Impact of joint-stock companies' financial condition on real activities manipulation to manage earnings

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Abstract. The aim of the paper is both to determine whether joint-stock companies in poor financial condition undertake real activities manipulation to manage earnings, and to investigate the potential relationship between the scope of real activities manipulation and business fields in which these companies are operating. The database of the Notoria Serwis company and panel data models were used for the purpose of the study. In order to measure the scale of real earnings manipulation, the author adopted Roychowdhury's methodology, focusing on the manipulation of sales, production costs and discretionary expenses.

The study examined a sample of non-financial joint-stock companies listed on the Warsaw Stock Exchange in the period 1998–2016, and was based on 1493–1669 observations. The results demonstrated that companies in poor financial condition undertake actions to manage earnings. Managers manipulate sales volumes and reduce levels of discretionary expenses. The intensity of those actions depends on the type of business activity of a given company.

Keywords: joint-stock companies, earnings management, financial condition, real activity manipulation

Wpływ kondycji finansowej spółek akcyjnych na podejmowanie działań o charakterze realnym w celu zarządzania zyskami

Streszczenie. Celem artykułu jest, po pierwsze, ustalenie, czy spółki akcyjne będące w gorszej kondycji finansowej podejmują działania o charakterze realnym w celu zarządzania zyskami, a po drugie, zweryfikowanie, czy skala podejmowanych działań zależy od rodzaju działalności gospodarczej przedsiębiorstwa. W badaniu wykorzystano bazę danych firmy Notoria Serwis oraz modele panelowe. Dla określenia skali działalności związanej z manipulowaniem zyskami posłużono się metodyką zaproponowaną przez Roychowdhury, koncentrując się na manipulacjach związanych ze sprzedażą, produkcją oraz kosztami pośrednimi.

Badanie przeprowadzono na podstawie próby niefinansowych spółek akcyjnych funkcjonujących na Giełdzie Papierów Wartościowych w Warszawie w latach 1998–2016; obejmowało łącznie od 1493 do 1669 obserwacji. Wyniki pozwalają stwierdzić, że spółki będące w gorszej kondycji finansowej podejmują działania o charakterze realnym związane z zarządzaniem zyskami. Zarządzający manipulują wielkością sprzedaży oraz redukują koszty pośrednie produkcji. Natężenie tych działań jest związane z rodzajem działalności gospodarczej prowadzonej przez dany podmiot.

Słowa kluczowe: spółki akcyjne, zarządzanie zyskami, kondycja finansowa, działania o charakterze realnym

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Earnings management is a well-known subject, described in literature. Its popularity grew fast after the financial crisis on the US market in the early 2000s.

According to literature, earnings management occurs when the management of a company decides to use accounting techniques which make it possible to change the contents of the company's financial statements:

- to give stakeholders a false impression of the company's financial condition;
- to fulfil the terms of other contracts that depend on reported statements (Healy & Wahlen, 1999).

According to Healy and Wahlen (1999), it is the management's decision, based on their judgement, to adopt such techniques or not. It is worth noting that such practices are allowed by the law. Various actions might be taken to manage earnings. They can be divided into two basic categories (Roychowdhury, 2006; Zang, 2011). The first is accrual-based earnings management, which involves transaction recognition in financial statements. This kind of activity does not directly affect the level of cash flow. Examples include changing the depreciation method for fixed assets or delaying impairment losses of fixed assets. Accrual-based earnings management results in a changed financial statement without making any new transactions.

The second category is real activities manipulation which can be defined as actions of the management distinctly different from standard business practices, whose purpose is to obtain a certain financial result. Real activities manipulation affects the level of cash flow. Examples include decreasing expenditures on research and development or offering high discounts to customers.

Real activities manipulation is the subject of the study presented in this paper. The study focused on three types of activities from that category (Roychowdhury, 2006):

- sales manipulation – activity aimed at temporarily increasing sales revenues in a given year, e.g. by offering discounts or more favourable financing terms to customers. Such actions result in achieving a higher profit at the end of the accounting period, but on the other hand, they negatively affect the level of cash flow, which is consequently lower than expected for a certain level of sales volume;
- reduction of discretionary expenses – limiting expenditure on research and development or cutting advertising or general management costs. As a result, the company is able to present a higher profit in its financial statement. The level of indirect costs is consequently lower than expected for a certain level of sales volume;
- overproduction – production increased to the level exceeding demand. For a higher production level, fixed costs are divided between more items, which translates into a lower unit cost. As a result, the company has higher operating margins, but also higher costs connected to the production and storage of products. Consequently, the company's production costs amount to the level higher than expected.

The management can undertake each of the above-mentioned activities to achieve a certain financial result. However, in the long run, such practices may reduce the value of a company. Overstating financial results in a given accounting period is bound to have a negative effect on the level of cash flow in subsequent periods.

Roychowdhury (2006) wrote one of the most important publications on real activities manipulation. His methodology was used in a number of publications, most of which concerned the US capital market. Real earnings manipulation was studied there in relation to: changes in the law (Cohen, Dey & Lys, 2008), legal forms of companies (Haga, Höglund & Sundvik, 2018), the firm value (Mellado--Cid, Jory & Ngo, 2008), the auditing company's reputation (Magnis & Iatridis, 2017) and the professional experience of the management (Jiang, Zhu & Huang, 2013).

Since there have only been few studies on this subject concerning the Polish capital market, the author decided to conduct an empirical study in this area based on the performance of joint-stock companies listed on the Warsaw Stock Exchange (WSE).

The main goal of the paper is to determine whether joint-stock companies in poor financial condition undertake real activities manipulation to manage earnings. The findings of the study are also expected to answer the question whether the scope of real activities manipulation depends on a company's business profile.

The article consists of four sections. The first section presents a set of empirical studies pertaining to earnings management on the Polish capital market. The second section explores the relationship between the financial condition of companies and earnings management. The research methodology and the research sample are presented in the third section of the article, and the results obtained in the study and their interpretation in the fourth section.

EARNINGS MANAGEMENT ON THE POLISH CAPITAL MARKET

Polish literature on earnings management includes a series of papers which can be divided into three groups.

The first group comprises empirical studies which analyse the reported financial results and their distribution. The authors Jackowicz and Kuryłek used a research sample made up of commercial banks in Poland in the years 1994––2003 in their study (Jackowicz and Kuryłek, 2005). They demonstrated a significant discontinuity in the threshold set by the zero financial result. The correlation was stronger in the case of banks with a comparatively low capital endowment, and during the period of low economic growth. Interestingly, such activities were not highly popular among banks listed on the stock exchange.

Later, this study was extended to commercial banks in Central and Eastern Europe (Jackowicz & Kozłowski, 2010). The research sample consisted of

commercial banks in 11 European countries in the years 1991–2008. The results showed that while banks avoided reporting losses, they did not seem to counteract the decrease of profitability. The results did not change when the sample was divided according to the geographic location, the quality of capital equipment, the company's presence on the stock exchange, or the macroeconomic situation of the country of origin.

Another set of studies analysing financial result distribution was conducted by Wójtowicz. In the first publication (Wójtowicz, 2007a), the author tried to find out whether earnings management could be effectively checked by audits. The research sample consisted of companies listed on the WSE in the years 1998–2004. The analysis of the distribution of net financial result and cash flow in the operational activity showed that earnings management undertaken in order to avoid losses was not significantly limited by ongoing audits. There were ways to manage earnings so that a statutory auditor was not able to stop this procedure.

In the following study (Wójtowicz, 2007b), the author attempted to determine whether the scope of earnings management depended on the legal form of a company. The research, based on 1078 observations from the period 2003–2004, showed that earnings management to avoid losses occurred in nearly 28% of limited liability companies. In the case of general limited and other partnerships as well as sole proprietorships, no indication of earnings management was detected.

Another study by Wójtowicz (2012) was aimed at verifying the hypothesis that economic climate determines the scope of financial result management to recover losses. The study was based on 2229 observations of public companies in the period 1997–2010, and analysed breakdowns of net financial results and cash flow from operating activities. The results provided insufficient evidence to reject the hypothesis. However, it was demonstrated that in good economic times, earnings management does not occur. The situation changes significantly when the economic situation is deteriorating. When the actual financial result of a company is unsatisfactory for the management, they will be trying to shape it according to their expectations.

Further research by the same author (Wójtowicz, 2015) attempted to detect any signs of earnings management to achieve zero or small positive earnings surprises. The research sample consisted of 609 observations of mWIG400 index companies in the years 2012–2014. When the author analysed the distribution of scaled annual earnings surprises (difference between actual and forecasted profits), he observed a high frequency of small positive surprises, i.e. actual profits being slightly higher than forecasted profits. This indicates that earnings management is likely to have taken place there.

Brzeszczyński, Gajdka and Schabek (2011) author the latest study on earnings management where breakdowns of financial results were analysed. As the other above-mentioned studies, their research focused on earnings distribution,

and more specifically, on earnings per share and their change over time. The sample consisted of 359 companies listed on the WSE in the period 1997–2010. This empirical study indicated that Polish companies manage earnings at the level of around zero threshold. However, it concerns the "zero growth" threshold to a lesser extent. The results of the study showed that companies which adopted earnings manipulation achieved worse results in the consecutive periods than the companies which did not undertake such activity.

The second group of studies concerning the Polish capital market focuses on the estimation of accruals in order to identify accrual-based earnings management activities. A comprehensive study in this area was conducted by Piosik (2013). The research sample was comprised of companies listed on the WSE in the period 2006–2009. The author carried out a comparative analysis of models describing the change in the value of current nonmonetary assets and studied the influence of changing accounting standards on earnings management in Poland. The results indicated that, among others, there were differences in the scale of earnings management between the companies applying the Accounting Act and those applying the International Financial Reporting Standards.

Further studies connected to the estimation of accruals were conducted by Lizińska (2015) and Lizińska and Czapiewski (2016). Both papers attempted to determine whether companies launching initial public offering (IPO) were at the same time managing earnings. The first study examined companies launching IPOs on developed and developing markets in the years 2005–2011. The second focused on companies from nonfinancial sectors launching IPOs on the WSE in years 1998–2013. Both studies demonstrated that earnings management took place during issuance periods.

The third group of studies pertaining to the Polish capital market comprises works which attempt to identify real activities manipulation. Three empirical studies should be mentioned here. The first of them was carried out by Kałdoński and Jewartowski (2017). The research examined the potential connection between equity overvaluation and various types of earnings management (both accrual- and real-based).The research sample consisted of 356 nonfinancial joint-stock companies listed on the WSE in the period 2005–2015. The results indicated that the overvaluation of equity led to the intensification of accrual-based activities, but did not induce real-based activities.

In another research (Kałdoński & Jewartowski, 2018) the same authors tried to find out whether there was a relationship between institutional ownership stability and the level of both real and accrual-based earnings management. The research, performed on a sample of 217 companies (1204 observations) listed on the WSE in the period 2007–2016, showed that such a relationship existed, but only with regard to real activities manipulation.

The most recent research investigating real activities manipulation was carried out by Kałdoński, Jewartowski and Mizerka (in press). The aim of their study

was to determine whether institutional ownership stability influences the use of real-based activities. The research sample consisted of 1204 observations of non-financial joint-stock companies listed on the WSE in the period 2007–2016. The research demonstrated that the presence of institutional investors considerably limited real earnings management, especially in the case of firms whose managers were pressurised by capital market forces to "meet or beat" earnings targets. The opposite situation took place in companies whose managers were protected from the capital market pressure.

The literature review of empirical research pertaining to the Polish capital market yielded some interesting results. The vast majority of the presented studies employed the method of analysing the distribution of companies' financial results. Only a few of the above-mentioned works attempted to identify real and accrual-based earnings management on the Polish capital market.

EARNINGS MANAGEMENT AND COMPANIES' FINANCIAL CONDITION

Earlier literature dealing with the relationship between the financial condition of companies and real earnings management is rather limited. The first paper on this subject, authored by Charitou, Lambertides and Trigeorgis (2007a), presented a study based on a research sample of 455 US companies that went bankrupt between the years 1986–2001, and the same number of companies in good financial condition. The results showed that earnings management occurred a year before filing for bankruptcy, and that companies manipulated mainly current accruals.

The same authors extended their analysis to another study (Charitou, Lambertides & Trigeorgis, 2007b). The research sample was made up of 859 companies that went bankrupt in the years 1986–2004. The aim of the study was to identify the motivation behind the managements' decisions to use earnings management. The results showed that what had a big impact on such decisions were the opinions of statutory auditors, but they also depended on the companies' ownership structure.

Further study on the relationship between companies' financial condition and earnings management was conducted by García Lara, Osma and Neophytou (2009). The study examined 268 British companies that went bankrupt in the years 1998–2004. Its results demonstrated that companies which filed for bankruptcy also undertook earnings management activities. Such activities were observed even as early as four years before the bankruptcy. The managements tried to hide the deteriorating financial condition of their companies, and they engaged in both accrual-based earnings management and real activities manipulation.

A similar study was carried out for the New Zealand market (Habib, Uddin Bhuiyan & Islam, 2013). The research sample consisted of 767 companies ob-

served for a year, in the period 2000–2011. The results confirmed the findings of other studies on this subject, namely that managements of companies at risk of bankruptcy manage earnings. The study also indicated that the global economic crisis had a considerable impact on managements' decisions.

Campa and Camacho-Miñano's analysis (2015) also explored the relationship between companies' financial condition and the use of real activities manipulation. The authors attempted to find out which tools for earnings management were used by the managements of companies at risk of bankruptcy. The research sample consisted of 362 companies that went bankrupt in Spain. According to the results, these companies indeed engaged in earnings management. If a company was in poor financial condition, the management was more likely to use real activities manipulation. It was not checked, however, whether the intensity of these activities depended on the business profile of a given company.

The literature review of the relationship between the financial condition of a company and earnings management showed that all the studies pertaining to this issue were comparing a group of companies that went bankrupt with companies in good financial condition. The analyses, then, concerned only the two extreme situations a company can experience. Therefore, the author decided to conduct an empirical study in which an intermediate situation is being considered, namely, he posed a question whether there was any relationship between companies' deteriorating financial condition and the decisions to employ earnings management.

METHODOLOGY

According to literature, earnings management results in cash flow and discretionary expenses lower than expected for a given sales volume, as well as surprisingly high production costs. In order to estimate the values that are regarded as typical or expected, Roychowdhury's (2006) methodology was used. The following model was adopted to estimate the normal level of cash flow:

$$
\frac{CFO_{it}}{ASSETS_{it-1}} = \alpha + \beta_{1t}\left(\frac{1}{ASSETS_{it-1}}\right) + \beta_{2t}\left(\frac{SALES_{it}}{ASSETS_{it-1}}\right) + \beta_{3t}\left(\frac{\Delta SALES_{it}}{ASSETS_{it-1}}\right) + \\ + \varepsilon_{it} \quad (1)
$$

where:
CFO_{it} — cash flow from operations in period t,
$ASSETS_{it-1}$ — total assets at the end of period $t-1$,
$SALES_{it}$ — sales during period t,
$\Delta SALES_{it} = SALES_{it} - SALES_{it-1}$.

There is a linear relationship between the level of cash flow from operating activities, estimated in the above-mentioned way, and the revenues and their change. The level of abnormal cash flow (*Abnormal CFO*) for each company and studied year is the difference between the actual level of cash flow and the one estimated following the above model. An indicator of earnings manipulation in companies in poor financial condition is a lower level of abnormal cash flow than in companies in good financial condition.

As mentioned above, overproduction in a company results in the level of production costs higher than expected. According to Roychowdhury (2006), production costs are the sum of the cost of goods sold and the change in the inventory. The normal level of production costs was estimated according to the model below:

$$
\begin{aligned}
\frac{PROD_{it}}{ASSETS_{it-1}} = \alpha + \beta_{1t}\left(\frac{1}{ASSETS_{it-1}}\right) + \beta_{2t}\left(\frac{SALES_{it}}{ASSETS_{it-1}}\right) + \\
+ \beta_{3t}\left(\frac{\Delta SALES_{it}}{ASSETS_{it-1}}\right) + \beta_{4t}\left(\frac{\Delta SALES_{it-1}}{ASSETS_{it-1}}\right) + \varepsilon_{it}
\end{aligned}
\tag{2}
$$

where:
PROD$_{it}$ – production costs in period *t,*
ASSETS$_{it-1}$ – total assets at the end of period *t* – 1,
SALES$_{it}$ – sales during period *t,*
$\Delta SALES_{it} = SALES_{it} - SALES_{it-1}$,
$\Delta SALES_{it-1} = SALES_{it-2} - SALES_{it-1}$.

Therefore, the level of production costs depends on revenues and changes in them over time. The level of abnormal production costs (*Abnormal PROD*) for each company and studied year is the difference between the actual production costs and their estimation obtained following the above model. The indicator of earnings manipulation in companies in poor financial condition is a higher level of abnormal production costs than in companies in good financial condition.

As stated in the introduction, the reduction of discretionary expenses in a company results in their abnormal, lower than expected, level. According to the methodology used in this study, discretionary expenses depend on the level of revenues, which can be described by the model below:

$$
\frac{DISEXP_{it}}{ASSETS_{it-1}} = \alpha + \beta_{1t}\left(\frac{1}{ASSETS_{it-1}}\right) + \beta_{2t}\left(\frac{SALES_{it-1}}{ASSETS_{it-1}}\right) + \varepsilon_{it}
\tag{3}
$$

where:
DISEXP$_{it}$ – discretionary expenses in period *t,*
ASSETS$_{it-1}$ – total assets at the end of period *t* – 1,
SALES$_{it-1}$ – sales during period *t* – 1.

The level of abnormal discretionary expenses (*Abnormal DISEXP*) for each company and studied year was estimated as the difference between the actual level of discretionary expenses and their calculation based on the model. As in the case of cash flow, the indicator of earnings manipulation in companies in poor financial condition is a lower value of abnormal discretionary expenses than in companies in good financial condition. The presented models (1)–(3) were estimated separately with the use of the ordinary least squares method for each combination of business activity and studied year.

The main aim of this paper is to determine whether joint-stock companies in poor financial condition undertake real activities manipulation to manage earnings. To define the financial condition of a company in every studied year, a composite measure was used (Panek, 2009). The following financial indicators[1] (with preferred value range for nominants[2]) were used to create the measure:

- return on assets;
- return on equity;
- quick ratio (0.8–1.2);
- cash flow liquidity (0.1–0.2);
- receivables turnover ratio (7–17);
- inventory turnover (7–17);
- debt ratio (0.57–0.60).

After converting all the above indicators to stimulants, their values were normalized using the zero unitarisation method[3], thanks to which they assumed non-negative values. Next, a composite measure was calculated as the arithmetic mean of the standardised values. The values of the measure reflected the financial condition of studied companies (measure referred to as *CONDITION*).

An adequate research sample was essential to estimate models (1)–(3). The database of the Notoria Serwis company was used for this purpose. The research examined yearly financial statements of companies operating in the years 1998–2016 in six business fields (the fields with the strongest representation on the WSE):

- food;
- construction;
- IT;
- real estate;
- textiles and cosmetics;
- mechanical and electrical engineering.

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[1] Coefficients of variation for all variables were higher than 50%.

[2] Based on financial literature.

[3] It was assumed that profitability ratios are stimulants while the others are nominants.

The study examined companies with financial data available for at least two consecutive years, and those years for which the data of at least 15 companies was available were analysed. Taking all the above into account, the author managed to gather the following numbers of company-year observations: 1669 for the first model (1), 1383 for the second model (2), and 1493 for the third model (3). To eliminate all outliers, all financial data were winsorized at the 5th and 95th percentile.

As mentioned above, companies in poor financial condition using real activities manipulation were expected to demonstrate a lower level of abnormal cash flow and discretionary expenses than companies in good financial condition, and the opposite results were anticipated in the case of abnormal production costs. To prove the above assertion, the following panel data models were estimated:

$$
Y_{it} = \alpha + \beta_1 CONDITION_{it} + \beta_2 SIZE_{it} + \beta_3 LEV_{it} + \\
+ \beta_4 GROWTH_{it} + \beta_5 EISSUE_{it} + \beta_6 DISSUE_{it} + \varepsilon_{it}
$$

(4)

where:

Y – *Abnormal CFO, Abnormal PROD or Abnormal DISEXP*,
CONDITION$_{it}$ – composite measure (financial condition*)* at the end of period *t*,
SIZE$_{it}$ – natural logarithm of total assets at the end of period *t*,
LEV$_{it}$ – leverage measured as total liabilities over total equity at the end of period *t*,
GROWTH$_{it}$ – annual change in net sales,
EISSUE$_{it}$ – annual change in shareholder equity,
DISSUE$_{it}$ – annual change in liabilities.

Abnormal cash flow, discretionary expenses and production costs estimated with the use of (1)–(3) models served as dependent variables in the estimated panel models. Apart from the independent variable showing the financial condition of companies (*CONDITION$_{it}$*), control variables (following earlier literature, e.g. Campa, 2015; Haga et al., 2018) were introduced to the models, because previous studies showed that their level may significantly impact the scope of earnings management activities in a company. Therefore, the following additional variables were introduced to the model: the size of a company (Park & Shin, 2004), leverage (Dechow, Sloan & Sweeney, 1995), growth of sales volume (Carey & Simnett, 2006) and the way of financing (Shan, Taylor & Walter, 2010).

RESULTS

Firstly, the strength of the correlation between all the variables of the model (4) was analysed. Table 1 presents the Pearson correlation coefficients for all analysed variables.

TABLE 1. PEARSON CORRELATION MATRIX

Variable	Abnormal CFO	Abnormal PROD	Abnormal DISEXP	SIZE	LEV	GROWTH	EISSUE	DISSUE	CONDITION
Abnormal CFO	1.00	–0.09	0.03	0.00	–0.03	0.00	0.01	–0.47	0.13
Abnormal PROD	–0.09	1.00	–0.02	–0.04	0.05	0.15	0.09	0.10	0.03
Abnormal DISEXP	0.03	–0.02	1.00	0.01	0.01	0.19	0.08	0.01	0.05
SIZE	0.00	–0.04	0.01	1.00	0.22	0.04	0.00	0.00	–0.02
LEV	–0.03	0.05	0.01	0.22	1.00	0.06	–0.04	0.00	–0.35
GROWTH	0.00	0.15	0.19	0.04	0.06	1.00	0.17	0.01	0.18
EISSUE	0.01	0.09	0.08	0.00	–0.04	0.17	1.00	0.03	0.12
DISSUE	–0.47	0.10	0.01	0.00	0.00	0.01	0.03	1.00	0.01
CONDITION	0.13	0.03	0.05	–0.02	–0.35	0.18	0.12	0.01	1.00

N o t e. Statistically significant coefficients are in italics.

S o u r c e: own calculation based on the Notoria Serwis database.

According to the results displayed in Table 1, the levels of abnormal cash flow (*Abnormal CFO*) and abnormal discretionary expenses (*Abnormal DISEXP)* have a positive correlation coefficient with the financial condition of companies. These correlations are statistically significant (at the significance level of 0.05). It means that the lower the value of the composite measure, the worse the financial condition of the studied companies, and the lower the level of abnormal cash flow and discretionary expenses. Therefore, as mentioned in the second section of the paper, in such cases the managements are likely to use real activities manipulation to manage earnings. In the case of the *Abnormal PROD* variable, a statistically significant correlation was not observed. Furthermore, the data presented in Table 1 indicates that the majority of control variables are strongly correlated with variables describing abnormal cash flow, discretionary expenses and production costs. For that reason, a correlation between the financial condition and the scale of earnings management of a company should be studied prior to the use of a multidimensional approach. Taking the results of Breusch-Pagan and Hausman tests into account, relevant panel data models (4) were estimated. The first model presents random effects, and the other two fixed effects. The results are presented in Tables 2–4.

In the case of the panel data model where the *Abnormal CFO* (Table 2) was the dependent variable, only three independent variables were statistically significant (at the significance level of 0.05). One of them was the variable reflecting the financial condition of the studied joint-stock companies, and, what is important, its parameter had a positive value. It means that companies in poor financial condition present a lower level of abnormal cash flow from operating activity (for a given sales volume) than companies in good financial condition. This indicates that the managements of those companies might manipulate sales volumes.

TABLE 2. PANEL DATA MODEL FOR A DEPENDENT VARIABLE *ABNORMAL CFO*

Specification	Coeff	Std. error	*t*-statistic	*p*-value
Const	−0.1300	0.0509	−2.557	0.011
CONDITION	0.3915	0.0999	3.915	0.000
SIZE	−0.0001	0.0031	−0.034	0.973
LEV	0.0046	0.0032	1.404	0.160
GROWTH	0.0001	0.0086	0.008	0.994
EISSUE	0.0010	0.0015	0.651	0.515
DISSUE	−0.0036	0.0002	−23.180	0.000
Mean dependent var.	−0.003			
Sum squared resid.	19.422			
Log-likelihood	1348.284			
Schwarz criterion	−2644.627			
S.D. dependent var.	0.124			
S.E. of regression	0.108			
Akaike criterion	−2682.567			
Hannan-Quinn	−2668.509			
Breusch-Pagan test	302.021			0.000
Hausman test	11.647			0.070

S o u r c e: as in Table 1.

In the model where the *Abnormal PROD* was a dependent variable (Table 3), four variables were statistically significant (at the significance level of 0.05). These were the variables reflecting the financial condition of a company, the leverage and the growth of sales volume. Moreover, the sign of the parameter for the financial condition variable suggests that the level of production costs is lower for companies in poor financial condition. It is not an indicator of earnings management in a company.

TABLE 3. PANEL DATA MODEL FOR A DEPENDENT VARIABLE *ABNORMAL PROD*

Specification	Coeff	Std. error	*t*-statistic	*p*-value
Const	−1.1531	0.3878	−2.974	0.003
CONDITION	1.6233	0.5135	3.161	0.002
SIZE	0.0304	0.0271	1.257	0.209
LEV	0.0533	0.0186	2.864	0.004
GROWTH	0.1835	0.0429	4.272	0.000
EISSUE	0.0053	0.0077	0.680	0.497
DISSUE	−0.0321	0.0183	−1.752	0.080
Mean dependent var.	0.033			
Sum squared resid.	200.608			
LSDV R-squared	0.294			
LSDV F(174, 1494)	3.133			
Log-likelihood	−627.341			
Schwarz criterion	2433.499			
S.D. dependent var.	0.453			
S.E. of regression	0.406			
Within R-squared	0.034			
p-value (*F*)	0.000			
Akaike criterion	1580.681			
Hannan-Quinn	1899.678			

S o u r c e: as in Table 1.

The analysis of the results of the panel data model in which the *Abnormal DISEXP* was the dependent variable (Table 4) showed that six variables were statistically significant (at the significance level of 0.1). One of them was the variable reflecting the financial condition of the studied joint-stock companies. A positive value of the parameter for this variable means that the level of discretionary expenses is lower for companies in poor financial condition. It indicates that their managements might have reduced the level of these expenses to manage earnings.

TABLE 4. PANEL DATA MODEL FOR A DEPENDENT VARIABLE *ABNORMAL DISEXP*

Specification	Coeff	Std. error	*t*-statistic	*p*-value
Const	−0.4927	0.1068	−4.615	0.000
CONDITION	0.2682	0.1465	1.831	0.067
SIZE	0.0215	0.0071	3.020	0.003
LEV	0.0084	0.0051	1.653	0.099
GROWTH	0.1153	0.0118	9.776	0.000
EISSUE	0.0036	0.0021	1.764	0.078
DISSUE	0.0001	0.0002	0.579	0.562
Mean dependent var.	0.009			
Sum squared resid.	21.008			
LSDV R-squared	0.525			
LSDV F(174, 1494)	9.145			
Log-likelihood	1065.552			
Schwarz criterion	−947.011			
S.D. dependent var.	0.172			
S.E. of regression	0.126			
Within R- squared	0.093			
p-value (*F*)	0.000			
Akaike criterion	−1807.103			
Hannan-Quinn	−1486.624			

S o u r c e: as in Table 1.

Another aim of this paper is to investigate the potential relationship between the scope of real activities manipulation and business fields in which the studied joint-stock companies were operating. Panel data models (Table 4) for each business field were estimated for that purpose. As a result, 24 panel data models were created. As in the case of the previous models, the results of the Breusch-Pagan and Hausman tests were taken into account here. Due to the large number of models, Table 5 presents only the information on parameter values for each business activity and the three dependent variables.

The analysis of the results of the panel data models connected with abnormal cash flow (Table 5) indicates that the parameter for the *CONDITION* variable had a positive value and was statistically significant for three business fields: food, construction, and textiles and cosmetics. For the IT, mechanical and electrical engineering and real estate sectors, the parameter did not statistically sig-

nificantly differ from zero. There were no indicators of sales volume manipulation in any of these three business fields.

In the case of the panel data models where the level of *Abnormal PROD* was a dependent variable (Table 5), the financial *CONDITION* variable was statistically significant for the IT, textiles and cosmetics and the mechanical and electrical engineering sectors, but the parameter had a negative value only for the mechanical and electrical engineering sector. This might indicate that earnings management activities were undertaken by managements in the latter sector. Interestingly, the analysis for all the examined companies studied as a group did not yield similar results.

TABLE 5. PANEL DATA MODELS FOR EACH BUSINESS ACTIVITY AND A DEPENDENT VARIABLES *ABNORMAL CFO*, *ABNORMAL PROD* AND *ABNORMAL DISEXP*

Specification	Food	Construction	IT	Textiles and cosmetics	Mechanical and electrical engineering	Real estate
ABNORMAL CFO						
Const	–0.306**	–0.058	–0.276*	0.194	0.007	–0.204
CONDITION	0.534***	0.333*	0.527	0.496*	0.118	0.099
SIZE	0.013*	–0.005	0.007	–0.028*	0.002	0.018
LEV	0.009	–0.002	0.019	0.005	0.005	–0.020**
GROWTH	–0.002	–0.008	–0.041	–0.006	–0.013	–0.007
EISSUE	–0.009	–0.006	0.034***	0.003	–0.008	–0.028***
DISSUE	–0.029***	0.014	0.009	–0.007	0.003	–0.004***
Model	random effects			fixed effects		
ABNORMAL PROD						
Const	–0.566*	0.571	–10.264***	–1.087***	0.664**	1.866***
CONDITION	–0.082	–0.023	8.420***	1.314**	–1.452***	–0.142
SIZE	0.042*	–0.068***	0.613***	0.038	–0.022	–0.141***
LEV	0.022*	0.042**	0.096	0.003	–0.008	–0.015
GROWTH	–0.006	0.089*	0.731**	0.109**	0.009	0.037
EISSUE	0.020*	0.093***	–0.170	0.001	0.039**	0.015**
DISSUE	0.025	0.054**	–0.161**	0.089***	0.028*	0.039*
Model	fixed effects			fixed effects		
ABNORMAL DISEXP						
Const	–0.172	–0.048	–0.767***	–1.484***	–0.141*	0.287***
CONDITION	–0.307	–0.135	0.027	–0.168	0.028*	–0.071
SIZE	0.004	0.003	0.051**	0.103***	0.006	–0.020***
LEV	0.025***	–0.012***	–0.009	0.019	–0.007	–0.004
GROWTH	0.027	0.037***	–0.043	0.230***	0.036***	0.022***
EISSUE	0.066***	–0.001	0.055***	–0.021***	0.006	0.000
DISSUE	0.078***	0.025***	0.124***	0.062***	0.022***	0.000**
Model	random effects		fixed effects	random effects		fixed effects

N o t e. Variable is significant at the level of: * $\alpha = 0.1$, ** $\alpha = 0.05$, *** $\alpha = 0.01$.

S o u r c e: as in Table 1.

With regard to the panel data models in which the *Abnormal DISEXP* variable was a dependent variable (Table 7), the parameter had a positive value and was statistically significant only for the mechanical and electrical engineering sector. This indicates that earnings management could have occurred only in that sector. The results suggest that discretionary expenses might have been intentionally reduced there to achieve certain financial results.

CONCLUSIONS

The study examined non-financial joint-stock companies listed on the Warsaw Stock Exchange in the years 1998–2016. The results show that managers of joint-stock companies in poor financial condition operating in Poland use real activities manipulation to manage earnings. They manipulate the sales volume and reduce the level of discretionary expenses.

The scope of actions undertaken to manage earnings depends on the type of business activity. The manipulation of sales volume was observed in the manufacturing sector, while the reduction of discretionary expenses and overproduction in the mechanical and electrical engineering sector.

This empirical analysis should be continued in two directions. Firstly, it should attempt to identify and characterise companies that are likely to be involved in earnings management. Secondly, it should try to find out whether earnings manipulation influences the future financial condition and share quotes of a given company.

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