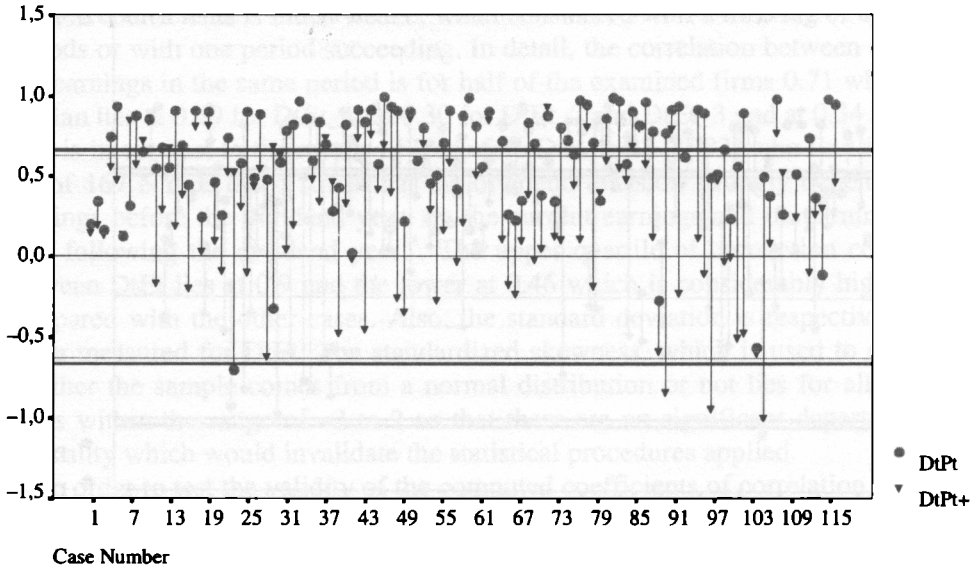

Fig. 3. Comparing correlation coefficients between dividends and profits for current period and lag+1

Literature

Allen F., Michelay R., *Dividend Policy*, The Wharton Financial Institutions Center Working Paper nr 01-21-B, 2002.

Bakytova H., Urgon M., Konstekova O., *Zaklady statistiky*, Alfa Vydavatelstvo technickej a ekonomickej literatury, Bratislava 1975.

Barca F., Becht M., *The Control of Corporate Europe*, Oxford University Press, Oxford 2001.

Becht M., Böhmer E., *Voting Control of German Corporations*, „International Review of Law and Economics" 2003, vol. 23, pp. 1-29.

Becht M., Röell A., *Blockholdings in Europe: an International Comparison*, „European Economic Review" 1999, vol. 42, pp. 1049-1056.

Bhattacharya S., *Imperfect Information, Dividend Policy, and 'The Bird in the Hand Fallacy'*, „Bell Journal of Economics" 1979, vol. 10, pp. 259-270.

Crespi R., Renneboog L., *Corporate Monitoring by Shareholder Coalitions in the UK*, ECGI Working Paper Series in Finance nr 12, 2003.

DeAngelo H., DeAngelo L., Skinner D.J., *Dividends and Losses*, „The Journal of Finance" 1992, vol. XLVII, pp. 1837-1863.

Easterbrook F.H., *Two Agency-Cost Explanations of Dividends*, „American Economic Review" 1984, vol. 74, pp. 650-659.

Goergen M., Renneboog L., da Silva L.C., *When do German Firms Change their Dividends?*, ECGI Working Paper Series in Finance nr 13, 2003.

Jensen M.C., *Agency Cost and Free Cash Flow, Corporate Finance, and Takeover*, „American Economic Review" 1986, vol. 79, pp. 323-329.
Jensen M.C., Meckling W.H., *Theory of the Firm: Managerial Behaviour, Agency Costs and Ownership Structure*, „Journal of Financial Economics" 1976, vol. 3(4), pp. 305-360.
John K., Williams J., *Dividends, Dilutions, and Taxes: A Signaling Equilibrium*, „The Journal of Finance" 1986, vol. 40, pp. 1053-1070.
Mayer C. (2001), *Financial Institutions and the Institutional Foundations of a Market Economy*, World Bank Working Paper, http://www.worldbank.org/wdr/2001/wkshppapers/berlin/mayer.pdf, 18.02.2004.
Miller M., Rock K., *Dividend Policy under Asymmetric Information*, „Journal of Finance" 1985, vol. 40, pp. 1031-1051.
Rozeff M.S., *Growth, Beta and Agency Costs as Determinants of Dividend Payout Ratios*, „Journal of Financial Research" 1982, vol. 5, pp. 249-259.
Zwiebel J., *Block Investment and Partial Benefits of Corporate Control*, „Review of Economic Studies" 1995, vol. 62, pp. 161-185.

ANALIZA EMPIRYCZNA MODELI WYPŁAT DYWIDEND PRZEZ NIEMIECKIE SPÓŁKI

Streszczenie

Artykuł przedstawia badania empiryczne dotyczące modeli wypłat dywidend w odniesieniu do spółek niemieckich. W pierwszej części artykułu przedstawiono syntetycznie rozważania dotyczące różnych teorii związanych z wypłacanymi przez spółki dywidendami. W drugiej części przedstawiono wyniki badań empirycznych weryfikujących hipotezy wynikające z niektórych modeli.