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EARNINGS MANAGEMENT IN ENTERPRISE – METHODOLOGICAL MEASUREMENT PROPOSAL

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1. Introduction

The company's financial result is a very complex economic and social category. It has various types, it is shaped by the diversified objectives of its creation and redistribution, multifarious conditions for the implementation of these objectives and inconclusive competences of the management. Its size is reflected in many documents of the company's financial statements – the value of net profit (loss) is therefore shown in the form of a specified increase in the value of total assets of an enterprise included in the balance sheet or as a separate category presented in the profit and loss account, cash flow statement and comprehensive income statement. All the financial result categories listed in mentioned documents have a different character, due to the manner of their presentation, usefulness and purpose.

Since the entering into contracts between an economic entity and its stakeholders is largely based on the analysis of economic data contained in the entity's financial statements, among managers there may be a special temptation to intentional "retouching" of the company's performance[2]. As the literature on the subject indicates, the area particularly exposed to this type of practice is the sphere of net financial result. It can be assumed that the indicated phenomenon, known as earnings management consists of two processes, namely: accrual-based earnings management and real earnings management. The first of them, with a strictly reporting dimension, can be equated with all accounting measures and activities aimed at achieving various goals of selected groups of company's stakeholders [see *inter alia*: Piosik 2016, pp. 22-40; Shi, Zhang 2011, pp. 814-815; Roonen, Yaari 2008]. In turn, the second one, more substantive in nature, can be attributed to the operational effects of the company's

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[2] These issues are described in more detail in the chapter 2.

business activity e.g. in the sphere of manipulation of the volume of sales of products and services, costs of goods sold or discretionary expenses [Roychowdhury 2006, pp. 335-370].

The main goal of this section is to examine the scale and differentiation of earnings management methods implemented by listed industrial enterprises listed on the Warsaw Stock Exchange, computed by a different total earnings management indicator (*TOTAL_EM*). This is a relatively innovative approach, as numerous empirical studies referring to the subject matter relate either to the assessment accrual-based earnings management, or to estimation real earnings management in public companies. Despite the fact, that the attempts to empirically use the indicator of overall earnings management are indeed illustrated in selected articles on the subject matter, researchers present different views as to the ways to distinguish them, methods of calculation, etc. In some approaches total earnings management phenomenon is calculated as a dummy captures the combined effects of accrual-based and real earnings management, which occurs only when the level of both sub-categories of earnings management is above the industry average [Braam et al. 2015, p. 15; Jang, Lee 2017, pp. 6-47]. Whereas other theorists criticize this method claiming, that total earnings management may not be as significant as researchers would expect, because managers may use real activities manipulation in the opposite direction than accrual-based earnings management [Chen 2009, p.6]. Therefore, the secondary objective of the chapter is to examine the relations between the two mentioned sub-categories of intentional shaping of the financial result in Polish listed companies.

2. Earnings management – outline of the problem

Definition, dimensions and premises for earnings management

In economics and management sciences, a broad spectrum of theoretical conditions relating to the issue of earnings management is emphasized. Probably the theory most often quoted in the subject literature as the basis for the analysis of potential reasons for the implementation of activities in the field of earnings management is the agency theory. According to its assumptions, numerous business conflicts related to the separation of ownership and management may appear in the business entity. It is underlined that managers (agents) have a broader knowledge of enterprises they manage than their owners and can use it in pursuit of their own goals, often contrary to the interests of their principals [Jensen, Mechling 1976, pp. 305-360]. The problem of the determinants of intentional shaping of the company's financial result can also be found in the analyzes concerning, among others: the issue of moral hazard or the phenomenon of adverse selection. It is also considered from the perspective of the theory of property rights, which focuses on the need to delegate shareholders' rights to managers in the company, which in practice reduces its

shareholders to the position of specific capital donors (despite the fact that they have a real impact on the choice of managers) [Mirrlees 1999, pp. 2-3; Dąbrowski, Stanek 2015, pp. 70-83].

In general meaning, earnings management concerns the ability to use accounting procedures (or real operations) that allow to make distortion in company's profitability. Thus, one of the basic principles of accounting, postulating compliance with a faithful and reliable picture of the data presented in the company's financial statements, is broken. However, this is a multidimensional phenomenon and difficult to clearly explain. This can be proved by the fact that over the years researchers have evolved several definitions of earnings management, reflecting different points of view and explaining this phenomenon in distinct paths. A closer description of earnings management requires a separate look at its two main components, namely: accrual-based earnings management and real earnings management.

As has already been mentioned, accrual-earnings management is "the process of taking deliberate steps within the constraints of generally accepted accounting principles to bring about a desired level of reported earnings" [Davidson et al. 1987, by: Schipper 1989, pp. 91-92]. While the presented definition of the analyzed phenomenon takes on a neutral character, many researchers in the subject present a rather restrictive approach in characterizing accrual-based earnings management. For example, Beattie et. al. [1994, p. 793] consider it to be "artificial earnings management, which encompasses both changes in accounting methods and classificatory choice". In turn, according to Healy and Wahlen [1999, pp. 365-383] accrual-earnings management "occurs when managers use judgment in financial reporting and in structuring transactions to alter financial reports to either mislead some stakeholders about the underlying economic performance of the company or to influence contractual outcomes that depend on reported accounting numbers". These authors emphasize pernicious (harmful) character and perceive earnings management in relatively negative way. On the other hand, Ronen and Yaari [2008, pp. 25-28] notice that earnings management can enhance the transparency of reports and takes the shape of taking advantage of the flexibility in the choice of accounting treatment to signal the manager's private information on future cash flows. Similarly, Sankar and Subramanyam [2001, pp. 365-386] note that it involves the use of discretion in financial reporting and (in the case of having more detailed information than other stakeholders) with the transfer of information relevant to the value of the enterprise and future cash flows. Generally, beneficial or neutral approach from the perspective of intentional shaping of the entity's financial result assumes the use of activities referred to as creative accounting. The applied "innovations" in the methods of calculating the amounts presented in the financial statements will be within the limits set by the accounting standards, and therefore they will be (consistent with the law) creative use of specific accounting techniques that will allow to measure in

accordance with the interest of the "information producer". On the other hand, adherents of the pernicious earnings management concept believe that these actions stand on the side of aggressive accounting that is against the law and aimed at deliberately misleading users of the balance sheet, profits and losses statements etc. The presented terminological approach clearly indicates that accrual-based earnings management can be interpreted in various perspectives.

The situation is slightly different from the point of view of real earnings management. This phenomenon is referred as deviating from normal business practices to manipulate reported income. Additionaly, Zhang [2012, pp. 675-703] indicates that "real activities manipulation is a purposeful action to alter reported earnings in a particular direction, which is achieved by changing the timing or structuring of an operation, investment, or financing transaction, and which as suboptimal business consequences". In fact, from the perspective of real earnings management to "classic" techniques of manipulation of the company's net financial result can be included [Gunny 2005, pp. 5-10; Roychowdhury 2006, pp. 335-370]: unusual (unprecedented in previous reference periods) reduction of the SG&A expenses or expenditure on research and development; intensification of sales of non-current assets at the moment when the level of operating profit is below the forecasted value (even at less favorable prices); increase in sales at the end of the period resulting either from offering abnormal price discounts on manufactured goods, or from the adoption of non-standard (usually very liberal) policies for granting trade credit; overproduction and the use of defensive stock management strategies; limiting any investments in the components of the company's fixed assets and striving to minimize the amortization and depreciation costs.

Eventually, it should be pointed out that activities that fall under the real earnings management concept are clearly differentiated from earnings management practices based on solutions that use flexibility in the selection of accounting policies. Their characteristic feature is more difficult and more cost-intensive implementation (in relation to accrual-based earnings management practices based on accounting estimates and creative accounting) and more frequent negative consequences of realizing these practices (interference in the adopted sales policy and change in the management strategy of property components not directly related to the market conditions of these transformations, regardless of the effect achieved, directly affects the entity in subsequent periods).

Models used for measurement of earnings management

The most commonly used tools for estimating the phenomenon of earnings management are econometric models. They are successfully used in analytical procedures, thanks to which it becomes possible to confirm the rationality of the amounts included in the financial report of an examined enterprise. These models

differ in their nature depending on the variant of earnings management whose scope they estimate.

The interpretation and assessment of the scale of the accrual-based earnings management significantly depend on the ability to accurately separate the accrual adjustments of net profit, taking into account both operating (non-discretionary) and intentional (discretionary) accruals [Dechow, Skinner 2000, pp. 235-250; Comporek 2017, pp. 17-31]. In the assumption, non-discretionary accruals (*NDACC*) refer to the economic operations actually occurring in an enterprise in given financial year, which from the point of view of accounting principles can be included as one of the following items: amortization and depreciation, exchange gains (losses), interest and profit sharing, profit (loss) on investment activities or changes in provisions, inventories, receivables, short-term liabilities excluding credits and loans, prepayments etc. In turn, the value of discretionary accruals (*DACC*) do not depend on the nature of pre-economic operations, presenting a summary entirety of subjective accounting choices aimed at lowering the transparency of financial statements.

To implement the research objective of this study, in order to assess the degree of accrual-based earnings management was used the original version of the Jones model, which is also the basis for modern analyzes of the described phenomenon. The Jones model assumes that the value of operational accruals is determined by two variables: change in sales revenues *(*ΔREV) and average value of property, plant and equipment (*PPE*) [Jones 1991, pp. 193-228]. Whereas, the value of intentional accruals is based on the difference between the empirical and theoretical value of total accruals (*TACC*)[3] as the explained variable. For the sake of comparability of data, the model should be standardized using the value of lagged total assets. Consequently, formula of the Jones Model takes the final form as below:

$$\frac{TACC_{i,t}}{TA_{i,t-1}} = \alpha_1 \left(\frac{1}{TA_{i,t-1}}\right) + \alpha_2 \left(\frac{\Delta REV_{i,t}}{TA_{i,t-1}}\right) + \alpha_3 \left(\frac{PPE_{i,t}}{TA_{i,t-1}}\right) + \varepsilon_{i,t}$$

where: $\Delta REV_{i,t}$ indicates a change in sales revenues of company i in year t; $PPE_{i,t}$ points out gross property, plant and equipment of company i in year t; $a_i, i = 0,1, \dots, k$ are specific regression parameters while $\varepsilon_{i,t}$ denotes error term in regression model.

And at the same time the value of $\varepsilon_{i,t}$ forms the essential basis for the assessment of direction and range of accrual-based earnings management ($\varepsilon_{i,t}$ = *DACC* = *ACC_EM*) in analyzed company:

[3] The amount of total accruals *TACC* is the difference between the net income in a given year computed by using an accrual-based accounting system and the surplus in cash from operating activities.

$$ACC\_EM = \frac{TACC_{i,t}}{TA_{i,t-1}} - \left[\alpha_1\left(\frac{1}{TA_{i,t-1}}\right) + \alpha_2\left(\frac{REV_{i,t}}{TA_{i,t-1}}\right) + \alpha_3\left(\frac{PPE_{i,t}}{TA_{i,t-1}}\right)\right]$$

It is worth mentioning that over the years there have appeared further transformations of the Jones Model. In their analytical formulas, these models take into account other variables that explain the value of total accruals (*TACC*), while their use in the scope of earnings management predictions remains unchanged [Table 1].

Table 1. Models for extracting individual categories of accrual-based earnings management

Reference to the literature	**Calculation formulas based on regression models**
Dechow, Sloan, Sweeney (1995).	$\frac{TACC_t}{TA_{t-1}} = \alpha_1\left(\frac{1}{TA_{t-1}}\right) + \alpha_2\left(\frac{\Delta REV_t - \Delta REC_t}{TA_{t-1}}\right) + \alpha_3\left(\frac{PPE_t}{TA_{t-1}}\right) + \varepsilon_t$
Kothari, Leone, Wasley (2005)	$\frac{TACC_t}{TA_{t-1}} = \alpha_0 + \alpha_1\left(\frac{1}{TA_{t-1}}\right) + \alpha_2\left(\frac{\Delta REV_t}{TA_{t-1}}\right) + \alpha_3\left(\frac{PPE_t}{TA_{t-1}}\right) + \alpha_4 ROA_t + \varepsilon_t$
Kasznik (1999)	$\frac{TACC_t}{TA_{t-1}} = \alpha_1\left(\frac{1}{TA_{t-1}}\right) + \alpha_2\left(\frac{\Delta REV_t}{TA_{t-1}}\right) + \alpha_3\left(\frac{PPE_t}{TA_{t-1}}\right) + \alpha_4\left(\frac{\Delta OCF_t}{TA_{t-1}}\right) + \varepsilon_t$
Yoon, Miller, Jiraporn (2006)	$\frac{TACC_t}{REV_t} = \alpha_1\left(\frac{\Delta REV_t - \Delta REC_t}{REV_t}\right) + \alpha_2\left(\frac{\Delta EXP_t - \Delta PAY_t}{REV_t}\right) + \alpha_3\left(\frac{\Delta DEP_t - \Delta RET_t}{TA_{t-1}}\right) + \varepsilon_t$

where:

- ΔREC_t – increase in short-term receivables in the year *t*;
- ROA_t – Return On Assets coefficient in the year *t*;
- EXP_t – sum of cost of goods sold and selling and general administrative expenses excluding non-cash expenses in the year *t*;
- ΔOCF_t – increase in cash flow from operations in the year *t*;
- ΔDEP_t – increase in depreciation and amortization in the year *t*;
- ΔPAY_t – increase in short-term payables in the year *t*;

other designations – as above.

Source: own study based on: Dechow et al. 1995; Kothari et al. 2005; Kasznik 1999; Yoon et al. 2006.

Diagnostic imaging of the size and extent of abnormal deviations from the normal economic events of enterprise (which may indicate the potential implementation of practices related to real profit management) was carried out using three econometric models, more widely exposed, among others in the works: Dechow et al. 1998, pp. 133-168; Braam et al. 2015, pp. 111-141; Cohen et al. 2008, pp. 757-787; Roychowdhury 2006, pp. 335-370]. These models allowed to distinguish the following economic measures describing the scale of intentional shaping of the financial result of an economic entity through real earnings management:

- abnormal level of cash flow from operations (*OCF_EM*), whose value represents the residual component of the model describing the shaping of operational cash flows using such exogenous variables as: sales revenues and change in sales revenues. It can be represented by the equation:

$$\frac{OCF_{i,t}}{TA_{i,t-1}} = \alpha_1\left(\frac{1}{TA_{i,t-1}}\right) + \alpha_2\left(\frac{REV_{i,t}}{TA_{i,t-1}}\right) + \alpha_3\left(\frac{\Delta REV_{i,t}}{TA_{i,t-1}}\right) + \varepsilon_{i,t}$$

  where: $OCF_{i,t}$ – operating cash flows of company *i* in year *t*; other designations – as above.

  Considering the fact, that $\varepsilon_{i,t}$ sets the value of earnings management (in this case $\varepsilon_{i,t} = OCF\_EM$), it is noticeable that:

$$OCF\_EM_{i,t} = \frac{OCF_{i,t}}{TA_{i,t-1}} - \left[\alpha_1\left(\frac{1}{TA_{i,t-1}}\right) + \alpha_2\left(\frac{REV_{i,t}}{TA_{i,t-1}}\right) + \alpha_3\left(\frac{\Delta REV_{i,t}}{TA_{i,t-1}}\right)\right]$$

- abnormal level of production cost (*PROD_EM*), estimating by using the following regression model:

$$\frac{PROD_{i,t}}{TA_{i,t-1}} = \alpha_0 + \alpha_1\left(\frac{1}{TA_{i,t-1}}\right) + \alpha_2\left(\frac{REV_{i,t}}{TA_{i,t-1}}\right) + \alpha_3\left(\frac{\Delta REV_{i,t}}{TA_{i,t-1}}\right) + \alpha_4\left(\frac{\Delta REV_{i,t-1}}{TA_{i,t-1}}\right) + \varepsilon_{i,t}$$

  where: $PROD_{i,t}$ – production costs (including: cost of goods sold and value of goods and materials sold at purchase prices increased by a change in inventories) of company *i* in year *t*; other designations – as above.
  Similarly as in the case of the *ACC_EM* or *OCF_EM* indicators, the value of abnormal levels of production cost (*PROD_EM*) reflects the value of the residual component of the analyzed regression model. It can therefore be seen that:

$$PROD\_EM_{i,t} = \frac{PROD_{i,t}}{TA_{i,t-1}} - \left[\alpha_0 + \alpha_1\left(\frac{1}{TA_{i,t-1}}\right) + \alpha_2\left(\frac{REV_{i,t}}{TA_{i,t-1}}\right) + \alpha_3\left(\frac{\Delta REV_{i,t}}{TA_{i,t-1}}\right) + \alpha_4\left(\frac{\Delta REV_{i,t-1}}{TA_{i,t-1}}\right)\right]$$

- abnormal level of discretionary expenses (*DISC_EM*), calculated as the difference between the forecasted value and the actual value of discretionary costs of the enterprise scaled with the average value of total assets from the previous period:

$$\frac{DISC_{i,t}}{TA_{i,t-1}} = \alpha_1\left(\frac{1}{TA_{i,t-1}}\right) + \alpha_2\left(\frac{\Delta REV_{i,t}}{TA_{i,t-1}}\right) + \alpha_3\left(\frac{REV_{i,t}}{TA_{i,t-1}}\right) + \varepsilon_{i,t}$$

where: $DISC_{i,t}$ – discretionary expenses (equated with: sales costs, general and administrative expenses and research and development expenditures) of company *i* in year *t*; other designations – as above.

At the same time:

$$DISC\_EM_{i,t} = \frac{DISC_{i,t}}{TA_{i,t-1}} - \left[\alpha_1\left(\frac{1}{TA_{i,t-1}}\right) + \alpha_2\left(\frac{\Delta REV_{i,t}}{TA_{i,t-1}}\right) + \alpha_3\left(\frac{REV_{i,t}}{TA_{i,t-1}}\right)\right]$$

Because, according to the theoretical assumptions, the real earnings management is evaluated in three dimensions, for the final prediction of activities that deviate from normal business practices can be used the total real earnings management indicator (*REAL_EM*). Its value is the sum of: abnormal level of cash flow from operations (*OCF_EM*), abnormal level of production cost (*PROD_EM*) and abnormal level of discretionary expenses (*DISC_EM*), as shown below:

$$REAL\_EM = OCF\_EM + PROD\_EM + DISC\_EM$$

Going further, it is also possible to distinguish the total earnings management indicator (*TOTAL_EM*). Its value will be shaped by the value of the discretionary accruals (*DACC = ACC_EM*) (reference to accral-based earnings management) and the total real earnings management indicator (*REAL_EM*) described above. In conclusion, the following equation can be obtained that can be the reference for the estimation of intentional shaping of the financial result in the enterprise:

$$TOTAL\_EM = ACC\_EM + REAL\_EM$$
$$= ACC\_EM + (OCF\_EM + PROD\_EM + DISC\_EM)$$

From an interpretative point of view, the scale of the implemented phenomenon of earnings management in company will be demonstrated by the deviations in plus or in minus the values of analyzed indicators from zero. This note applies to both the *TOTAL_EM* indicator and its individual sub-components.

3. Research methodology

Empirical research has been carried out among industrial public companies listed in the Warsaw Stock Exchange that shares have been traded for at least thirteen years with the 2003-2017 reference horizon. Additionally, sample selection was based on the criteria as following:

- the fiscal year of firm should be end up to 31 December;
- examined companies do not conduct business activity in the finance and insurance sectors;
- all of financial required data must be available.

Consequently, the study was investigated within 78 listed companies that provided precisely a sample of 1109 observations. Empirical research based on financial information taken from the Notoria Service database.

4. Empirical results

The first step of evaluation of research aptitude of selected econometric models used for prediction of earnings management was associated with assessment the structure of industrial companies listed on the Warsaw Stock Exchange from the perspective of implemented strategies of intentional shaping of net profit (loss) in the period 2003-2017. The analysis of empirical studies shows that in the reference horizon, the percentage of enterprises exhibiting positive and negative values of *TOTAL_EM* indicator was very similar (Figure 1). The majority of the surveyed population was dominated by those economic entities that showed positive values of the real earnings management (*REAL_EM*) with simultaneous negative values of the accrual-based earnings management (*ACC_EM*) (these entities accounted for over 20 percent of the total examined population).

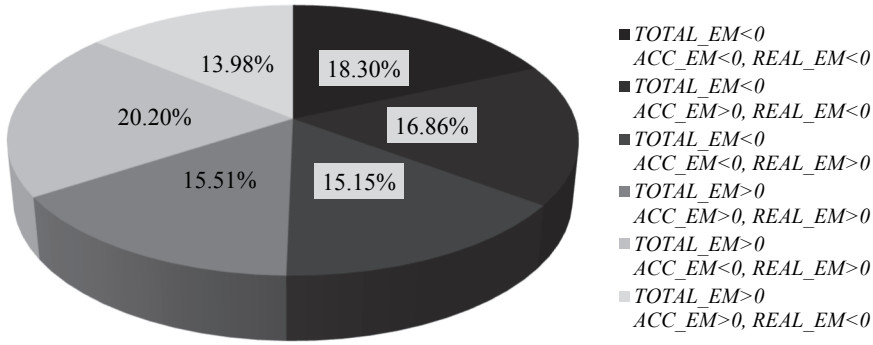

Fig. 1. The structure of industrial listed companies based on the achieved annual values of the total earnings management indicator (*TOTAL_EM*) in the period 2003-2017
Source: own study based on financial information from the Notoria Service database.

Subsequently, empirical examinations have been focused around the values of correlations calculated by Pearson correlation coefficient. This measure was used to compute the intensity and direction of relationships between: total earnings management (*TOTAL_EM*), accrual-bases earnings management (*ACC_EM*) and real earnings management (*REAL_EM*) indicators. The results of the correlation analysis carried out for all analyzed listed companies indicate that the relations between *TOTAL_EM* indicator and its two mains subcomponents (*ACC_EM* and *REAL_EM*)

have similar strength[4] (see Table 2). However, in the first case there was reported clear linear correlations (the strength of the relationship between *TOTAL_EM* and *ACC_EM*, measured by the Pearson's linear correlation coefficient, was 37.8 percent), while in the case of the second of relationship (*TOTAL_EM* and *REAL_EM*) there was noticed moderate correlation with a strength of 42.7 percent. Also noteworthy is moderate, but negative correlation between accounting earnings management and real earnings management measures.

Table 2. Relationship between individual categories of earnings management in industrial listed companies by using Pearson linear correlation coefficient

Category of earnings management	*TOTAL_EM*	*ACC_EM*	*REAL_EM*
TOTAL_EM	1.000		
ACC_EM	**0.378****	1.000	
REAL_EM	**0.427****	**-0.410****	1
** significant correlation at p-value = 0.01			

Source: own study based on financial information from the Notoria Service database.

The presented results of empirical research on the mean values of the total earnings management indicator (*TACC_EM*) in industrial enterprises listed on the Warsaw Stock Exchange for the period of fifteen consecutive years (2003-2017) indicate the existence of very diversified in terms of directions and value of changes in this coefficient (Table 3 and Table 4). In general terms, it is difficult to observe some trend from the point of view of shaping the mean values of the analyzed measure *TACC_EM*. However, high values of standard deviation show that the values of the *TOTAL_EM* variable are strongly dispersed around the average (and therefore they are characterized by high diversity). In the six analyzed periods, the TOTAL-EM index in most statistical units was lower than the arithmetic mean, which confirms the right-sided distribution asymmetry. At the same time, left-sided asymmetrical distribution could be observed.

[4] In this section the following interpretation of calculated correlation coefficients should be adopted, namely:
- $r = 0$ – no correlation,
- $0 < |r| < 0.2$ – practically no linear correlation between the examined variables,
- $0.2 \leq |r| < 0.4$ – linear correlation clear, but low,
- $0.4 \leq |r| < 0.7$ – moderate correlation,
- $0.7 \leq |r| < 0.9$ – significant correlation,
- $|r| \geq 0.9$ – correlation very strong,
- $|r| = 1$ – full correlation [Ostasiewicz et al. 2001, p. 311].

Table 3. Descriptive statistics of the total earnings management indicator (*TOTAL_EM*) in industrial listed companies in individual years of the period 2003-2017

Year	Statistical measure				
	mean value	*median*	*min*	*max*	*standard deviation*
2003	-0.0022	-0.0192	-0.1783	0.4474	0.1034
2004	0.0138	-0.0067	-0.2151	0.7497	0.1383
2005	-0.0036	0.0053	-0.5801	0.4640	0.1352
2006	0.0073	-0.0013	-0.4196	0.5849	0.1197
2007	0.0188	0.0071	-0.3056	0.5056	0.1046
2008	0.0323	0.0247	-0.2183	0.3817	0.0974
2009	-0.0147	-0.0115	-0.3031	0.3613	0.1036
2010	-0.0023	0.0007	-0.4452	0.4488	0.1174
2011	-0.0189	-0.0013	-0.5209	0.2300	0.1142
2012	-0.0168	-0.0101	-0.3907	0.2183	0.1006
2013	0.0082	0.0180	-0.3241	0.3689	0.0982
2014	0.0074	0.0164	-0.3061	0.1677	0.0773
2015	0.0010	-0.0064	-0.3548	0.7269	0.1314
2016	-0.0209	-0.0101	-0.6937	0.3483	0.1283
2017	-0.0279	-0.0152	-0.9304	0.4829	0.1613

Source: own study based on financial information from the Notoria Service database.

Table 4. Mean values of selected indicators used for examining the earnings management phenomenon in industrial listed companies from the perspective of individual years of the period 2003-2017

Year	Category of earnings management					
	TOTAL_EM	*ACC_EM*	*REAL_EM*	*Subcomponents of real earnings management*		
				OCF_EM	*PROD_EM*	*DISC_EM*
2003	-0.0022	-0.0369	0.0361	0.0162	-0.0110	0.0309
2004	0.0138	-0.0097	0.0241	0.0090	-0.0094	0.0245
2005	-0.0036	0.0242	-0.0268	-0.0156	0.0018	-0.0130
2006	0.0073	-0.0037	0.0107	0.0013	0.0103	-0.0009
2007	0.0188	0.0286	-0.0101	-0.0161	0.0098	-0.0038
2008	0.0323	0.0293	0.0038	-0.0023	0.0092	-0.0032
2009	-0.0147	-0.0033	-0.0122	-0.0055	-0.0071	0.0003
2010	-0.0023	-0.0153	0.0130	0.0142	-0.0053	0.0042
2011	-0.0189	-0.0037	-0.0151	-0.0176	-0.0021	0.0046
2012	-0.0168	-0.0136	-0.0038	-0.0033	0.0041	-0.0046
2013	0.0082	-0.0027	0.0106	-0.0095	0.0237	-0.0036
2014	0.0074	-0.0036	0.0101	0.0094	0.0098	-0.0091
2015	0.0010	-0.0161	0.0170	0.0152	0.0066	-0.0048
2016	-0.0209	-0.0229	0.0005	0.0128	-0.0104	-0.0019
2017	-0.0279	-0.0089	-0.0199	0.0124	-0.0364	0.0041

Source: own study based on financial information from the Notoria Service database.

However, similar reference should be given to the results of the analysis of the average values of individual components shaping the final value of the *TACC_EM* indicator. From the perspective of accrual-based earnings management (*ACC_EM* measure) as well as real earnings management (*REAL_EM* indicator and its individual components: *OCF_EM, PROD_EM* and *DISC_EM* measures) very different average values of all six economic measures illustrating the scale and directions of earnings management in business entities have been observed. This may indicate a high flexibility of enterprises in the selection of diversified tools for the purposeful and deliberate influencing of the reported net profit (loss).

The results of research obtained and illustrated in Figure 5 and Table 6 underline that the estimated average values of total earnings management indicator (*TOTAL_EM*) vary considerably depending on the sector in which the economic activity is carried out. Based on the analysis of the mean 15-year values of the *TOTAL_EM* measure, it can be concluded that in the: building materials, electro-mechanical and metal industries positive average 15-year values of this measure were recorded. On the other hand, negative 15-year average values of the analyzed indicator were characteristic for enterprises operating in the following branches of industry, namely: automotive, chemistry, food, fuel, light, pharmaceutical, plastics, raw materials and wood industries. Particularly noteworthy are the very high deviations from zero of the 15-year average values of the *TOTAL_EM* variable, calculated for the enterprises of the fuel (-0.039) and pharmaceutical (-0.024) industries. From the point of view of the general surveyed companies, the average 15-year value of *TOTAL_EM* indicator was slightly negative (-0.001).

Table 5. Descriptive statistics of 15-years sectoral values of the total earnings management indicator (*TOTAL_EM*) computed for industrial listed companies in the period 2003-2017

Branch of industry	**Statistical measure**				
	mean value	*median*	*min*	*max*	*standard deviation*
automotive	-0.0053	-0.0037	-0.3548	0.1998	0.0733
biulding materials	0.0100	0.0053	-0.4452	0.7497	0.1198
chemistry	-0.0017	-0.0050	-0.3907	0.7269	0.1648
electromechanical	0.0005	0.0050	-0.4196	0.3483	0.0996
food	-0.0030	-0.0040	-0.6937	0.5056	0.1303
fuel	-0.0386	-0.0474	-0.5209	0.5320	0.2078
light	-0.0044	-0.0031	-0.3241	0.2691	0.0831
metal	0.0067	0.0051	-0.2381	0.2775	0.0879
pharmaceutical	-0.0243	0.0096	-0.9304	0.3051	0.1877
plastics	-0.0009	-0.0122	-0.5801	0.5849	0.1360
raw materials	-0.0015	-0.0008	-0.2091	0.2183	0.1169
wood	-0.0057	-0.0162	-0.3056	0.2588	0.0782
total industrial companies	-0.0011	-0.0008	-0.9304	0.7497	0.1180

Source: own study based on financial information from the Notoria Service database.

Proportionally to the changes of the mean 15-year values of the total earnings management indicator *TOTAL_EM* in examined population there are noticeable some sector deviations from the values of: accrual-based earnings management (*ACC_EM*) and real earnings management (*REAL_EM*) indicators (Table 6). Again, they are characteristic of companies belonging to the group of pharmaceutical industry (very low average value of *ACC_EM* measure on the level of -0.31) and fuel industry (very low mean value of *REAL_EM* indicator equals to -0.39, explained by significant deviations of *DISC_EM* value from zero). In general, taking into account the shaping of the average 15-year values of the *REAL_EM* subcomponents, it should be underlined that industrial enterprises in a much lesser extent have shaped the level of net profit (loss) through overproduction (*PROD_EM*), and in a larger one through sales manipulation (*OCF_EM*) and reducing of research and development expenditure, advertising expenses, maintenance cost etc. (*DISC_EM*). Especially in the area of *TOTAL_EM*, *ACC_EM* and *REAL_EM* indicators, significant sectoral fluctuations in these measures are noticeable, which leads to the presumption that the scope and specifics of intentional shaping of the financial result through earnings management phenomenon take on diverse character in particular industries.

Table 6. Mean sectoral 15-years values of selected indicators used for examining of earnings management phenomenon in industrial listed companies in the period 2003-2017

Branch of industry	**Category of earnings management**					
	TOTAL_EM	*ACC_EM*	*REAL_EM*	*Subcomponents of real earnings management*		
				OCF_EM	*PROD_EM*	*DISC_EM*
automotive	-0.0053	-0.0061	0.0009	-0.0003	0.0000	0.0012
biulding materials	0.0100	-0.0003	0.0103	-0.0003	0.0093	0.0013
chemistry	-0.0017	-0.0059	0.0036	0.0111	-0.0074	-0.0001
elektromechanical	0.0005	0.0063	-0.0057	0.0031	0.0015	0.0017
food	-0.0030	-0.0061	0.0031	0.0009	-0.0033	0.0055
fuel	-0.0386	-0.0022	-0.0364	-0.0002	0.0000	-0.0362
light	-0.0044	-0.0025	-0.0019	-0.0024	0.0000	0.0005
metal	0.0067	0.0052	0.0013	-0.0005	0.0000	0.0019
pharmaceutical	-0.0243	-0.0308	0.0065	0.0061	0.0000	0.0004
plastics	-0.0009	-0.0024	0.0015	0.0010	-0.0007	0.0012
raw materials	-0.0015	0.0030	-0.0045	-0.0058	0.0000	0.0013
wood	-0.0057	-0.0025	-0.0032	-0.0030	0.0000	-0.0002
total industrial companies	**-0.0011**	**-0.0034**	**0.0021**	**0.0010**	**0.0004**	**0.0008**

Source: own study based on financial information from the Notoria Service database.

5. Limitations of the study

The fundamental limitations in the unambiguous analysis of the results of empirical research are based on the fact that researchers present different views to the possibility of harmonizing (with accounting standards) what should be measured and how it should be measured in the specific circumstances of the country and/or enterprise. Nowadays, the phenomenon of earnings management can be treated as an accounting category, and yet the measurement made within the scope of business accounting is not uniquely objective [Neal 2001, p. 4]. It is not possible to develop a narrow set of rules that are good enough to ensure the comparability of financial statements of enterprises from different parts of the world [Kutera et al. 2006, p. 27]. For example, discretionary expenses used to assess one of the indicators of real earnings management (namely: *DISC_EM*) have no equivalent in the guidelines of the Polish Accounting Act or IAS; To their group are usually classifies: sales costs, general administrative expenses (referred to as costs of the period) as well as expenditures on research and development. Because in the case of Polish legislative conditions, information on the costs of the last mentioned group is possibly shown in Notes[5] (differently than in the financial statements prepared in accordance with the US GAAP assumptions in which R & D expenditures are one of main items of the profit and loss account), their designation may become problematic. A similar example can be considered in the field of accrual-based earnings management. In numerous studies devoted to the issue under discussion, the category of total accruals (*TACC*) is determined in a variety of ways, i.e. using differentiated models, taking into account both the balance sheet categories and the items taken directly from the cash flow statement [see: Sloan 1996, pp. 289-315; Hribar, Collins 2002, pp. 107-109; Richardson et al. 2005, pp. 437-485]. The mentioned discrepancy in the recognition of absolute values of the total accruals may lead to fundamental disproportions within the estimated values of discretionary accruals (*DACC)*, and thus – in an erroneous estimation of the size of earnings management in the enterprise.

Another discussion area seems to be the excessive dependence of models used to assess the scale of earnings management from the category of sales revenues. Of course, the analysis of techniques used by business units within accounting earnings management allows to distinguish a wide group of activities that allow manipulation of the value of reported sales revenues. However, the importance of "embellishing" financial statements by manipulating the value of costs (e.g. by: improper costs, creation of fictitious provisions/reserves, impairment allowances for assets) has been slightly marginalized. From the perspective of real earnings management, basing the analytical formulas of econometric models on the sales revenue category can be

[5] The part of financial statements containing additional information and explanations for financial statements.

explained by the fact that production can be considered only as a means of achieving the financial objectives of business entities and should be subordinated to the sales opportunities, while the financial standing of the company is largely shaped by the degree of adjustment of the production program to the market demand.

It is worth noting that the assessment of the real earnings management seems to be accompanied by a lower risk of detecting the "intentionality" of the harmful operations undertaken within company's environment. Accounting practices used in the process of accrual-based earnings management are described in domestic and international regulations regarding financial reporting of business entities, and their implementation may be subject to more explicit control and verification. Assuming, in turn, that the changes in the field of production and sales are the result of the ability of enterprise to respond quickly and adequately to the changing economic reality, requirements of the labor market and the needs of stakeholders of the business unit, the question arises: does the *REAL_EM* coefficient uniquely highlight abnormal deviations from typical business activities motivated by the private benefits of the management staff? Or it can be understood as a specific expression of the elasticity of the production to the nature of the demand shown, the specificity of technical and processes, competition on the market, financial standing of the enterprise etc.?

It should also be pointed out that the regression models used to determine both the scale of accrual-based earnings management and real earnings management are characterized by a variable goodness-of-fit to empirical data in hand in relation to individual enterprises. However, this is a characteristic feature of the majority of studies using econometric models in their analyzes.

6. Conclusions

Among the wide range of information used by investors, the most important are those that are contained in the financial statements of the company. They are the final product of business accounting, while their quality strictly depends to a large extent on the credibility of the data exposed.

As economic practice confirms, companies decide to implement earnings management practices for a variety of reasons, such as: persuading business partners about their credibility, avoiding the effects of shareholder control, subduing the achievements of the managerial staff, gaining access to additional sources of capital, etc. However, it is also noticed that using selected econometric models it may be possible to estimate the scale and scope of these operations carried out by managerial staff in host entities.

The results of empirical research presented in the chapter confirmed the main assumption that in industrial companies listed on the Warsaw Stock Exchange there is significant diversification in the scope and characteristics of operations aimed at

intentional shaping of the financial result through earnings management. The cross-sectoral analysis of the average values of discretionary accruals (*DACC*) extracting by the Jones Model or individual subcomponents of real earnings management (*OCF_EM, PROD_EM, DISC_EM*) have shown that in individual branches of industry the spectrum of implemented earnings management operations was clearly divergent, potentially reaching the largest range in public enterprises conducting their manufacturing activity in fuel sector (clear deviations from the sectoral average values of *REAL_EM* and *DISC_EM* indexes) and pharmaceutical industry (significantly more extensive impact of accounting earnings management than in other sectors). At the same time, on the basis of the conducted research, it can be stated that in surveyed companies, the smallest influence on the estimated practices in the field of real earnings management had manipulation of production costs (described by the *PROD_EM* indicator).

It should be also clearly emphasized that the presented research results do not aspire to generalize the assessment of earnings management processes in industrial joint-stock companies. First of all, they contain partial results, which in the longer term should be extended to a wider group of examined enterprises. Secondly, it should be noted that earnings management processes (especially the real type) are difficult to unequivocally assess, not only of a quantitative nature.

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